# January 1, 2013

# Actuarial Valuation Report

# Essex Regional Retirement System

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President

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December 9, 2013

Essex Regional Retirement Board
491 Maple Street, Suite 202
Danvers, MA 01923

Dear Essex Regional Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2013 actuarial valuation of the Essex Regional Retirement System. This valuation and report was prepared using generally accepted actuarial principles and practices and meets the parameters set by the Governmental Accounting Standards Board Statement (GASB) No. 27. To the best of our knowledge, this report is complete and accurate, and the assumptions used represent our best estimate of anticipated experience of the system.

As part of performing the valuation, Stone Consulting, Inc. was furnished member data by the Essex Regional Retirement System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary. In addition, the administrative staff furnished financial statements that were not audited by the actuary or by the plan's auditors.

The funding objective of the plan is to fully fund the system while attempting to maintain a stable contribution amount for the upcoming fiscal year that is consistent with prior funding schedules or if employer finances allow it, to increase the contribution amount. This funding objective is being met.

We anticipate over time the contribution level to increase as a percentage of payroll. The contribution rate is determined by adding the normal cost plus an amortization of the unfunded actuarial accrued liability. The normal cost is expected to remain at a level percentage of payroll. The length of the funding schedule contained in this actuarial valuation report is twenty-one years (fully funded by 2035). The contribution is set so the Fiscal 2015 contribution is 8% greater than the Fiscal 2014 contribution, with further increases of 7% for the next four years and by 4% thereafter. The contribution in Fiscal 2035 decreases instead of increases.

The amortization payments are the amount left over after subtracting the normal cost and the 3(8)(c) payments from the contribution amount.

The maximum length of the amortization is until Fiscal 2040. These limits are contained in Section 22F of Chapter 32 of the Massachusetts General Laws and related statutes.

The contribution amount for Fiscal Year 2015 is $26,560,007 which is the same as the anticipated contribution amount from the prior funding schedule.  PERAC and GASB guidelines indicate that actuarial valuations should be conducted at least every other year.  The Essex Regional Retirement Board conducted their previous actuarial valuation effective January 1, 2011.

We are pleased to present the results of this valuation.  If the Retirement Board has any questions on the content of this report, we would be glad to respond.  Please note that this report is meant to be used in its entirety. Use of excerpts of this report may result in inaccurate or misleading understanding of the results.

The undersigned is a consultant for Stone Consulting, Inc. and a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,
STONE CONSULTING, INC.
Actuaries for the Plan

Lawrence B. Stone
Member, American Academy of Actuaries

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## Introduction

This report presents the results of the actuarial valuation of the Essex Regional Retirement System. The valuation was performed at the request of the Retirement Board as of January 1, 2013 for the purpose of determining the contribution requirements for Fiscal Year 2015 and beyond. The contribution requirements are based on:

- The financial condition of the system as of December 31, 2012
- The benefit provisions of M.G.L. Chapter 32 and related statutes;
- The demographics of members in the system (i.e., active and inactive participants, retirees and beneficiaries as of January 1, 2013);
- Economic assumptions regarding salary increases and investment earnings; and
- Other actuarial assumptions (e.g., withdrawals, retirement, death, etc.)

### January 1, 2013 Valuation Summary

| | January 1, 2013 | January 1, 2011 | Change |
|---|---|---|---|
| **Contribution Fiscal 2015** | $26,560,007 | $26,560,007 | $0 |
| **Funding Schedule Length** | 21 years | 21 years | 0 years |
| **Funding Ratio** | 51% | 52% | -1% |
| **Interest Rate Assumption** | 8.00% | 8.25% | -0.250% |
| **Salary Increase Rate Assumption** | Select with 3.75% Ultimate | 5.00% | -1.25% Ultimate Rate |

- The Fiscal Year 2015 contribution is the same as the planned 2015 contribution. Stone Consulting, with agreement from the Retirement Board, values assets using a five year asset smoothing method. In this approach, asset gains and losses are recognized over a five-year period. The purpose of this approach is to avoid wide swings in asset value from one year to the next. The prior valuation used a different asset smoothing method. The new method produces an actuarial value of assets which is $2.2 million higher than under the prior method.

- The System experienced a 6.99% annual return over the two year period on the market value of assets versus our assumption of an 8.25% return which resulted in a $5.6 million net actuarial loss. The System's asset portfolio, effective December 31, 2012 is approximately 79% equities, alternative investments, real estate and other non-fixed income investments and 21% fixed income and short-term investments. The assets are mainly invested in Pension Reserves Investment Trust (PRIT). The interest rate assumption was changed to 8.00% to reflect anticipated market performance. This increased the actuarial accrued liability by $15.3 million.

- We have modified the salary increase assumption to reflect a select and ultimate table. The prior valuation used a constant 5% salary increase rate. This table is based on an ultimate rate of 3.75% with select periods as shown in the following table:

| Year | Salary Increase |
|---|---|
| 0 | 7.50% |
| 1 | 6.50% |
| 2 | 6.00% |
| 3 | 5.50% |
| 4 | 5.00% |
| 5+ | 3.75% |

  This change decreased the actuarial accrued liability by $15 million. Total compensation changed by 4.6% over the prior valuation; however average annual compensation (compensation divided by number of active members) changed by 12.0%. We believe some of this increase is due to data improvements. This assumption is based on expected future experience.

- The funding level of the Essex Regional Retirement System is 51% compared to 52% for the January 1, 2011 actuarial valuation. The funding level is estimated to be approximately the median of Massachusetts' Contributory Retirement Systems.

  The schedule length is twenty-one (21) years (which is the same length as the remainder of the prior funding schedule). The maximum period permitted under Section 22F of Chapter 32 of the Massachusetts General Laws is 26 years (2040). The contribution amount was calculated to be 8% higher than the Fiscal 2014 contribution and is expected to increase by 7% each of the next four years and 4% thereafter for the next 15 years. A smaller payment is expected in Fiscal 2035 when the amortization period ends.

- Non-economic assumptions were changed from the January 1, 2011 actuarial valuation. The mortality assumption is based upon the RP2000 Table projected 18 years with Scale AA. The previous assumption used a 10 year projection with Scale AA. The net effect of this change increased the accrued liability by $8.5 million. Changes were made to the retirement, disability and withdrawal assumptions. These changes increased the actuarial accrued liability by $19.3 million.

- The COLA Base was increased from $12,000 to $13,000. This increased the actuarial accrued liability by $3.5 million.

## January 1, 2013 Actuarial Valuation Results

| | January 1, 2013 | January 1, 2011 | Percentage Change |
|---|---|---|---|
| **Funding** | | | |
| Contribution for Fiscal 2015 | $26,560,007 | | |
| Contribution for Fiscal 2015 based on current schedule | | $26,560,007 | 0% |
| **Members *** | | | |
| ▪ Actives | | | |
| a. Number | 2,816 | 3,013 | -6.5% |
| b. Annual Compensation | $119,292,287 | $114,006,815 | 4.6% |
| c. Average Annual Compensation | $42,362 | $37,838 | 12.0% |
| d. Average Attained Age | 49.1 | 48.4 | 1.4% |
| e. Average Past Service | 10.9 | 10.3 | 5.8% |
| ▪ Retired, Disabled and Beneficiaries | | | |
| a. Number | 1,670 | 1,624 | 2.8% |
| b. Total Benefits* | $33,498,993 | $29,684,724 | 12.8% |
| c. Average Benefits* | $20,059 | $18,279 | 9.7% |
| d. Average Age | 72.9 | 72.4 | 0.6% |
| ▪ Inactives | | | |
| a. Number | 1,009 | 914 | 10.4% |
| **Normal Cost** | | | |
| a. Total Normal Cost | $14,403,825 | $17,845,068 | -19.3% |
| b. Less Expected Members' Contributions | 10,757,904 | 11,104,835 | -3.1% |
| c. Normal Cost to be funded by the Municipality | $3,645,921 | $6,740,233 | -45.9% |
| d. Eighteen month adjustment | 220,928 | 333,818 | -33.8% |
| e. Administrative Expense Assumption | 945,000 | 1,075,000 | -12.1% |
| f. Adjusted Normal Cost and Expense | $4,811,849 | $8,149,051 | -41.0% |

*Excluding State reimbursed COLA

| | January 1, 2013 | January 1, 2011 | Percentage Change |
|---|---|---|---|
| **Actuarial Accrued Liability as of January 1, 2013** | | | |
| a. Active Members | $293,688,366 | $253,348,484 | 15.9% |
| b. Inactive Members | 7,150,383 | 7,307,140 | -2.1% |
| c. Retired Members and Beneficiaries | 318,500,331 | 275,459,912 | 15.6% |
| d. Total | $619,339,080 | $536,115,536 | 15.5% |
| **Unfunded Actuarial Accrued Liability** | | | |
| a. Actuarial Accrued Liability | $619,339,080 | $536,115,536 | 15.5% |
| b. Less Actuarial Value of Assets | 314,565,925 | 278,332,006 | 13.0% |
| c. Unfunded Actuarial Accrued Liability | $304,773,155 | $257,783,530 | 18.2% |
| d. Eighteen month adjustment | 18,482,329 | 10,422,859 | |
| e. Adjusted Unfunded Actuarial Accrued Liability | $323,255,484 | $268,206,389 | |

- The data was supplied by the Essex Regional Retirement Board. The data was checked under broad parameters for reasonableness. With the assistance of the staff of the Essex Regional Retirement Board, we were able to develop a database sufficient for valuation purposes.

- Payroll changed by 4.6% over the course of the past year. Average annual compensation changed by 12.0% over the same time period.

- The salary increase assumption includes general wage adjustments, step increases, and promotional increases.

### History of Active Participants

| Valuation Year | Number | Average Age | Average Past Service | Average Annual Compensation |
|---|---|---|---|---|
| 2013 | 2,816 | 49.1 | 10.9 | $42,362 |
| 2011 | 3,013 | 48.4 | 10.3 | $37,838 |
| 2008 | 3,139 | 47.4 | 9.2 | $33,976 |

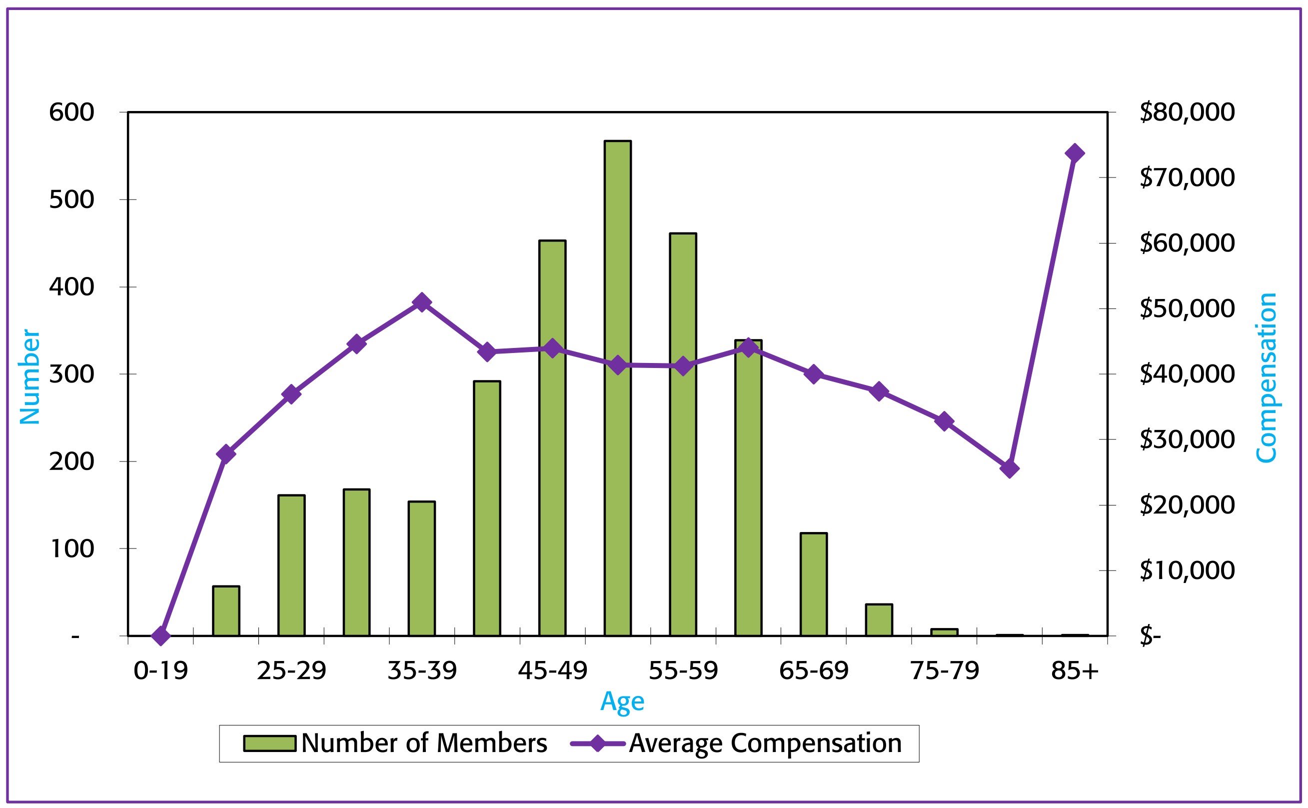
- Employee age has increased by 1.7 years and service has increased by 1.7 years over the course of the past five years. This is consistent with the trend in the Commonwealth's public sector towards an aging of the employee population. Average annual compensation has grown by 24.7% (4.5% annually) over the same time period.

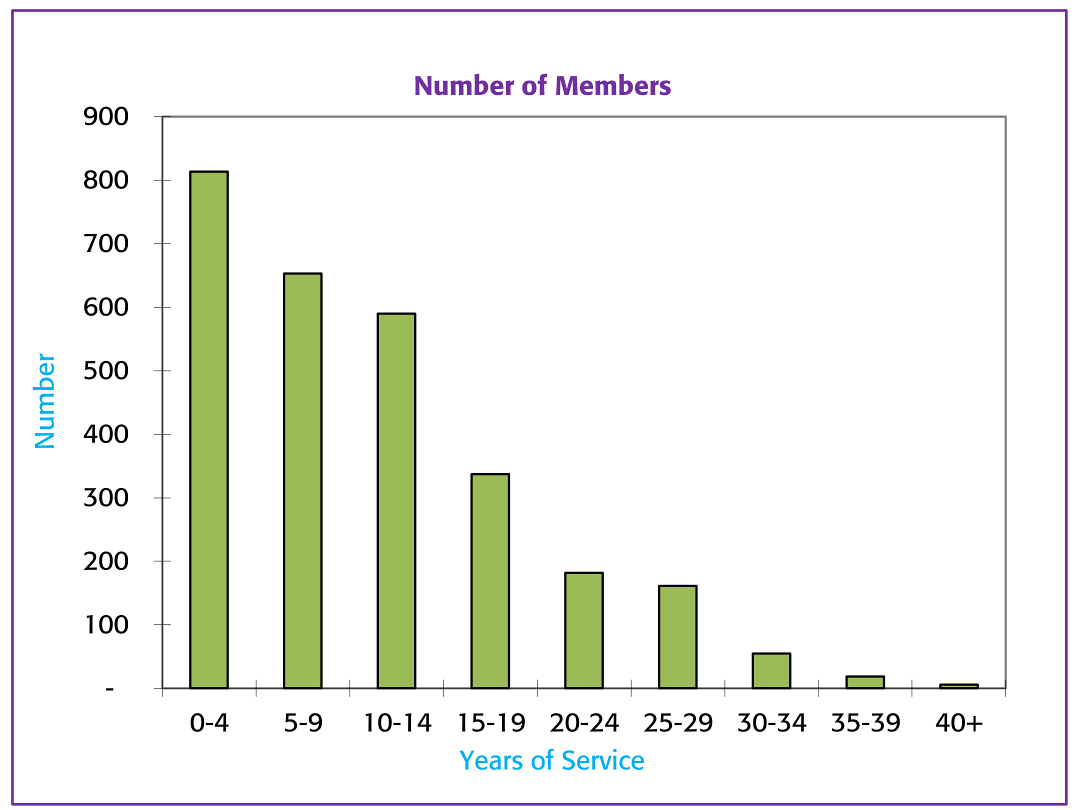
The charts on the following pages summarize demographic information regarding active and retiree members.

## Distribution of Plan Members as of January 1, 2013

Active Members

| AGE | 0-4 Years | 5-9 Years | 10-14 Years | 15-19 Years | 20-24 Years | 25-29 Years | 30-34 Years | 35-39 Years | 40 + Years | Total | Total Compensation | Average Compensation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-19 | - | - | - | - | - | - | - | - | - | - | $ - | $ - |
| 20-24 | 56 | 1 | - | - | - | - | - | - | - | 57 | 1,583,745 | 27,785 |
| 25-29 | 134 | 27 | - | - | - | - | - | - | - | 161 | 5,945,493 | 36,929 |
| 30-34 | 82 | 63 | 22 | 1 | - | - | - | - | - | 168 | 7,493,737 | 44,606 |
| 35-39 | 45 | 52 | 49 | 8 | - | - | - | - | - | 154 | 7,850,061 | 50,974 |
| 40-44 | 113 | 57 | 56 | 50 | 15 | 1 | - | - | - | 292 | 12,667,886 | 43,383 |
| 45-49 | 136 | 119 | 84 | 46 | 42 | 26 | - | - | - | 453 | 19,915,769 | 43,964 |
| 50-54 | 107 | 156 | 128 | 65 | 43 | 54 | 13 | 1 | - | 567 | 23,465,182 | 41,385 |
| 55-59 | 94 | 89 | 122 | 76 | 25 | 29 | 19 | 7 | - | 461 | 19,008,496 | 41,233 |
| 60-64 | 36 | 58 | 81 | 62 | 38 | 32 | 18 | 10 | 4 | 339 | 14,936,918 | 44,062 |
| 65-69 | 9 | 23 | 34 | 21 | 15 | 11 | 3 | 1 | 1 | 118 | 4,718,110 | 39,984 |
| 70-74 | 1 | 6 | 11 | 7 | 3 | 6 | 2 | - | - | 36 | 1,345,246 | 37,368 |
| 75-79 | - | 2 | 3 | 1 | 1 | 1 | - | - | - | 8 | 262,330 | 32,791 |
| 80-84 | - | - | - | - | - | 1 | - | - | - | 1 | 25,579 | 25,579 |
| 85+ | - | - | - | - | - | - | - | - | 1 | 1 | 73,737 | 73,737 |
| TOTAL | 813 | 653 | 590 | 337 | 182 | 161 | 55 | 19 | 6 | 2,816 | $ 119,292,287 | $ 42,362 |



## Distribution of Plan Members as of January 1, 2013

Retired Members

### Retired Members and Beneficiaries

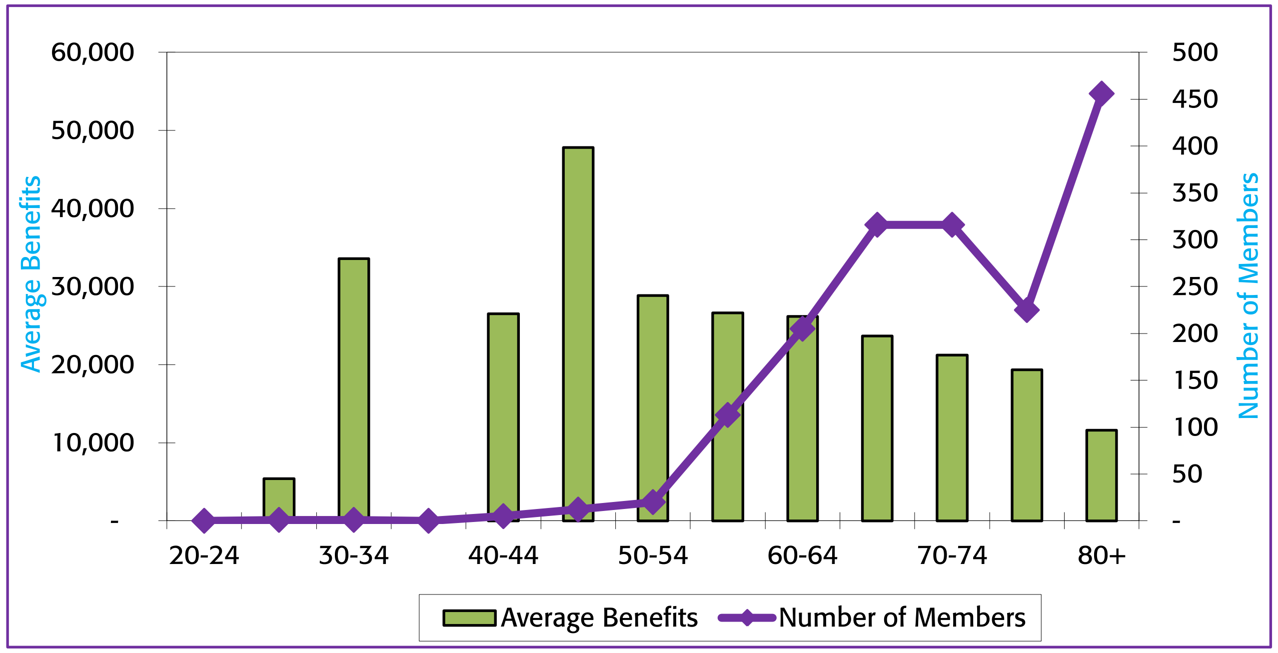
| Age | Number | Average Benefit | Total Benefit |
|---|---|---|---|
| 20-24 | - | - | - |
| 25-29 | 1 | 5,374 | 5,374 |
| 30-34 | 1 | 33,582 | 33,582 |
| 35-39 | - | - | - |
| 40-44 | 1 | 6,753 | 6,753 |
| 45-49 | 9 | 54,550 | 490,952 |
| 50-54 | 13 | 28,429 | 369,577 |
| 55-59 | 88 | 24,483 | 2,154,526 |
| 60-64 | 185 | 25,464 | 4,710,921 |
| 65-69 | 296 | 23,623 | 6,992,263 |
| 70-74 | 297 | 20,960 | 6,225,182 |
| 75-79 | 214 | 19,307 | 4,131,711 |
| 80+ | 442 | 11,349 | 5,016,309 |
| TOTAL | 1,547 | $ 19,481 | $ 30,137,150 |

### Disabled Members

| Age | Number | Average Benefit | Total Benefit |
|---|---|---|---|
| 20-24 | - | - | - |
| 25-29 | - | - | - |
| 30-34 | - | - | - |
| 35-39 | - | - | - |
| 40-44 | 4 | 31,476 | 125,904 |
| 45-49 | 3 | 27,700 | 83,100 |
| 50-54 | 7 | 29,628 | 207,399 |
| 55-59 | 25 | 34,127 | 853,164 |
| 60-64 | 20 | 32,792 | 655,841 |
| 65-69 | 20 | 23,975 | 479,504 |
| 70-74 | 19 | 25,127 | 477,406 |
| 75-79 | 11 | 19,713 | 216,845 |
| 80+ | 14 | 18,763 | 262,681 |
| TOTAL | 123 | $ 27,332 | $ 3,361,843 |

### Total

| Age | Number | Average Benefit | Total Benefit |
|---|---|---|---|
| 20-24 | - | - | - |
| 25-29 | 1 | 5,374 | 5,374 |
| 30-34 | 1 | 33,582 | 33,582 |
| 35-39 | - | - | - |
| 40-44 | 5 | 26,531 | 132,657 |
| 45-49 | 12 | 47,838 | 574,052 |
| 50-54 | 20 | 28,849 | 576,975 |
| 55-59 | 113 | 26,617 | 3,007,689 |
| 60-64 | 205 | 26,179 | 5,366,762 |
| 65-69 | 316 | 23,645 | 7,471,767 |
| 70-74 | 316 | 21,211 | 6,702,588 |
| 75-79 | 225 | 19,327 | 4,348,556 |
| 80+ | 456 | 11,577 | 5,278,990 |
| TOTAL | 1,670 | $ 20,059 | $ 33,498,993 |




Benefits shown are net of State reimbursed COLA.



stoneconsulting,inc

## Valuation Methodology

Stone Consulting, Inc. used the Entry Age Normal actuarial funding method in this actuarial valuation. The use of the Entry Age Normal actuarial funding method is consistent with the requirements of Chapter 32 of the Massachusetts General Laws.

### NORMAL COST

| Valuation Date | January 1, 2013 | % of Payroll* |
|---|---|---|
| Gross Normal Cost (GNC) | $14,403,825 | 12.1% |
| Employees Contribution | $10,757,904 | 9.0% |
| Net Normal Cost (NNC) | $3,645,921 | 3.1% |
| Adjusted to Beginning of Fiscal Year 2015 | $220,928 | |
| Administrative Expense | $945,000 | 0.8% |
| Adjusted Net Normal Cost With Admin. Expense | $4,811,849 | |

*Payroll paid in 2012 for employees as of January 1, 2013 is $119,292,287. Payroll for new hires in 2012 was annualized.

- The gross normal cost (GNC) is the “price” of benefits accruing in the current year if the assumptions underlying the normal cost were realized.

- An individual normal cost represents that part of the cost of a member’s future benefits that are assigned to the current year as if the costs are to remain level as a percentage of the member’s pay. Benefits payable under all circumstances (i.e., retirement, death, disability, and withdrawals) are included in this calculation.

- Anticipated employee contributions to be made during the year are subtracted from the GNC to determine employer normal cost, or net normal cost (NNC).

- Administrative expenses added to the NNC. The administrative expense does not include investment manager and custodial fees. These fees are considered part of the interest rate assumption that is net of fees.

### Actuarial Accrued Liability and Funded Status

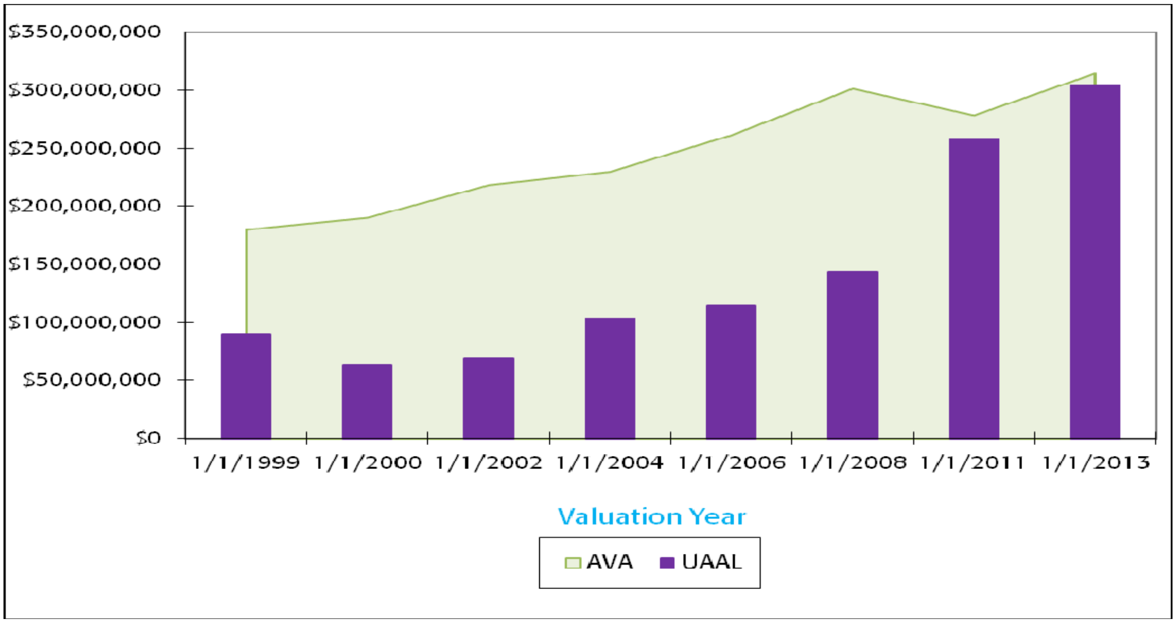
| | | January 1, 2013 | Percentage Change |
|---|---|---|---|
| Active Actuarial Accrued Liability | | | |
| Superannuation | $269,628,439 | | |
| Death | 5,646,184 | | |
| Disability | 15,367,979 | | |
| Withdrawal | 3,045,764 | | |
| Total | | $293,688,366 | 15.9% |
| Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability | | | |
| Retirees and Beneficiaries | $281,992,077 | | |
| Disabled | 36,508,254 | | |
| Inactive | 7,150,383 | | |
| Total | | 325,650,714 | 15.2% |
| | | | |
| Total Actuarial Accrued Liability (AAL) | | $619,339,080 | 15.5% |
| Actuarial Value of Assets (AVA) | | 314,565,925 | 13.0% |
| Unfunded Actuarial Accrued Liability (UAAL) | | $304,773,155 | 18.2% |
| | | | |
| Funded Ratio (AVA / AAL) | | | |
| 2013 (8.00% interest rate): | | 51% | |
| 2011 (8.25% interest rate): | | 52% | |

Actuarial Accrued Liability (AAL) is the "price" of benefits attributable to benefits earned in past years, or in other words, represents today's value of all benefits earned by active and inactive members.

The total AAL is $619,339,080. This along with an actuarial value of assets of $314,565,925 produces a funded status of 51%. This compares to a funded status of 52% for the 2011 valuation.

The chart on the following page is a history of the unfunded actuarial accrued liability (UAAL) and the valuation assets (AVA) over the course of the past eight actuarial valuations.

### History of Actuarial Valuation of Assets (AVA) and Unfunded Actuarial Accrued Liability (UAAL)




### Development of Funding Schedule

| | |
|---|---|
| Net Employer Normal Cost for Fiscal 2015 | $ 4,811,849 |
| Net 3(8)(c) payments | 1,433,638 |
| Amortization | 19,813,206 |
| Interest adjustment to payment date | 501,314 |
| Total Appropriation required for Fiscal 2015 | $26,560,007 |

- The funding schedule is composed of the normal cost, the net 3(8)(c) payments and the amortization of the actuarial accrued unfunded liability and is adjusted by the administrative expense assumption. The contribution is assumed to be made semiannually.

- The 3(8)(c) payments is the net of payments made to or from different Chapter 32 Systems to reflect benefits paid due to service either with Essex Regional or other Chapter 32 Systems.

- The contribution amount for Fiscal 2015 is $26,560,007. The funding schedule is presented on page 12. The schedule's length is twenty-one (21) years (for the fresh start base) which is the same as the remainder of the January 1, 2011 valuation schedule's length. The maximum funding schedule length allowed by Section 22F of Chapter 32 of the Massachusetts General Laws is twenty-six years, Fiscal 2040.

- In developing the funding schedule, we used a fresh start approach in which the unfunded actuarial accrued liability (UAAL), other than the UAAL due to past early retirement incentives, is reamortized instead of maintaining the existing amortization amount and separately amortizing the actuarial gain or loss. The use of a fresh-start approach can result in a funding schedule in which the changes in contribution amounts from year to year are more consistent. The amortization is adjusted each year to maintain a constant increase in the total contribution. The contribution increases 8% over the prior scheduled Fiscal 2014 contribution and by 7% for the next 4 years and 4% thereafter with a decrease in payment in FY 2035.

## FUNDING SCHEDULE

| Fiscal Year | Normal Cost | Unfunded Liability | Funding Amortization of UAL | Net 3(8)(c) Payments | Schedule Contribution | Adjusted Payments |
|---|---|---|---|---|---|---|
| 2015 | 4,811,849 | 323,255,484 | 19,813,206 | 1,433,638 | 26,058,693 | 26,560,007 |
| 2016 | 5,004,323 | 327,717,660 | 21,444,840 | 1,433,638 | 27,882,801 | 28,419,207 |
| 2017 | 5,204,496 | 343,101,543 | 23,196,464 | 1,433,638 | 29,834,597 | 30,408,552 |
| 2018 | 5,412,676 | 345,497,486 | 25,076,706 | 1,433,638 | 31,923,019 | 32,537,151 |
| 2019 | 5,629,183 | 344,600,709 | 27,094,810 | 1,433,638 | 34,157,630 | 34,814,751 |
| 2020 | 5,854,350 | 342,906,371 | 28,235,948 | 1,433,638 | 35,523,936 | 36,207,341 |
| 2021 | 6,088,524 | 339,844,057 | 29,422,731 | 1,433,638 | 36,944,893 | 37,655,635 |
| 2022 | 6,332,065 | 335,255,032 | 30,656,986 | 1,433,638 | 38,422,689 | 39,161,860 |
| 2023 | 6,585,348 | 328,965,890 | 31,940,611 | 1,433,638 | 39,959,596 | 40,728,335 |
| 2024 | 6,848,762 | 320,787,301 | 33,275,581 | 1,433,638 | 41,557,980 | 42,357,468 |
| 2025 | 7,122,712 | 310,512,658 | 34,663,950 | 1,433,638 | 43,220,299 | 44,051,767 |
| 2026 | 7,407,620 | 297,916,605 | 36,107,853 | 1,433,638 | 44,949,111 | 45,813,837 |
| 2027 | 7,703,925 | 282,753,452 | 37,609,513 | 1,433,638 | 46,747,076 | 47,646,391 |
| 2028 | 8,012,082 | 264,755,454 | 39,171,239 | 1,433,638 | 48,616,959 | 49,552,246 |
| 2029 | 8,332,566 | 243,630,953 | 40,795,434 | 1,433,638 | 50,561,637 | 51,534,336 |
| 2030 | 8,665,868 | 219,062,360 | 42,484,597 | 1,433,638 | 52,584,103 | 53,595,710 |
| 2031 | 9,012,503 | 190,703,985 | 44,241,326 | 1,433,638 | 54,687,467 | 55,739,538 |
| 2032 | 9,373,003 | 158,179,671 | 46,068,325 | 1,433,638 | 56,874,966 | 57,969,120 |
| 2033 | 9,747,923 | 121,080,254 | 47,968,403 | 1,433,638 | 59,149,964 | 60,287,884 |
| 2034 | 10,137,840 | 78,960,799 | 49,944,485 | 1,433,638 | 61,515,963 | 62,699,400 |
| 2035 | 10,543,354 | 31,337,620 | 31,337,620 | 1,433,638 | 43,314,611 | 44,147,893 |
| 2036 | 10,965,088 | - | - | 1,433,638 | 12,398,726 | 12,637,251 |

**Amortization of Unfunded Liability as of July 1, 2014**

| Year | Type | Original Amort. Amount | Percentage Increasing | Original # of Years | Current Amort. Amount | Years Remaining |
|---|---|---|---|---|---|---|
| 2003 | 2002 ERI | 4,357 | 4.50% | 26 | 7,389 | 14 |
| 2003 | 2002 ERI | 336,771 | 0.00% | 17 | 336,771 | 5 |
| 2004 | 2003 ERI | 4,229 | 4.50% | 25 | 6,863 | 14 |
| 2004 | 2003 ERI | 193,085 | 0.00% | 17 | 193,085 | 6 |
| 2015 | Fresh Start | N/A | N/A | 21 | N/A | 21 |

* Includes recognition of asset/gains and losses in Fiscal 2017 and 2019

**Notes on Amortization of Unfunded Liability**

Year is the year the amortization base was established. Type is the reason for the creation of the base.
Original Amortization Amount is the annual amortization amount when the base was established.
Percentage Increasing is the percentage that the Original Amortization Amount increases per year.
Original # of Years is the number of years over which the base is being amortized.
Current Amortization Amount is the amortization payment amount for this year.
Years Remaining is the number of years left to amortize the base.
*Fresh Start amortization is set to be the amount resulting from increasing the contribution by 8% compared to lat year's contribution (Fiscal 2014) in the first year, increasing the contribution by 7% for four years and increasing contribution by 4% thereafter, except for Fiscal 2035 where there is a decrease.

## Assumptions and Methodology Summary

The principal actuarial assumptions used in this valuation are the same as the assumptions used in the previous valuation, except where noted, and are summarized in the following table:

| | |
|---|---|
| Valuation Date | January 1, 2013 Valuation |
| Interest Rate | 8.00% |
| Salary Increase | |

| Year | Salary Increase |
|---|---|
| 0 | 7.50% |
| 1 | 6.50% |
| 2 | 6.00% |
| 3 | 5.50% |
| 4 | 5.00% |
| 5+ | 3.75% |

| | |
|---|---|
| COLA | 3% of $13,000 *($12,000 prior valuation)* |
| COLA Frequency | Granted every year |
| Mortality | RP-2000 table (sex distinct, healthy employees for actives and healthy annuitants for retirees) projected 18 years with scale AA. For members retired under an Accidental Disability (job-related), 40% of deaths are assumed to be from the same cause as the disability. Disabled mortality is the healthy retiree table ages set forward 2 years. *(Prior valuation used RP2000 projected 11 years with scale AA.)* |
| Overall Disability | |

| | Ordinary | Accidental |
|---|---|---|
| Groups 1 and 2 | 45% | 55% |
| Group 4 | 10% | 90% |

| | |
|---|---|
| Retirement Rates | Groups 1 and 2: Ages 55 – 70, Group 4: Ages 50 – 65 |
| Administrative Expense | $945,000 budget estimated for FY 2015 provided by Essex Regional Retirement Board. |

## Assets

| | | | |
|---|---|---|---|
| a. | Cash | $ | 8,577,710.41 |
| b. | Fixed Income | | 9,312.79 |
| c. | Equities | | 1.06 |
| d. | Pooled Alternative Investments | | 17,002,550.05 |
| e. | Pooled Real Estate Funds | | 11,691,813.61 |
| f. | PRIT Cash | | 3,000,424.60 |
| g. | PRIT Fund | | 262,714,185.98 |
| h. | Sub-Total: | $ | 303,244,545.50 |
| | | | |
| i. | Interest Due and Accrued | $ | 318.89 |
| j. | Accounts Receivable | | 489,314.99 |
| k. | Accounts Payable | | (41,418.41) |
| l. | Sub-Total: | $ | 448,215.47 |
| m. | Market Value of Assets [(h) + (l)] | $ | 303,692,760.97 |

- We were furnished with the System's annual report by the Board. The market value of assets as of December 31, 2012 (adjusted for payables and receivables) is $303,692,760.97.

- The asset allocation is approximately 21% cash, receivables, payables and fixed income and 79% equities, alternative investments and other similar investments.

- Historically, 10 to 11% has been the expected long-term rate of return for equities, and 6% to 7% has been the expected long-term rate of return for fixed income securities. Many economists and investment professionals are projecting lower returns of 6.25% to 9.00% for equities and 3.65 to 6.00% for fixed income securities. In light of these projections, as well as historical investment returns, the 8.00% interest rate assumption is within the reasonable assumption range. We encourage close monitoring for changes in investment performance against expectations.

## Calculation of Valuation Assets

| | | |
|---|---|---|
| 1. | Market value of assets including receivable/payable as of 01/01/2013 | $303,692,761 |

2. Phase-in of asset gains and losses

| | Plan Year (1) | Original Amount (2) | Percent Unrecognized (3) | Amount Unrecognized (2) x (3) |
|---|---|---|---|---|
| a. | 2012 | $12,876,959 | 80% | $10,301,567 |
| b. | 2011 | ($18,485,248) | 60% | ($11,091,149) |
| c. | 2010 | $8,650,025 | 40% | $3,460,010 |
| d. | 2009 | ($67,717,964) | 20% | ($13,543,593) |
| e. | Total | | | ($10,873,164) |

| | | |
|---|---|---|
| 3. | Valuation assets without corridor as of 01/01/2013<br>(1. - 2.d.) | $314,565,925 |
| 4. | Corridor Check | |
| a. | 90% of Market Value | $273,323,485 |
| b. | 110% of Market Value | $334,062,037 |
| 5. | Valuation assets with corridor as of 01/01/2012<br>3. within Corridor | $314,565,925 |
| 6. | Calculation of return on valuation assets | |
| a. | Valuation assets as of 01/01/2011 | 278,332,006 |
| b. | ER contribs + EE contribs - Ben Pymts - Expenses | (3,796,470) |
| c. | Actual return on valuation assets<br>5. - (6.a. + 6.b.) | $40,030,390 |
| d. | Weighted value of valuation assets | $270,756,233 |
| e. | Return on valuation assets<br>6.c. / 6.d. | 14.8% |
| f. | Annualized return on valuation assets | 7.1% |

## Disclosure Statement Under GASB Statement 25

### SCHEDULES OF FUNDING PROGRESS
(Dollars In Thousands)

| Actuarial Valuation Date | Actuarial Value of Assets A | Actuarial Accrued Liability B | Unfunded AAL (UAAL) B-A | Funded Ratio A/B | Covered Payroll C | UAAL as a % of Covered Payroll (B-A)/C |
|---|---|---|---|---|---|---|
| 1/1/2013 | $314,566 | $619,339 | $304,773 | 51% | $119,292 | 255% |
| 1/1/2011 | $278,332 | $536,116 | $257,784 | 52% | $119,707 | 215% |
| 1/1/2008 | $301,421 | $445,171 | $143,751 | 68% | $111,727 | 129% |
| 1/1/2006 | $261,327 | $376,035 | $114,708 | 70% | $98,641 | 116% |
| 1/1/2004 | $229,853 | $333,396 | $103,543 | 69% | $93,404 | 111% |

### Notes to Schedules

Additional information as of the latest actuarial valuation follows:

| | |
|---|---|
| Valuation date | 1/1/2013 |
| Actuarial cost method | Entry Age Normal |
| Amortization method | Approximate level percent of payroll Closed |
| Remaining amortization period | 21 years for the fresh start base |
| Asset valuation method | A five-year (20% per year) smoothing method that reflects differences between expected market asset return and actual market return. *(changed from a method that used expected asset return on actuarial value of assets)* |

### Actuarial Assumptions

| | |
|---|---|
| Investment Rate of Return | 8.00% per year |

Projected Salary Increases

| Year | Salary Increase |
|---|---|
| 0 | 7.50% |
| 1 | 6.50% |
| 2 | 6.00% |
| 3 | 5.50% |
| 4 | 5.00% |
| 5+ | 3.75% |

## PERAC Information DIsclosure

The most recent actuarial valuation of the System was prepared by Stone Consulting, Inc. as of January 1, 2013

| | | |
|---|---|---|
| The normal cost for employees on that date was: | $10,757,904 | 9.0% of payroll |
| The normal cost for the employer was: | $3,645,921 | 3.1% of payroll |

| | |
|---|---|
| The actuarial liability for active members was: | $293,688,366 |
| The actuarial liability for retired members was (includes inactives): | $325,650,714 |
| Total actuarial accrued liability: | $619,339,080 |
| System assets as of that date: | $314,565,925 |
| Unfunded actuarial accrued liability: | $304,773,155 |

| | |
|---|---|
| The ratio of system's assets to total actuarial liability was: | 51% |

| | |
|---|---|
| As of that date the total covered employee payroll was: | $119,292,287 |

The principal actuarial assumptions used in the valuation are as follows:

| | |
|---|---|
| Investment Return: | 8.00% per annum |
| Rate of Salary Increase: | 3.75% per annum (ultimate rate) |

SCHEDULE OF FUNDING PROGRESS (Dollars in $1,000's)

| Actuarial Valuation Date | Actuarial Value of Assets (a) | Actuarial Accrued Liability (AAL) (b) | Unfunded AAL (UAAL) (b-a) | Funded Ratio (a/b) | Covered Payroll (c) | UAAL as a % of Covered Payroll ((b-a)/c) |
|---|---|---|---|---|---|---|
| 1/1/2013 | $314,566 | $619,339 | $304,773 | 51% | $119,292 | 255% |
| 1/1/2011 | $278,332 | $536,116 | $257,784 | 52% | $119,707 | 215% |
| 1/1/2008 | $301,421 | $445,171 | $143,751 | 68% | $111,727 | 129% |
| 1/1/2006 | $261,327 | $376,035 | $114,708 | 70% | $98,641 | 116% |
| 1/1/2004 | $229,853 | $333,396 | $103,543 | 69% | $93,404 | 111% |

## Actuarial Methods and Assumptions

### ACTUARIAL METHODS

| | | |
|---|---|---|
| 1. | Actuarial Cost Method | The Entry Age Normal Actuarial Cost Method has been used in this valuation. Under this method, the normal cost is the amount calculated as the level percentage of compensation necessary to fully fund the prospective benefits from each member's entry age to retirement age.<br><br>The actuarial accrued liability represents the theoretical accumulation of all prior years' normal costs for the plan members as if the program had always been in effect. The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over plan assets. |
| 2. | Asset Valuation Method | Market value of assets (adjusted by payables and receivables) adjusted to phase in investment gains or losses above or below the expected rate of investment return over a five-year rolling period. The phase-in is 20% for year one, 40% for year two, 60% for year three, 80% for year four and 100% for year five. The actuarial value of assets may be no less than 90%, or more than 110% of the market value of assets plus payables and receivables. |
| 3. | Fiscal Year Adjustment | The actuarial results are adjusted by the valuation interest rate and salary scale to the beginning of Fiscal Year 2015. The unfunded actuarial accrued liability is rolled forward with normal cost and further adjusted by anticipated contributions and interest. |

### ACTUARIAL ASSUMPTIONS

| | | |
|---|---|---|
| 1. | Investment Return | 8.00% per year net of investment expenses. *(Changed from 8.25%)* |
| 2. | Salary Increases | |

| Year | Salary Increase |
|---|---|
| 0 | 7.50% |
| 1 | 6.50% |
| 2 | 6.00% |
| 3 | 5.50% |
| 4 | 5.00% |
| 5+ | 3.75% |

*(Changed from 5% flat)*

3. Withdrawal Prior to Retirement

The rates shown at the following sample ages illustrate the withdrawal assumption. Withdrawal rates are set to zero if the retirement rate at that age is nonzero.

Rate of Withdrawal

| Service | Group 1 and 2 | Group 4 |
|---|---|---|
| 0 | 15% | 1.5% |
| 1 | 12% | 1.5% |
| 2 | 10% | 1.5% |
| 3 | 9% | 1.5% |
| 4 | 8% | 1.5% |
| 5 | 7.6% | 1.5% |
| 10 | 5.4% | 1.5% |
| 15 | 3.3% | 0.0% |
| 20 | 2.0% | 0.0% |

4. Disability Prior to Retirement

The rates shown at the following sample ages illustrate the assumption regarding the incidence of disability:

Rate of Disability

| Age | Group 1 and 2 | Group 4 |
|---|---|---|
| 20 | 0.01% | 0.10% |
| 25 | 0.02% | 0.20% |
| 30 | 0.03% | 0.30% |
| 35 | 0.06% | 0.30% |
| 40 | 0.10% | 0.30% |
| 45 | 0.15% | 1.00% |
| 50 | 0.19% | 1.25% |
| 55 | 0.24% | 1.20% |
| 60 | 0.28% | 0.85% |

Disability is assumed to be 45% ordinary and 55% accidental for Group 1 and 2 and 10% ordinary and 90% accidental for Group 4.

## **Actuarial Methods and Assumptions** (Continued)

5. Rates of Retirement

The rates shown at the following ages illustrate the assumption regarding the incidence of retirement. A member would need to be eligible for the benefit to be assumed to retire. See Summary of Principal Provisions Number 5 for eligibility requirements.

**Rates of Retirement**

| Age | Group 1& 2 Male | Group 1 & 2 Female | Group 4 | Hired after 4/1/2012 Group 1& 2 Male | Hired after 4/1/2012 Group 1 & 2 Female | Hired after 4/1/2012 Group 4 |
|---|---|---|---|---|---|---|
| 50 | 1% | 1.5% | 2% | 0% | 0% | 1.5% |
| 51 | 1% | 1.5% | 2% | 0% | 0% | 1.5% |
| 52 | 1% | 2.0% | 2% | 0% | 0% | 1.5% |
| 53 | 1% | 2.5% | 2% | 0% | 0% | 1.5% |
| 54 | 2% | 2.5% | 7.5% | 0% | 0% | 5% |
| 55 | 2% | 5.5% | 15% | 0% | 0% | 10% |
| 56 | 2.5% | 6.5% | 10% | 0% | 0% | 7% |
| 57 | 2.5% | 6.5% | 10% | 0% | 0% | 20% |
| 58 | 5% | 6.5% | 10% | 0% | 0% | 10% |
| 59 | 6.5% | 6.5% | 15% | 0% | 0% | 15% |
| 60 | 12% | 5% | 20% | 25% | 30% | 20% |
| 61 | 20% | 13% | 20% | 20% | 13% | 20% |
| 62 | 30% | 15% | 25% | 30% | 15% | 25% |
| 63 | 25% | 12.5% | 25% | 25% | 12.5% | 25% |
| 64 | 22% | 18% | 30% | 22% | 18% | 30% |
| 65 | 40% | 15% | 100% | 40% | 15% | 100% |
| 66 | 25% | 20% | N/A | 25% | 20% | N/A |
| 67 | 25% | 20% | N/A | 25% | 20% | N/A |
| 68 | 30% | 25% | N/A | 30% | 25% | N/A |
| 69 | 30% | 20% | N/A | 30% | 20% | N/A |
| 70 | 100% | 100% | N/A | 100% | 100% | N/A |

6. Mortality

The RP-2000 mortality table (sex-distinct) projected 18 years with scale AA. (*Prior valuation used RP-2000 mortality table projected 10 years with scale AA.).* During employment the healthy employee mortality table is used. Post-employment the healthy annuitant table is used.

7. Disabled Life Mortality

The RP-2000 mortality table for healthy annuitants (sex-distinct) projected 18 years with scale AA set-forward by 2 years. Death is assumed to be due to the same cause as the disability 40% of the time. *(Prior valuation used RP-2000 mortality table projected 10 years with scale AA).*

## **Actuarial Methods and Assumptions** (Continued)

| | | |
|---|---|---|
| 8. | Regular Interest Rate Credited to Annuity Savings Account | 2% per year. |
| 9. | Family Composition | Members assumed married with 2 dependent children – one male and one female both age 15; age difference between member and spouse assumed to be 3 years (the male being the older). |
| 10. | Cost-of-Living Increases | A 3% COLA on the first $13,000 of a member's retirement allowance is assumed to be granted every year. *Previously $12,000.* |
| 11. | Administrative Expenses | Estimated budgeted amount of $945,000 for the Fiscal Year 2015 excluding investment management fees and custodial fee is added to the Normal Cost. |
| 12. | Step Increases | Step increases are assumed to be part of the salary increase assumption. |
| 13. | Credited Service | All service is assumed to be due to employment with the municipality. |
| 14. | 3(8)(c) | Net 3(8)(c) payments are added to the contribution amount, they have not been included in the Accrued Liability. They are assumed to remain constant. |
| 15. | Contribution Timing | Contributions are assumed to be made semi-annually |
| 16. | Valuation Date | January 1, 2013. |

## Summary of Principal Provisions

| | |
|---|---|
| 1. Participant | Participation is mandatory for all full-time employees whose employment commences before age 65. There are three classes of members in the retirement system:<br><br>*Group 1*: general employees<br><br>*Group 2*: employees in specified hazardous occupations (e.g., electricians)<br><br>*Group 4*: police and firefighters |
| 2. Member Contributions | Member contributions vary depending upon date hired as follows: |

| Date of Hire | Member Contribution Rate |
|---|---|
| Prior to 1975 | 5% of Pay |
| 1975 – 1983 | 7% of Pay |
| 1984 – June 30, 1996 | 8% of Pay |
| After June 30, 1996 | 9% of Pay |

| | |
|---|---|
| | Members hired after 1978 contribute an additional 2% of pay over $30,000. |
| 3. Pay | |
| a. Pay | Gross regular compensation excluding bonuses, overtime, severance pay, unused sick pay, and other similar compensation. |
| b. Average Pay | The average of pay during the 3 consecutive years that produce the highest average or, if greater, during the last three years (whether or not consecutive) preceding retirement. |
| 4. Credited Service | Period during which an employee contributes to the retirement system plus certain periods of military service and "purchased" service. |

## Summary of Principal Provisions (Continued)

5. Service Retirement

a. Eligibility

1) Completion of 20 years of credited service or attainment of age 55 and completion of 10 years of credited service. If hired prior to 1978 or a member of group 4, attainment of age 55.

2) Hired after April 1, 2012 and (Group 1 – Age 57, Group 2 – Age 52, Group 4 – Age 50) and completion of 10 years of service

b. Retirement Allowance

Determined as the product of the member's benefit percentage, average pay and credited service, where the benefit percentage is shown below (maximum allowance of 80% of average pay):

| Benefit Percentage | Group 1 | Group 2 | Group 4 |
|---|---|---|---|
| 2.5% | 65+ | 60+ | 55+ |
| 2.4 | 64 | 59 | 54 |
| 2.3 | 63 | 58 | 53 |
| 2.2 | 62 | 57 | 52 |
| 2.1 | 61 | 56 | 51 |
| 2.0 | 60 | 55 | 50 |
| 1.9 | 59 | N/A | 49 |
| 1.8 | 58 | N/A | 48 |
| 1.7 | 57 | N/A | 47 |
| 1.6 | 56 | N/A | 46 |
| 1.5 | 55 | N/A | 45 |
| | Hired after April 1, 2012* | | |
| 2.5% | 67+ | 62+ | 57+ |
| 2.35 | 66 | 61 | 56 |
| 2.20 | 65 | 60 | 55 |
| 2.05 | 64 | 59 | 54 |
| 1.90 | 63 | 58 | 53 |
| 1.75 | 62 | 57 | 52 |
| 1.60 | 61 | 56 | 51 |
| 1.45 | 60 | 55 | 50 |

In addition, veterans receive an additional $15 per year for each year of credited service up to 20 years

*Reduction is .125% for each year early instead of .15% per year for employees with over 30 years of service.

## Summary of Principal Provisions (Continued)

| | |
|---|---|
| 6. Deferred Vested Retirement *(continued)* | |
| b. Retirement Allowance | Determined in the same manner as 5b. with the benefit payable at age 55, (57 if hired after April 1, 2012) unless deferred until later at the member's option.<br><br>Member contributions with interest may be withdrawn after separation from service. If contributions are withdrawn, eligibility for retirement benefits is forfeited. Members hired before 1984 receive full interest on contributions that are withdrawn; otherwise, one half the credited interest is provided for members who withdraw after 5 but before 10 years of credited service and no interest is provided for withdrawals before 5 years of credited service. |
| 7. Ordinary Disability Retirement | |
| a. Eligibility | Non-job related disability after completion of 10 years of credited service. |
| b. Retirement Allowance | Determined in the same manner as 5b. with the benefit payable immediately. Veterans receive 50% of pay (during final year) plus an annuity based on accumulated member contributions with interest. |
| 8. Accidental Disability Retirement | |
| a. Eligibility | Disabled as a result of an accident in the performance of duties. No age or service requirement. |
| b. Retirement Allowance | 72% of pay plus an annuity based on accumulated member contributions with interest. Also, a dependent's allowance per year for each child. Total allowance not to exceed 100% of pay (75% for members hired after 1987). |

## Summary of Principal Provisions (Continued)

| | |
|---|---|
| 9. Non-Occupational Death | |
| a. Eligibility | Dies while in active service, but not due to occupational injury. 2 years of service. |
| b. Retirement Allowance | Benefit as if Option C had been elected (see below). Minimum monthly benefits provided as follows: spouse - $250, first child - $120, each additional child - $90. |
| 10. Occupational Death | |
| a. Eligibility | Dies as a result of an occupational injury. |
| b. Benefit Amount | Same as 8b. |
| 11. Cost-of-Living Increases | An increase of up to 3% applied to the first $13,000 of annual benefit. Funded by the Municipality from Fiscal Year 1999. Percentage increase is voted on each year by the Retirement Board. Cost-of-living increases granted during Fiscal Year 1982 through Fiscal 1998 are reimbursed by the Commonwealth. |
| 12. Optional Forms of Payment | |
| a. Option A | Allowance payable monthly for the life of the member. |
| b. Option B | Allowance payable monthly for the life of the member with a guarantee of remaining member contributions with interest. |
| c. Option C | Allowance payable monthly for the life of the member with 66-2/3% continuing to the member's beneficiary upon the member's death. If the beneficiary predeceases the member, the allowance amount "pops up" to the non-reduced amount. |

## Glossary of Terms

| | | |
|---|---|---|
| 1. | Present Value of Benefits | Represents the dollar value today of all benefits expected to be earned by current members if all actuarial assumptions are exactly realized. |
| 2. | Actuarial Cost Method | The procedure that is used to allocate the present value of benefits between the liability that is attributable to past service (Actuarial Accrued Liability) and that attributable to future service. |
| 3. | Actuarial Assumptions | Estimates are made as to the occurrence of certain events that determine the level of benefits to be paid and how long they will be provided. The more important actuarial assumptions include the investment return on assets, salary increases and the rates of turnover, disability, retirement and mortality. |
| 4. | Actuarial Accrued Liability | The portion of the Present Value of Benefits that is attributable to past service. |
| 5. | Normal Cost | The portion of the Present Value of Benefits that is attributable to benefits to be earned in the coming year. |
| 6. | Actuarial Assets | Market value of assets (adjusted by payables and receivables) adjusted to phase in investment gains or losses above or below the expected rate of investment return over a five-year rolling period. The phase-in is 20% for year one, 40% for year two, 60% for year three, 80% for year four and 100% for year five. The actuarial value of assets may be no less than 90%, or more than 110% of the market value of assets plus payables and receivables. |
| 7. | Unfunded Actuarial Accrued Liability | That portion of the Actuarial Accrued Liability not covered by System Assets. |
| 8. | PERAC | Public Employee Retirement Administration Commission, a division of the State government which has regulatory authority over the administration of the retirement system. |

### Glossary of Terms (Continued)

| | | |
|---|---|---|
| 9. | PRIT | Pension Reserves Investment Trust Fund is the state controlled and administered fund for the investment of assets for members of the retirement system. |
| 10. | GASB | Government Accounting Standards Board (issues guidance for disclosure of retirement system liabilities). |
| 11. | 3(8)(c) Payment | Payment made by a retirement system to another retirement system. The purpose is to reimburse the portion of a retirement allowance due to service with a previous retirement system. |