

# Commonwealth

ACTUARIAL VALUATION REPORT

JANUARY 1, 2005

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION  
COMMONWEALTH OF MASSACHUSETTS



# COMMONWEALTH ACTUARIAL VALUATION REPORT

January 1, 2005

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# I. INTRODUCTION & CERTIFICATION

This report presents the results of the actuarial valuation of the pension benefits that are the obligation of the Commonwealth of Massachusetts as follows:

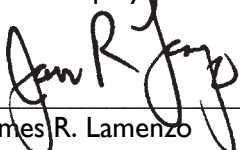
- State Employees Retirement System
- State Teachers' Retirement System
- Boston Teachers
- Cost of Living Allowance Reimbursements to Local Systems

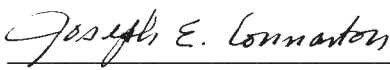
The valuation was performed as of January 1, 2005 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts, and is based on the plan provisions in effect at that time. The actuarial assumptions used to calculate the accrued liability and the normal cost are the same as the assumptions we used in our January 1, 2004 actuarial valuation and reflect the experience analysis we conducted in 2000.

This valuation is based on member data as of December 31, 2004, which was supplied by the Boston, State, and State Teachers' Retirement Boards. We performed a number of tests on the data to ensure reasonableness and made specific assumptions for a number of State Teacher data items. Asset information as of December 31, 2004 was provided by the Pension Reserves Investment Management Board and by the Boston Retirement Board in its 2004 Annual Statement of Financial Condition. We reviewed both the membership data and financial information for reasonableness but we did not audit this information.

We believe this report represents an accurate appraisal of the actuarial status of the Commonwealth's total pension obligation performed in accordance with generally accepted actuarial principles and practices relating to pension plans. In our opinion, the actuarial assumptions used in this report are reasonable, are related to plan experience and expectations, and represent our best estimate of anticipated experience.

Respectfully submitted,  
Public Employee Retirement Administration Commission

  
\_\_\_\_\_  
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*Member of the American Academy of Actuaries*  
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\_\_\_\_\_  
Joseph E. Connarton  
*Executive Director*

Dated: September 22, 2005

## 2. EXECUTIVE SUMMARY

### PART A | PRINCIPAL VALUATION RESULTS

Section 22C of G.L. c. 32 mandates the establishment of a funding schedule for the Commonwealth of Massachusetts pension obligation. The schedule, as mandated by law, calls for payment of the Normal Cost plus an amortization payment on the Unfunded Actuarial Liability. The provisions of Chapter 32, Section 22C require amortization payments such that the Unfunded Actuarial Liability (UAL) is reduced to 0 by June 30, 2023. Under the current schedule, the amortization payments to eliminate the UAL increase by 4.5% per year.

The results of the January 1, 2005 actuarial valuation are as follows (in thousands):

Total Normal Cost	\$1,063,124
Expected Employee Contributions	<u>805,292</u>
Net Normal Cost	<u>\$257,832</u>

Total Actuarial Liability	\$48,357,694
Assets	<u>34,938,529</u>
Unfunded Actuarial Liability	<u>\$13,419,165</u>

## 2. EXECUTIVE SUMMARY *(continued)*

### PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS

A comparison of the current valuation and the January 1, 2004 valuation is shown below.  
(\$000's omitted)

	1/1/05	1/1/04	Increase (Decrease)	Increase (Decrease)
Total Normal Cost	\$1,063,124	\$1,026,624	\$36,500	3.6%
Expected Employee Contributions	<u>805,292</u>	<u>778,284</u>	<u>27,008</u>	3.5%
Net Normal Cost	<u>\$257,832</u>	<u>\$248,340</u>	<u>\$9,492</u>	3.8%
Actuarial Liability				
Actives	\$24,911,255	\$24,478,858	\$432,397	1.8%
Retirees and Inactives	<u>23,446,439</u>	<u>21,580,351</u>	<u>1,866,088</u>	8.6%
Total	\$48,357,694	\$46,059,209	\$2,298,485	5.0%
Assets	<u>34,938,529</u>	<u>34,045,177</u>	<u>893,352</u>	2.6%
Unfunded Actuarial Liability	<u>\$13,419,165</u>	<u>\$12,014,032</u>	<u>\$1,405,133</u>	11.7%
Funded Ratio	72.3%	73.9%	(1.6%)	

The January 1, 2005 valuation results reflect the fifth year of the revised actuarial assumptions determined as part of our Experience Study Analysis reports we completed for the State Retirement System and State Teachers' Retirement System in 2000. PERAC is performing its second Experience Study Analysis for these systems in 2005. We expect to release our results by early 2006. Any assumption changes due to the experience study will first be reflected in the January 1, 2006 actuarial valuation.

The development of the actuarial gain/(loss) is shown on page 9. During 2004, there was an overall actuarial loss of \$1.2 billion. There was a non-investment gain on actuarial liability of approximately \$163 million and a loss on assets (on an actuarial value basis) of \$1.4 billion. The return on assets was approximately 4.7% on an actuarial value basis, compared to 14.5% on a market value basis. The difference reflects the smoothing methodology and partial recognition of losses that were deferred in the prior valuation.

## 2. EXECUTIVE SUMMARY *(continued)*

### PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS *(continued)*

The development of the actuarial value of assets for the State and State Teachers' systems is shown on page 13. As of January 1, 2005, the actuarial value of assets is 98.4% of the market value. Under the corridor approach used in this valuation, the actuarial value of assets cannot be less than 85% nor greater than 115% of the market value. The January 1, 2005 actuarial value of assets is within this corridor. As of January 1, 2004 the calculated actuarial value was 107.4% of market value. For a comparison of the market and actuarial value of assets since 1997 see page 7.

We have detailed a number of the assumptions we made for missing or questionable data for active members of the Teachers' Retirement System in Section 7. We believe our data assumptions are conservative based on our detailed review and comparison of information provided to us. We believe the assumptions we have made provide reasonable valuation results on an overall basis for the Commonwealth.

During 2004 the Boston Teachers received a retroactive salary increase covering several years. The reported pay in this year's data was overstated due to the fact that the amount of the retroactive payment was included in that field. Based on the data provided, the increase in pay for continuing active members was over 10% of the prior year's pay. After additional information regarding negotiated contracts was provided, we estimated the regular compensation for 2004 to be about 7% greater than the 2004 compensation. We believe this estimate to be conservative.

As in past valuations, the assets allocated to Boston teachers are based on the allocation of the total accrued liability between Boston teachers and other members of the State-Boston Retirement System. If only the annuity savings fund and annuity reserve fund for Boston teachers were included as Commonwealth valuation assets, the overall Commonwealth unfunded liability would increase by approximately \$610 million and the overall funded ratio would decrease to 71.0%.

## 2. EXECUTIVE SUMMARY *(continued)*

### PART C | FUNDING PROGRESS

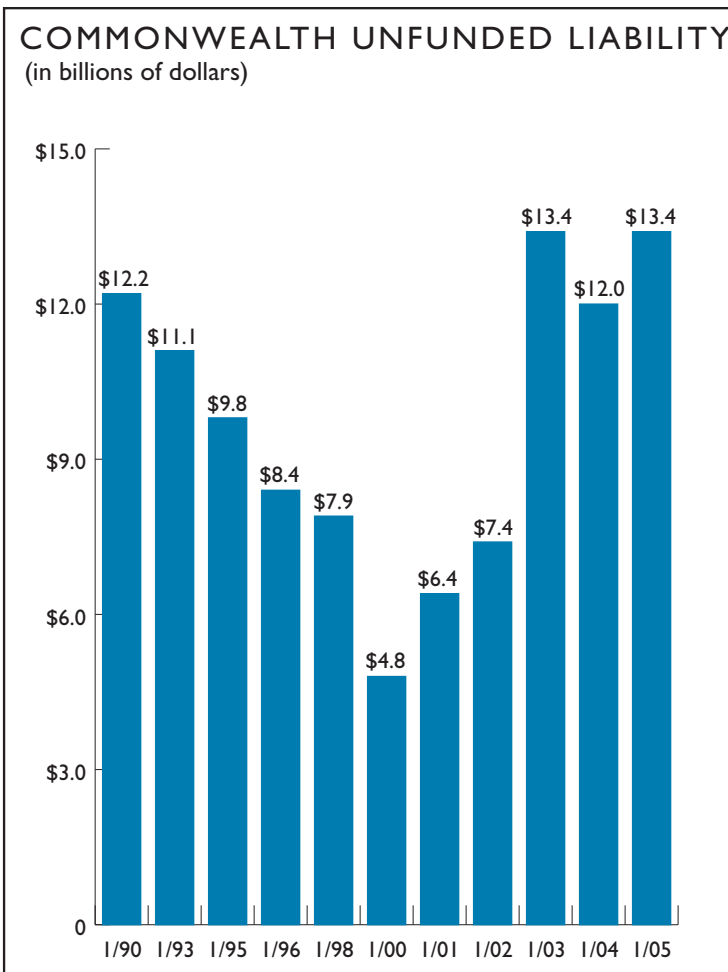
#### UNFUNDED LIABILITY

The chart below shows the Commonwealth's unfunded actuarial accrued liability (UAL) since 1990. The UAL represents the actuarial accrued liability less the actuarial value of plan assets. When there is no UAL, a system is said to be "fully funded".

The actuarial value of assets used to derive the UAL from January 1, 1990 to January 1, 1996 reflects the market value of plan assets. To reduce the potential volatility of the market value approach, in the January 1, 1998 actuarial valuation, we began implementing a method that averages realized and unrealized asset gains and losses over 5 years. Therefore, gains and losses in a given year are not fully reflected in the actuarial value of assets until 5 years later.

The chart below indicates the UAL, on an actuarial basis, increased from \$12.0 billion on 1/04 to \$13.4 billion on 1/05. (On a market value basis, the UAL decreased from \$14.3 billion on 1/04 to \$12.9 billion on 1/05.) From 1998 - 2001, the market value of assets exceeded the actuarial value of assets. Consequently, the unfunded liability on an actuarial value basis was greater than the unfunded liability on a market value basis. From 2002 - 2004, the market value of assets was less than the actuarial value of assets and, therefore, the UAL on an actuarial value basis was less than the UAL on a market value basis. For this valuation, the market

value of assets once again exceeds the actuarial value of assets (see page 7).





## 2. EXECUTIVE SUMMARY *(continued)*

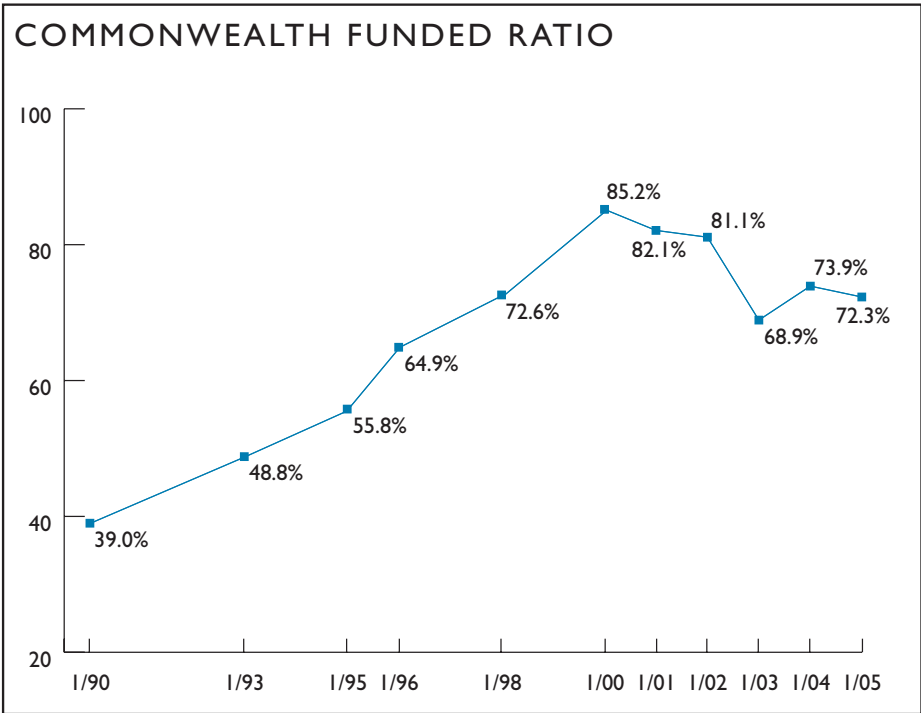
### PART C | FUNDING PROGRESS *(continued)*

#### FUNDED RATIO

The chart below shows the Commonwealth's funded ratio progress since 1990. The funded ratio represents the actuarial value of plan assets divided by the actuarial accrued liability. When the funded ratio reaches 100%, a system is said to be "fully funded".

The actuarial value of assets used to derive the funded ratio from January 1, 1990 to January 1, 1996 reflects the market value of plan assets. To reduce the potential volatility of the market value approach, in the January 1, 1998 actuarial valuation, we began implementing a methodology that averages realized and unrealized asset gains and losses over 5 years. Therefore, gains and losses in a given year are not fully reflected in the actuarial value of assets until 5 years later.

The chart below indicates the funded ratio on an actuarial basis slightly decreased from last year. (On a market value basis, the funded ratio increased from 68.8% to 73.4%.) From 1998 - 2001, the market value of assets exceeded the actuarial value of assets. Consequently, the funded ratio on an actuarial value basis was less than the funded ratio on a market value basis for those years. From 2002 - 2004, the market value of assets was less than the actuarial value of assets and, consequently, the funded ratio on an actuarial basis was greater than the funded ratio on a market value basis. For this valuation, the market value of assets once again exceeds the actuarial value of assets (see page 7).

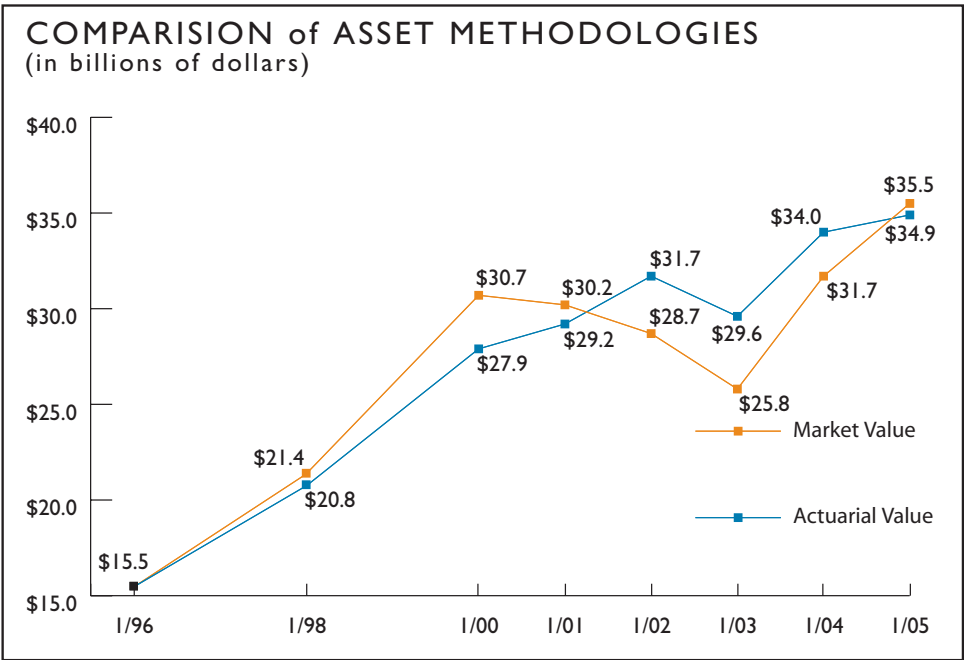


## 2. EXECUTIVE SUMMARY *(continued)*

### PART C | FUNDING PROGRESS *(continued)*

#### COMPARISON OF MARKET AND ACTUARIAL VALUE OF ASSETS

As part of the January 1, 1998 actuarial valuation, an actuarial value of assets methodology that smoothes investment gains and losses was adopted by the Commonwealth. Prior to 1998, the market value of assets was used in actuarial valuations. The goal of asset smoothing is to reduce the potential volatility of the market value approach. The actuarial method smoothes gains and losses over a 5-year period. Investment gains and losses are not fully realized until 5 years have elapsed. Therefore, in some years the actuarial value will be less than the market value, and in other years, it will exceed the market value.



### 3. SUMMARY OF VALUATION RESULTS

A. Number of Members	State	Teachers	Boston Teachers	COLA	Total
Active	81,682	88,027	5,780		175,489
Vested Terminated	3,033	N/A	183		3,216
Retired/ Beneficiaries	<u>50,907</u>	<u>42,164</u>	<u>3,155</u>		<u>96,226</u>
Total	135,622	130,191	9,118		274,931
<b>B. Total Payroll (\$000 omitted)</b>	<b>\$3,967,067</b>	<b>\$4,642,765</b>	<b>\$379,302</b>		<b>\$8,989,134</b>
<b>C. Normal Cost</b>					
Superannuation	\$343,408	\$450,267	\$36,331		\$830,006
Death	30,350	24,727	1,977		57,054
Disability	54,468	7,462	607		62,537
Termination	<u>50,366</u>	<u>58,649</u>	<u>4,512</u>		<u>113,527</u>
Total Normal Cost	\$478,592	\$541,105	\$43,427		\$1,063,124
Expected Employee Contributions	<u>326,443</u>	<u>443,317</u>	<u>35,532</u>		<u>805,292</u>
Net Employer Normal Cost	\$152,149	\$97,788	\$7,895		\$257,832
<b>D. Actuarial Liability</b>					
Active					
Superannuation	\$8,764,390	\$13,797,726	\$1,077,809		\$23,639,925
Death	249,959	188,009	15,588		453,556
Disability	273,657	72,948	6,036		352,641
Termination	<u>217,571</u>	<u>230,165</u>	<u>17,397</u>		<u>465,133</u>
Total Active	\$9,505,577	\$14,288,848	\$1,116,830		\$24,911,255
Vested Terminated (a)	328,789	400,000	29,300		758,089
Non-Vested Terminated	85,834	N/A	9,986		95,820
Retirees and Survivors	<u>9,655,138</u>	<u>11,477,827</u>	<u>984,565</u>	<u>475,000</u>	<u>22,592,530</u>
Total Actuarial Liability	\$19,575,338	\$26,166,675	\$2,140,681	\$475,000	\$48,357,694
<b>E. Actuarial Value of Assets</b>	<u>16,210,981</u>	<u>17,683,368</u>	<u>1,044,180</u>	0	<u>34,938,529</u>
<b>F. Unfunded Actuarial Liability</b>	<b>\$3,364,357</b>	<b>\$8,483,307</b>	<b>\$1,096,501</b>	<b>\$475,000</b>	<b>\$13,419,165</b>
<b>G. Funded Ratio: E/D</b>	<b>82.8%</b>	<b>67.6%</b>	<b>48.8%</b>	<b>0.0%</b>	<b>72.3%</b>

(a) State Teachers' amount is estimated and includes non-vested terminated members.

#### 4. DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS

(in millions)

	State	State Teachers	Boston Teachers	Local COLA	Total
1. Unfunded Actuarial Liability (UAL) 1/1/2004	3,065	7,445	982	522	12,014
2. Employer Normal Cost	140	101	8	0	249
3. Interest on (1) and (2) at 8.25%	264	623	82	43	1,012
4. Allocation of appropriation paid during 2004	335	575	72	43	1,025
5. Interest on (4) assuming mid-year payment	14	24	3	2	42
6. Expected UAL 1/05: (1)+(2)+(3)-(4)-(5)	3,121	7,570	996	520	12,206
7. UAL 1/1/05	3,364	8,483	1,097	475	13,419
8. Total gain/(loss): (6)-(7)	(243)	(913)	(101)	45	(1,213)

Note: Numbers may not add to totals due to rounding.

## 5. AUDIT INFORMATION

### PART A | OVERVIEW

We have included in this report the actuarial information required by GASB Statement No. 27. The Commonwealth of Massachusetts chose to begin implementing Statement No. 27 in Fiscal Year 1996.

Under GASB Statement No. 27, the calculation of an Annual Required Contribution (ARC) is required each year. This calculation is based on the same methods and assumptions as are applied in determining funding requirements, but with certain limiting parameters within which these methods and assumptions must fall. At this time, the methods and assumptions used by the Commonwealth to determine the funding schedule are well within the parameters established by Statement No. 27.

In order to calculate the ARC in the first year for which Statement No. 27 is in effect, a Net Pension Obligation (NPO) at transition must be calculated. This is essentially the cumulative difference between the employer's required contributions and the contributions actually made by the employer for all years beginning with Fiscal Year 1988.

As part of this valuation, we brought the NPO forward from FY04 to FY05. For FY05, in accordance with GASB Statement No. 27, amortization cost was determined on a schedule which is equivalent to that of the current schedule.

Note that, in any year, the amount of the ARC will not equal the Commonwealth's appropriation amounts because of the following:

1. The ARC is based upon the most recent valuation, whereas the funding schedule is generally submitted to the legislature 15 months after the valuation upon which it is based. The funding schedule is then set for the upcoming three fiscal years.
2. Amortization bases of actuarial gains and losses and plan amendments may be amortized on a different basis than the rest of the funding schedule. However, the amortization cost that GASB reflects is an amortization of the entire unfunded liability which is roughly equivalent to the current schedule.
3. Although there is no difference in the totals, contributions have been allocated slightly differently among the State and COLA portions. For purposes of Statement No. 27, a larger contribution was made to COLA, with lesser amounts to State. This was done so the NPO for the local COLA remains at zero. No assets are attributed to the local COLA.

## 5. AUDIT INFORMATION *(continued)*

### PART B | GASB STATEMENT NO. 27 (\$000's omitted)

	State	State Teachers	Boston Teachers	Local COLA	Total
I. Annual Required Contribution (ARC) for FY04					
Normal Cost	152,149	97,788	7,895	0	257,832
a. Amortization Cost	238,718	601,934	77,802	33,704	952,158
b. ARC: (a) + (b)	390,867	699,722	85,697	33,704	1,209,990
c.					
2. Amount under (over) funded from prior year (NPO)	(1,241,195)	(552,153)	95,480	0	(1,697,869)
3. Interest on NPO	(102,399)	(45,553)	7,877	0	(140,074)
4. Amortization of NPO	(88,069)	(39,178)	6,775	0	(120,472)
5. Pension Cost: (1c) + (3) – (4)	376,538	693,347	86,800	33,704	1,190,388
6. Actual Contribution *	415,296	682,000	86,000	33,704	1,217,000
7. (5) – (6)	(38,758)	11,347	800	0	(26,611)
8. Net Pension Obligation/(Asset): (2)+ (7)	(1,279,953)	(540,806)	96,279	0	(1,724,480)

\* allocation estimated

Figures may not add exactly due to rounding.

## 6. ASSETS

All figures are shown in thousands.

### PART A | STATE AND STATE TEACHERS' ASSET ALLOCATION

	State	State Teachers
Pension Reserves Investment Trust		
Market value	\$16,489,206	\$17,946,339
Actuarial value	\$16,210,981	\$17,683,368
Actuarial value as a percentage of market value	98.3%	98.5%

### PART B | BOSTON TEACHERS' ASSET ALLOCATION

For Boston Teachers, we assumed that the market value portion of total assets is allocated in the same proportion as shown in PERA's January 1, 1994 actuarial valuation report for the City of Boston. Assets were allocated to the teachers in the same proportion as the teachers' accrued liability compared to the system's total accrued liability at that time. Once the market value allocation is made, the actuarial value is determined based on the actuarial value as a percent of market value for the State and State Teachers' systems.

Total City of Boston assets (market value)	\$3,547,840
Assets allocated to Boston Teachers	
Market value (29.91% of City total)	\$1,061,159
Actuarial value (98.4% of market value)	\$1,044,180

## 6. ASSETS (continued)

### PART C | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

A. Development of 12/31/04 expected actuarial value of assets (AVA)	State	Teachers	Total
1. Market value (MV) 12/31/03	14,834,328	15,906,669	30,740,997
2. Actuarial value 12/31/03 (as calculated)	15,930,753	17,074,650	33,005,403
3. Employee contributions 2004 (estimated)	320,000	450,000	770,000
4. Employer contributions 2004 (estimated)	335,000	575,000	910,000
5. Benefit payments 2004 (estimated)	(1,035,000)	(1,150,000)	(2,185,000)
6. Expected investment return on (2): 0.0825x(2)	1,314,287	1,408,659	2,722,946
7. Expected investment return on (3)+(4)+(5): $\frac{1}{2} \times 0.0825 \times [(3)+(4)+(5)]$	(15,675)	(5,156)	(20,831)
8. Expected AVA 12/31/04: (2)+(3)+(4)+(5)+(6)+(7)	16,849,365	18,353,152	35,202,517
B. Previous differences not yet amortized			
1. Unrecognized amount of 12/31/03 difference			
a. .2 x 2000 gain/(loss)	(267,637)	(258,710)	(526,347)
b. .4 x 2001 gain/(loss)	(739,066)	(802,608)	(1,541,674)
c. .6 x 2002 gain/(loss)	(1,512,446)	(1,624,057)	(3,136,503)
d. .8 x 2003 gain/(loss)	<u>1,422,724</u>	<u>1,517,393</u>	<u>2,940,117</u>
e. Total	(1,096,425)	(1,167,981)	(2,264,407)
C. Gain/(loss) from 2004			
1. Market value 12/31/04	16,489,206	17,946,339	34,435,545
2. Expected market value 12/31/04: A(8)+B(1e)	15,752,940	17,185,171	32,938,111
3. Gain/ (loss) from 2004 investment: (1)-(2)	736,266	761,168	1,497,434
D. Development of AVA 12/31/04			
1. 2004 gain/(loss)	736,266	761,168	1,497,434
2. 2003 gain/(loss)	1,778,405	1,896,741	3,675,146
3. 2002 gain/(loss)	(2,520,744)	(2,706,761)	(5,227,505)
4. 2001 gain/(loss)	(1,847,665)	(2,006,520)	(3,854,185)
5. 2000 gain/(loss)	(1,338,185)	(1,293,548)	(2,631,733)
6. 20% of 2004 gain/(loss)	147,253	152,234	299,487
7. 20% of 2003 gain/(loss)	355,681	379,348	735,029
8. 20% of 2002 gain/(loss)	(504,149)	(541,352)	(1,045,501)
9. 20% of 2001 gain/(loss)	(369,533)	(401,304)	(770,837)
10. 20% of 2000 gain/(loss)	<u>(267,637)</u>	<u>(258,710)</u>	<u>(526,347)</u>
11. Total	(638,385)	(669,784)	(1,308,169)
12. Actuarial value 12/31/03: A8+D11	16,210,981	17,683,368	33,894,349
13. Percentage of market value	98.3%	98.5%	98.4%



## 7. SYSTEM MEMBERSHIP

### PART A | STATE ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the State Retirement System.

	Actives	Vested Terminations
Number of Members	81,682	3,033
Average Age	45.4	48.7
Average Service	12.1	15.2
Average Salary	\$48,567	\$48,997
Average Annuity Savings Fund Balance	\$40,429	\$48,767

### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	2,289	13						2,302
25 - 29	4,958	876	6					5,840
30 - 34	4,099	2,928	822	54				7,903
35 - 39	3,336	2,710	2,351	1,474	80			9,951
40 - 44	3,006	2,245	2,061	3,165	1,382	90		11,949
45 - 49	2,775	2,210	1,902	2,739	2,627	1,058	77	13,388
50 - 54	2,279	1,927	1,593	2,364	2,249	2,152	983	13,547
55 - 59	1,502	1,346	1,204	1,840	1,575	1,396	1,524	10,387
60 - 64	609	667	564	822	663	490	745	4,560
65+	208	267	225	256	197	171	531	1,855
Total	25,061	15,189	10,728	12,714	8,773	5,357	3,860	81,682

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART A | STATE ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	2,302	\$64,645,082	\$28,082
25 - 29	5,840	\$209,488,972	\$35,871
30 - 34	7,903	\$338,040,445	\$42,774
35 - 39	9,951	\$462,334,261	\$46,461
40 - 44	11,949	\$578,775,571	\$48,437
45 - 49	13,388	\$670,399,900	\$50,075
50 - 54	13,547	\$719,885,470	\$53,140
55 - 59	10,387	\$565,112,707	\$54,406
60 - 64	4,560	\$252,358,881	\$55,342
65+	1,855	\$106,025,415	\$57,157
Total	81,682	\$3,967,066,704	\$48,567

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART B | STATE RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	40,944	683	2,703	6,577	50,907
Average Age	71.3	66.3	62.4	74.3	71.2
Average Annual Benefit	\$21,817	\$14,294	\$27,151	\$10,312	\$20,513

### Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$143,666,036	\$1,110,527	\$3,740,850	\$9,086,891	\$157,604,304
Pension	\$749,609,333	\$8,652,474	\$69,648,163	\$58,736,998	\$886,646,968
Total	\$893,275,369	\$9,763,001	\$73,389,013	\$67,823,889	\$1,044,251,272

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART B | STATE RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	195	\$5,024,301	\$25,764
40 - 44	383	\$8,595,553	\$22,443
45 - 49	902	\$18,839,933	\$20,887
50 - 54	1,847	\$40,575,858	\$21,969
55 - 59	5,129	\$129,616,618	\$25,271
60 - 64	7,184	\$188,507,905	\$26,240
65 - 69	7,522	\$181,143,404	\$24,082
70 - 74	7,860	\$169,616,209	\$21,580
75 - 79	7,936	\$146,760,626	\$18,493
80 - 84	6,538	\$96,688,116	\$14,789
85 - 89	3,682	\$42,127,833	\$11,442
90+	1,729	\$16,755,186	\$9,691
Totals	50,907	\$1,044,251,272	\$20,513

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | STATE TEACHERS' ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the State Teachers' Retirement System (TRS).

We made several assumptions about missing, questionable or unavailable data. Since TRS did not provide credited service for most members, we estimated service based on the reported employment date (date of hire). For members whose reported adjusted employment date is before the employment date (18,000 members), we used the adjusted employment date to estimate service. It is not clear how we should estimate service for these members, so we have estimated service on a worst case basis. We plan to work with TRS over the coming year to better estimate service for these members.

The State Teachers' Retirement Board has indicated in past years that this date of hire represents the original date of hire/membership with the TRS. To the extent there are members with breaks in service, our methodology will overstate the plan's liability. For members with a questionable date of birth and/or date of hire, we assumed (based on credited service or date of birth) the member was hired at age 30 (or a younger age if the member is currently under 30).

The reported salary on the original data provided to us was significantly overstated. In the past TRS has expressed more confidence in the accuracy of the annuity savings fund contributions than the salary, so we recalculated each member's salary based on the employee contribution rate and the contributions during 2004. After performing this calculation several adjustments were made based on our experience with prior years' data and buyback issues. Members whose pay was less than \$5,000 were assumed to be inactive. For members with pay between \$5,000 and \$10,000, we used an estimated pay of \$20,000. For members with calculated pay over \$150,000 we compared this year's figure to the pay used in last year's valuation. We adjusted this year's figure if we believed it was overstated (typically due to a buyback during 2004).

Pay for all members hired in 2004 was annualized and determined in the same manner as above. We assumed a rate of pay of \$50,000 (the average of the rest of the group) for members hired toward the end of the year.

We could not determine the number of vested terminations and instead estimated a combined inactive (terminated vested plus terminated with an ASF balance) liability. This is the same methodology we used last year.

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | STATE TEACHERS' ACTIVE MEMBERS *(continued)*

	Actives
Number of Members	88,027
Average Age	44.7
Average Service	14.2
Average Salary	\$52,743
Average Annuity Savings Fund Balance	\$44,986

### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	2,397	2						2,399
25 - 29	8,239	1,463						9,702
30 - 34	4,872	5,169	994	2				11,037
35 - 39	2,841	3,062	2,311	603				8,817
40 - 44	2,652	2,070	1,311	2,101	455	2		8,591
45 - 49	2,440	2,276	1,333	1,791	1,913	1,046	3	10,802
50 - 54	1,962	2,045	1,544	1,886	1,473	4,619	3,890	17,419
55 - 59	907	1,000	875	1,421	804	1,392	8,563	14,962
60 - 64	249	271	253	457	295	326	1,863	3,714
65+	38	51	37	81	53	61	263	584
Total	26,597	17,409	8,658	8,342	4,993	7,446	14,582	88,027

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | STATE TEACHERS' ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	2,399	\$93,549,745	\$38,995
25 - 29	9,702	\$387,051,472	\$39,894
30 - 34	11,037	\$490,368,032	\$44,429
35 - 39	8,817	\$429,189,720	\$48,678
40 - 44	8,591	\$435,099,380	\$50,646
45 - 49	10,802	\$574,792,863	\$53,212
50 - 54	17,419	\$1,021,713,568	\$58,655
55 - 59	14,962	\$940,718,653	\$62,874
60 - 64	3,714	\$234,367,426	\$63,104
65+	584	\$35,913,959	\$61,497
Total	88,027	\$4,642,764,818	\$52,743

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART D | STATE TEACHERS' RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	38,152	471	301	3,240	42,164
Average Age	70.1	66.1	66.6	69.0	69.9
Average Annual Benefit	\$30,649	\$17,163	\$29,951	\$13,586	\$29,182

#### Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$130,602,485	\$461,031	\$256,034	\$2,381,131	\$133,700,681
Pension	\$1,038,707,444	\$7,622,921	\$8,759,251	\$41,637,765	\$1,096,727,381
Total	\$1,169,309,929	\$8,083,952	\$9,015,285	\$44,018,896	\$1,230,428,062



## 7. SYSTEM MEMBERSHIP *(continued)*

### PART D | STATE TEACHERS' RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	192	\$3,347,075	\$17,433
40 – 44	33	\$388,344	\$11,768
45 – 49	87	\$1,230,045	\$14,138
50 – 54	493	\$9,116,633	\$18,492
55 – 59	5,601	\$206,981,578	\$36,954
60 – 64	9,124	\$343,559,851	\$37,655
65 – 69	7,504	\$242,540,625	\$32,322
70 – 74	6,770	\$186,321,031	\$27,522
75 – 79	5,243	\$118,460,676	\$22,594
80 – 84	3,499	\$64,265,802	\$18,367
85 – 89	2,082	\$32,054,409	\$15,396
90+	1,536	\$22,161,993	\$14,428
Totals	42,164	\$1,230,428,062	\$29,182

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART E | BOSTON TEACHERS' ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the Boston Retirement System.

	Actives	Vested Terminations
Number of Members	5,780	183
Average Age	45.3	49.6
Average Service	14.1	19.7
Average Salary	\$65,623	\$55,110
Average Annuity Savings Fund Balance	\$56,130	\$49,921

### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	123	1						124
25 - 29	564	75	4					643
30 - 34	335	248	56	17				656
35 - 39	201	171	160	67	7			606
40 - 44	131	111	119	146	33	2		542
45 - 49	120	97	108	187	140	60	1	713
50 - 54	110	87	94	196	183	242	163	1,075
55 - 59	69	69	54	131	181	98	421	1,023
60 - 64	26	21	21	69	50	39	98	324
65+	1	2	8	14	14	14	21	74
Total	1,680	882	624	827	608	455	704	5,780

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART E | BOSTON TEACHERS' ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	124	\$5,626,854	\$45,378
25 - 29	643	\$32,137,567	\$49,981
30 - 34	656	\$37,158,920	\$56,645
35 - 39	606	\$37,346,880	\$61,629
40 - 44	542	\$34,508,373	\$63,669
45 - 49	713	\$48,400,167	\$67,882
50 - 54	1,075	\$78,491,202	\$73,015
55 - 59	1,023	\$76,442,515	\$74,724
60 - 64	324	\$23,900,929	\$73,768
65+	74	\$5,288,884	\$71,471
Total	5,780	\$379,302,292	\$65,623

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART F | BOSTON TEACHERS' RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	2,811	39	64	241	3,155
Average Age	70.6	64.2	68.6	72.6	70.6
Average Annual Benefit	\$36,060	\$18,552	\$30,612	\$13,874	\$34,038

#### Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$10,775,991	\$46,608	\$71,950	\$148,443	\$11,042,992
Pension	\$90,587,397	\$676,902	\$1,887,235	\$3,195,141	\$96,346,675
Total	\$101,363,388	\$723,510	\$1,959,185	\$3,343,584	\$107,389,667

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART F | BOSTON TEACHERS' RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	5	\$76,549	\$15,310
40 - 44	3	\$28,696	\$9,565
45 - 49	9	\$181,675	\$20,186
50 - 54	35	\$623,907	\$17,826
55 - 59	417	\$17,996,746	\$43,158
60 - 64	668	\$29,037,515	\$43,469
65 - 69	521	\$19,782,497	\$37,970
70 - 74	456	\$14,867,941	\$32,605
75 - 79	463	\$13,020,632	\$28,122
80 - 84	261	\$5,954,235	\$22,813
85 - 89	170	\$3,285,183	\$19,325
90+	147	\$2,534,091	\$17,239
Totals	3,155	\$107,389,667	\$34,038

## 8. VALUATION COST METHODS

### PART A | ACTUARIAL COST METHOD

The Actuarial Cost Method which was used to determine pension liabilities in this valuation is known as the *Entry Age Normal Cost Method*. Under this method the *Normal Cost* for each active member on the valuation date is determined as the level percent of salary, which, if paid annually from the date the employee first became a retirement system member, would fully fund by retirement, death, disability or termination, the projected benefits which the member is expected to receive. The *Actuarial Liability* for each member is determined as the present value as of the valuation date of all projected benefits which the member is expected to receive, minus the present value of future annual Normal Cost payments expected to be made to the fund. Since only active members have a Normal Cost, the Actuarial Liability for inactives, retirees and survivors is simply equal to the present value of all projected benefits. The sum of Normal Cost and Actuarial Liability for each member is equal to the Normal Cost and Actuarial Liability for the Plan. The *Unfunded Actuarial Liability* is the Actuarial Liability less current assets.

The Normal Cost for a member will remain a level percent of salary for each year of membership, except for changes in provisions of the Plan or the actuarial assumptions employed in projection of benefits and present value determinations. The Normal Cost for the entire system will also be changed by the addition of new members or the retirement, death, disability or termination of members. The Actuarial Liability for a member will increase each year to reflect the additional accrual of Normal Cost. It will also change if the Plan provisions or actuarial assumptions change.

Differences each year between the actual experience of the Plan and the experience projected by the actuarial assumptions are reflected by adjustments to the Unfunded Actuarial Liability. An experience difference which increases the Unfunded Actuarial Liability is an *Actuarial Loss* and one which decreases the Unfunded Actuarial Liability is an *Actuarial Gain*.

### PART B | ASSET VALUATION METHOD

The actuarial value of assets is determined in accordance with the deferred recognition method under which 20% of the gains or losses occurring in the prior year are recognized, 40% of those occurring 2 years ago, etc., so that 100% of gains and losses occurring 5 years ago are recognized. The actuarial value of assets will be adjusted, if necessary, in order to remain between 85% and 115% of market value.

In valuations prior to 1998, plan assets were determined at market value. As part of the 1998 valuation, this methodology was adjusted to reduce the potential volatility in the market value approach from year to year. The actuarial value of assets as of January 1, 2005 is approximately 98.4% of the market value.

## 9. ACTUARIAL ASSUMPTIONS

INVESTMENT RETURN 8.25% per year

INTEREST RATE CREDITED TO  
THE ANNUITY SAVINGS FUND 3.5% per year

COST OF LIVING  
INCREASES (COLA) 3% per year

MORTALITY RP-2000 Healthy Annuitant table projected 10 years with scale AA (gender distinct). This is applicable to both pre-retirement and post-retirement benefits. For disabled members, the mortality rate is assumed to be in accordance with the RP-2000 Table (gender distinct) set forward 3 years for males. It is assumed that 55% of pre-retirement deaths are job-related for Group 1 and 2 members and 90% are job-related for Group 3 and 4 members. For members retired under an Accidental Disability, 40% of deaths are assumed to be from the same cause as the disability.

SALARY INCREASE Based on an analysis of past experience. Annual rates are shown below.

<u>Service</u>	<u>Groups 1 &amp; 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Teachers</u>
0	8.50%	9.50%	12.00%	9.50%
1	8.00%	9.00%	10.00%	8.50%
2	7.50%	8.50%	9.00%	8.00%
3	7.00%	8.00%	8.00%	7.50%
4	6.50%	7.50%	7.50%	7.00%
5	6.00%	7.00%	7.00%	6.75%
6	5.50%	6.75%	6.50%	6.50%
7	5.00%	6.50%	6.00%	6.25%
8	4.75%	6.25%	5.50%	6.00%
9	4.75%	6.00%	5.50%	5.75%
10	4.75%	5.75%	5.50%	5.50%
11	4.75%	5.50%	5.50%	5.50%
12	4.75%	5.50%	5.50%	5.25%
13	4.75%	5.50%	5.50%	5.25%
14-24	4.75%	5.50%	5.50%	5.00%
25+	4.75%	5.50%	5.50%	4.75%

## 9. ACTUARIAL ASSUMPTIONS *(continued)*

### RETIREMENT

Age	Group 1		Group 2	Group 3	Group 4	Male Teachers Service		Female Teachers Service	
	Male	Female				<20	20+	<20	20+
	45	0.000				0.000	0.000	0.020	0.030
46	0.000	0.000	0.000	0.020	0.030	0.00	0.00	0.00	0.00
47	0.000	0.000	0.000	0.050	0.030	0.00	0.00	0.00	0.00
48	0.000	0.000	0.000	0.050	0.030	0.00	0.00	0.00	0.00
49	0.000	0.000	0.000	0.050	0.030	0.00	0.00	0.00	0.00
50	0.015	0.030	0.020	0.050	0.100	0.00	0.01	0.00	0.01
51	0.010	0.030	0.020	0.075	0.050	0.00	0.01	0.00	0.01
52	0.010	0.030	0.020	0.075	0.100	0.00	0.01	0.00	0.01
53	0.015	0.025	0.040	0.075	0.100	0.00	0.01	0.00	0.01
54	0.020	0.035	0.050	0.075	0.150	0.00	0.02	0.00	0.01
55	0.040	0.050	0.100	0.110	0.300	0.02	0.03	0.02	0.04
56	0.035	0.060	0.100	0.150	0.150	0.04	0.03	0.04	0.04
57	0.040	0.055	0.100	0.110	0.200	0.07	0.05	0.07	0.05
58	0.045	0.070	0.100	0.110	0.150	0.08	0.07	0.08	0.07
59	0.050	0.090	0.130	0.110	0.250	0.09	0.10	0.09	0.11
60	0.080	0.080	0.150	0.100	0.300	0.12	0.20	0.12	0.16
61	0.100	0.100	0.150	0.100	0.150	0.15	0.30	0.15	0.20
62	0.160	0.160	0.150	0.250	0.250	0.18	0.35	0.18	0.25
63	0.160	0.160	0.150	0.250	0.150	0.15	0.35	0.15	0.25
64	0.160	0.160	0.200	0.250	0.150	0.25	0.30	0.25	0.30
65	0.250	0.250	0.200	0.500	0.500	0.40	0.50	0.40	0.40
66	0.250	0.250	0.200	0.500	0.500	0.40	0.30	0.40	0.30
67	0.250	0.250	0.200	0.500	0.500	0.40	0.30	0.40	0.25
68	0.250	0.250	0.200	0.500	0.500	0.40	0.30	0.40	0.35
69	0.250	0.250	0.200	0.500	0.500	0.40	0.40	0.40	0.35
70	1.000	1.000	1.000	1.000	1.000	1.00	1.00	1.00	1.00

Teachers electing the increased benefit under Chapter 114 of the Acts of 2000 were assumed to have higher rates of retirement from ages 54 to 62 if their service was greater than 30 years. These rates are the same for males and females. The rate at age 54 is 0.035. The rate increases to 0.06 at age 55, 0.18 at age 56, and 0.30 at age 57. The rates for ages 58, 59, and 62 is 0.40. The rate for ages 60 and 61 is 0.35.



## 9. ACTUARIAL ASSUMPTIONS *(continued)*

DISABILITY Based on an analysis of past experience. Sample annual rates are shown below.

<u>Age</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Teachers</u>
20	0.00030	0.00060	0.00100	0.00410	0.00004
30	0.00033	0.00080	0.00160	0.00504	0.00006
40	0.00091	0.00166	0.00753	0.00608	0.00010
50	0.00168	0.00260	0.01559	0.00712	0.00050
60	0.00250	0.00350	0.02000	0.00780	0.00100

It is assumed that 55% of disabilities will be job-related for Group 1 and 2 members (other than Teachers), 90% will be job-related for Group 3 and 4 members, and 35% will be job-related for Teachers.

### WITHDRAWAL

Based on an analysis of past experience. For Groups 1 and 2, rates are both age and service based for service up to 10 years. After 10 years of service, rates are age based. In addition to being age and service based, Teacher rates are also gender based. For groups 3 and 4, rates are service based. Sample annual rates are shown below.

#### Groups 1 & 2

<u>Age</u>	<u>Service</u>		
	<u>0</u>	<u>5</u>	<u>10+</u>
20	0.180	0.000	0.000
30	0.150	0.090	0.041
40	0.125	0.070	0.031
50	0.100	0.048	0.021

<u>Service</u>	<u>Group 3</u>	<u>Group 4</u>
0	0.008	0.044
5	0.008	0.037
10	0.009	0.029
15	0.009	0.022
20+	0.009	0.015

# 9. ACTUARIAL ASSUMPTIONS *(continued)*

## Teachers

Age	Service	0		5		10+	
		Male	Female	Male	Female	Male	Female
20		0.090	0.060	0.040	0.090	0.010	0.040
30		0.108	0.116	0.043	0.090	0.010	0.040
40		0.093	0.114	0.049	0.070	0.015	0.031
50		0.059	0.068	0.042	0.045	0.019	0.019

## 10. SUMMARY OF PLAN PROVISIONS

### ADMINISTRATION

There are 106 contributory Retirement Systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by Chapter 32 of the Massachusetts General Laws. This law establishes benefits, contribution requirements and an accounting and funds structure for all systems.

### MEMBERSHIP

Membership is mandatory for nearly all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by each retirement board, and approved by PERAC. Membership is optional for certain elected officials. There are 4 classes of membership in the Commonwealth:

**Group 1:**

General employees, including clerical, administrative, technical and all other employees not otherwise classified.

**Group 2:**

Certain specified hazardous duty positions.

**Group 3:**

State police officers and inspectors

**Group 4:**

Police officers, firefighters, corrections officers, and other specified hazardous positions.

### MEMBER CONTRIBUTIONS

Member contributions vary depending on the most recent date of membership:

Prior to 1975:	5% of regular compensation
1975 - 1983:	7% of regular compensation
1984 to 6/30/96:	8% of regular compensation
7/1/96 to present:	9% of regular compensation
7/1/96 to present:	12% of regular compensation (State Police)
7/1/01 to present:	11% of regular compensation (for teachers hired after 7/1/01 and those accepting provisions of Chapter 114 of the Acts of 2000)
1979 to present:	an additional 2% of regular compensation in excess of \$30,000.

### RATE OF INTEREST

Interest on regular deductions made after January 1, 1984 is a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average

## 10. SUMMARY OF PLAN PROVISIONS (*continued*)

rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

### RETIREMENT AGE

There is no mandatory retirement age for employees in Groups 1 and 2. Most Group 4 members must retire at age 65. As the result of a federal court decision, there is no mandatory retirement age for group 3 members.

### SUPERANNUATION RETIREMENT

A member is eligible for a superannuation retirement allowance (service retirement) upon meeting the following conditions:

- completion of 20 years of service, or
- attainment of age 55 if hired prior to 1978, or if classified in Group 4, or
- attainment of age 55 with 10 years of service, if hired after 1978, and if classified in Group 1 or 2

### AMOUNT OF BENEFIT

A member's annual allowance is determined by multiplying the member's average salary by a benefit rate related to the member's age and job classification at retirement, and the resulting product by his creditable service. The amount determined by the benefit formula cannot exceed 80% of the average salary. For veterans as defined in G.L. c. 32, s. 1, there is an additional benefit of \$15 per year for each year of creditable service, up to a maximum of \$300.

- Salary is defined as gross regular compensation.
- Average Salary is the average annual rate of regular compensation received during the 3 consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutive) preceding retirement.
- The Benefit Rate varies with the member's retirement age, but the highest rate of 2.5% applies to Group 1 employees who retire at or after age 65, Group 2 employees who retire at or after age 60, and to Group 4 employees who retire at or after age 55. A .1% reduction is applied for each year of age under the maximum age for the member's group. For Group 2 employees who terminate from service under age 55, the benefit rate for a Group 1 employee shall be used.
- For a teacher who is subject to the provisions of Chapter 114 of the Acts of 2000 and who has completed at least 30 years of creditable service, the benefit rate is multiplied by the creditable service and the resulting percentage is increased by 2% per year for

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

each year of service in excess of 24. The amount determined cannot exceed 80% of the average salary.

- For Group 3 members, the rate is 3% for any age.

### DEFERRED VESTED BENEFIT

A participant who has completed 10 or more years of creditable service is eligible for a deferred vested retirement benefit. Elected officials and others who were hired prior to 1978 may be vested after 6 years in accordance with G.L. c. 32, s. 10.

The participant's accrued benefit is payable commencing at age 55, or the completion of 20 years, or may be deferred until later at the participant's option.

### WITHDRAWAL OF CONTRIBUTIONS

Member contributions may be withdrawn upon termination of employment. Employees who first become members on or after January 1, 1984, may receive only limited interest on their contributions if they voluntarily terminate their service. Those who leave service with less than 5 years receive no interest; those who leave service with greater than 5 but less than 10 years receive 50% of the interest credited.

### ORDINARY DISABILITY

**Eligibility:** Non-veterans who become permanently incapacitated from the essential duties of their positions by reason of a non-job related condition with at least 10 years of creditable service (or 15 years creditable service in systems in which the local option contained in G.L. c. 32, s.6(1) has not been adopted).

Veterans with ten years of creditable service who become permanently incapacitated from the essential duties of their positions by reason of a non-job related condition prior to reaching "maximum age".

**Retirement Allowance:** Equal to the accrued superannuation retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 55, he/she will receive an allowance that is not less than the allowance he/she would have received if retired for superannuation.

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

### ACCIDENTAL DISABILITY

**Eligibility:** Applies to members who become permanently incapacitated from the essential duties of the position as a result of a personal injury sustained or hazard undergone while in the performance of duties. There are no minimum age or service requirements.

**Retirement Allowance:** 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. However, for those who became members in service after January 1, 1988 or who have not been members in service continually since that date, the amount is limited to 75% of pay. There is an additional pension of \$611.28 per year, per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from earning. The additional pension may continue up to age 22 for any child who is a full time student at an accredited educational institution.

### ACCIDENTAL DEATH

**Eligibility:** Applies to members who die as a result of a work-related injury or if the member was retired for accidental disability and the death was the natural and proximate result of the injury or hazard undergone on account of which such member was retired.

**Allowance:** An immediate payment to a named beneficiary equal to the accumulated deductions at the time of death, plus a pension equal to 72% of current salary and payable to the surviving spouse, dependent children or the dependent parent, plus a supplement of \$312 per year, per child, payable to the spouse or legal guardian until all dependent children reach age 18 or 22 if a full time student, unless mentally or physically incapacitated.

The surviving spouse of a member of a police or fire department or any corrections officer who, under specific and limited circumstances detailed in the statute, suffers an accident and is killed or sustains injuries resulting in his death, may receive a pension equal to the maximum salary for the position held by the member upon his death.

In addition, an eligible family member of a firefighter, public prosecutor, police officer or corrections officer killed in the line of duty may receive a one time payment of \$100,000 from the State Retirement Board.

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

### DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

Effective November 7, 1996, Accidental Disability retirees were allowed to select Option C at retirement and provide a benefit for an eligible survivor. For Accidental Disability retirees prior to November 7, 1996, who could not select Option C, if the member's death is from a cause unrelated to the condition for which the member received accidental disability benefits, a surviving spouse will receive an annual allowance of \$6,000.

### DEATH IN ACTIVE SERVICE

**Eligibility:** At least 2 years of service

**Allowance:** An immediate allowance equal to that which would have been payable had the member retired and elected Option C on the day before his or her death. For death occurring prior to the member's superannuation retirement age, the age 55 benefit rate is used. The minimum annual allowance payable to the surviving spouse of a member-in-service who dies with at least two years of creditable service is \$3,000, provided that the member and the spouse were married for at least one year and living together on the member's date of death.

The surviving spouse of such a member-in-service receives an additional allowance equal to the sum of \$1,440 per year for the first child and \$1,080 per year for each additional child until all dependent children reach age 18 or 22 if full time students, unless mentally or physically incapacitated.

### COST OF LIVING

Chapter 17 of the Acts of 1997 provides that the first \$12,000 of a retiree's total allowance is subject to an annual cost-of-living adjustment (COLA). Each year PERAC notifies the Massachusetts General Court of the percentage increase in the Consumer Price Index used for indexing Social Security benefits. This COLA is subject to an annual vote of the Massachusetts General Court, but cannot exceed 3.0%.

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

### METHODS OF PAYMENT

A member may elect to receive his or her retirement allowance in one of 3 forms of payment.

**Option A:** Total annual allowance, payable in monthly installments, commencing at retirement and terminating at the member's death.

**Option B:** A reduced annual allowance, payable in monthly installments, commencing at retirement and terminating at the death of the member, provided, however, that if the total amount of the annuity portion received by the member is less than the amount of his or her accumulated deductions, including interest, the difference or balance of his accumulated deductions will be paid in a lump sum to the retiree's beneficiary or beneficiaries of choice.

**Option C:** A reduced annual allowance, payable in monthly installments, commencing at retirement. At the death of the retired employee, 2/3 of the allowance is payable to the member's designated beneficiary (who may be the spouse, or former spouse who remains unmarried for a member whose retirement becomes effective on or after February 2, 1992, child, parent, sister, or brother of the employee) for the life of the beneficiary. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases (or "pops up") based on the factor used to determine the Option C benefit at retirement. For members who retired prior to January 12, 1988, if the System has accepted Section 288 of Chapter 194 of the Acts of 1998 and the beneficiary pre-deceases the retiree, the benefit payable "pops up" in the same fashion. The Option C became available to accidental disability retirees on November 7, 1996.

### ALLOCATION OF PENSION COSTS

If a member's total creditable service was partly earned by employment in more than one retirement system, the cost of the "pension portion" is allocated between the different systems pro rata based on the member's service within each retirement system.



## II. GLOSSARY OF TERMS

### ACTUARIAL ACCRUED LIABILITY

That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

### ACTUARIAL ASSUMPTIONS

Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

### ACTUARIAL COST METHOD (OR FUNDING METHOD)

A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the Normal Cost and the Actuarial Accrued Liability.

### ACTUARIAL GAIN OR LOSS (OR EXPERIENCE GAIN OR LOSS)

A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

**Note:** The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, rather than an Actuarial Gain (Loss).

### ACTUARIAL PRESENT VALUE

The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

### AMORTIZATION PAYMENT

That portion of the pension plan appropriation which represents payments made to pay interest on and reduce the Unfunded Accrued Liability.

## II. GLOSSARY OF TERMS *(continued)*

### ANNUAL STATEMENT

The statement submitted to PERAC each year that describes the asset holdings and Fund balances as of December 31 as well as the transactions during the calendar year that affected the financial condition of the retirement system.

### ANNUITY RESERVE FUND

The fund into which total accumulated deductions, including interest, are transferred at the time a member retires, and from which annuity payments are made.

### ANNUITY SAVINGS FUND

The fund in which employee contributions plus interest credited are held for active and inactive members.

### ASSETS

The value of securities held by the plan.

### COST OF BENEFITS

The estimated payment from the pension system for benefits for the fiscal year.

### FUNDING SCHEDULE

The schedule, based upon the most recently approved actuarial valuation, which sets forth the amount which would be appropriated to the pension system in accordance with Section 22C of M.G.L. Chapter 32.

### GASB

Governmental Accounting Standards Board

## II. GLOSSARY OF TERMS *(continued)*

### NORMAL COST

Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits, which is to be paid in a single fiscal year. The Employee Normal Cost is the amount of the expected employee contributions for the fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

### PENSION FUND

The fund into which appropriation amounts, as determined by PERAC, are paid and from which pension benefits are paid.

### PENSION RESERVE FUND

The fund that shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

### SPECIAL FUND FOR MILITARY SERVICE CREDIT

The fund that is credited with an amount paid by the retirement board equaling the amount that would have been contributed by a member if the member had remained in active service instead of taking a military leave of absence. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

### UNFUNDED ACCRUED LIABILITY

The excess of the Actuarial Accrued Liability over the Assets.

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