

January 1, 2016

Actuarial Valuation Report

Essex Regional Retirement System

Lawrence B. Stone



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February 3, 2017

Essex Regional Retirement System  
491 Maple Street  
Suite 202  
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Dear Essex Regional Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2016 actuarial valuation of the Essex Regional Retirement System (ERRS). This valuation and report was prepared using generally accepted actuarial principles and practices and meets the parameters set by the Governmental Accounting Standards Board. 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 except where noted in the text.

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 eighteen years (fully funded by 2035). The total appropriation is set to increase by 7.41% annually for the first five years, followed by a 6.36% increase, and 4.00% increase thereafter until the final year, when the contribution increases by 3.89%.

The contribution amount for Fiscal Year 2018 is \$32,199,894, a \$92,808 increase compared to the anticipated contribution amount from the prior funding schedule, including changes made based on a letter study on the effect of the departure of the Essex Agricultural and Technical School. 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, 2014.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, increases or decreases expected as part of natural operation of the methodology used for these measurements such as additional contribution requirements based on the plan's funded status, and changes in plan provisions or applicable law. As part of the valuation, we have not performed an analysis of the potential range of future measurements.

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.

I, Lawrence Stone, am a consultant for Stone Consulting, Inc. I am a member of the American Academy of Actuaries and meet 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



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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, 2016 for the purpose of determining the contribution requirements for Fiscal Year 2018 and beyond. The contribution requirements are based on:

- The financial condition of the system as of December 31, 2015
- 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, 2016);
- Economic assumptions regarding salary increases and investment earnings; and
- Other actuarial assumptions (e.g., withdrawals, retirement, death, etc.)

## Valuation Summary

	January 1, 2016 Valuation	January 1, 2014 Valuation	Change
Contribution Fiscal 2018	\$32,199,894	\$32,107,086	\$92,808 increase
Funding Schedule Length (as of Fiscal 2018)	18 years	18 years	Same
Contribution Increase	7.41%	7.00%	0.41% increase
Funding Ratio	52%	48%	3%
Interest Rate Assumption	7.75%	8.00%	-0.25%
Salary Increase Rate Assumption	3.75% ultimate rate, plus the following steps:  7.50% in year one, 6.50% in year two, 6.00% in year three, 5.50% in year four, 5.00% in year five	Same select and ultimate assumption	No change

- The Fiscal Year 2018 contribution is \$32,199,894, equal to a \$92,808 increase compared to the planned 2018 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 System, over the two-year period from January 1, 2014 to December 31, 2015, experienced a 4.8% annual return on the market value of assets versus our assumption of 8.00%. There was a \$22,628,030 net actuarial asset loss in calendar years 2014 and 2015. The System's asset portfolio, effective December 31, 2015 is approximately 80% equities and 20% fixed income and short-term investments. The interest rate assumption was reduced to 7.75% to reflect anticipated future market performance. This change increased the actuarial accrued liability by \$18.6 million.
- The investment return assumption is a long term assumption and is based on capital market expectations by asset class, historical returns, and professional judgement.
- The salary increase assumption is based on a select and ultimate table, with a 3.75% ultimate rate. Employees receive a 7.50% step in their first year of service, followed by a 6.50% step in year two, 6.00% in year three, 5.50% in year four, and 5.00% in year five. This assumption has been maintained from the prior valuation. Total compensation changed by 6.0% over the prior valuation; however average annual compensation (compensation divided by number of active members) changed by 5.1%.
- The salary increase assumption reflects prior experience including PERAC's 2002 local experience study, current expectations, and professional judgement.
- The funding level of the Essex Regional Retirement System is 52% compared to 48% for the January 1, 2014 actuarial valuation. The funding level is estimated to be near the median for Massachusetts' Contributory Retirement Systems.

The schedule length is eighteen (18) years, a length consistent with the 18 years remaining from the 20 year schedule from the January 1, 2014 valuation. The maximum period permitted under Section 22F of Chapter 32 of the Massachusetts General Laws is twenty-three years (Fiscal 2040). The contribution is set to increase by 7.41% compared to the prior year, followed by another four years of 7.41% increases, a 6.36% increase, and 4.00% increases thereafter. The contribution in the final year (Fiscal 2035) increases by 3.89%.

- The mortality assumption is based upon the RP-2000 table projected with Generational Mortality, scale BB, with a base year of 2000. This has been maintained from the prior valuation.
- The COLA Base is assumed to increase from \$13,000 to \$14,000. The Retirement Board Advisory Council is expected to vote on increasing the COLA Base to \$14,000 in the Spring of 2017.

### January 1, 2016 Actuarial Valuation Results

	January 1, 2016	January 1, 2014	Percentage Change
<b>Funding</b>			
Contribution for Fiscal 2018	\$32,199,894		-1.0%
Contribution for Fiscal 2018 based on current schedule		\$32,537,151	
<b>Members</b>			
■ Actives			
a. Number	2,738	2,714	0.9%
b. Annual Compensation	\$126,928,690	\$119,733,698	6.0%
c. Average Annual Compensation	\$46,358	\$44,117	5.1%
d. Average Attained Age	49.0	49.3	-0.6%
e. Average Past Service	11.0	11.2	-1.8%
■ Retired, Disabled and Beneficiaries			
a. Number	1,768	1,725	2.5%
b. Total Benefits*	\$39,214,807	\$35,797,918	9.5%
c. Average Benefits*	\$22,180	\$20,752	6.9%
d. Average Age	72.7	72.8	-0.1%
■ Inactives			
a. Number	1,030	1,118	-7.9%
<b>Normal Cost</b>			
a. Total Normal Cost as of January 1, 2016	\$16,634,897	\$14,994,053	10.9%
b. Less Expected Members' Contributions	<u>11,619,360</u>	<u>10,822,926</u>	7.4%
c. Normal Cost to be funded by the Municipality	\$5,015,537	\$4,171,127	20.2%
d. Adjustment to July 1, 2017	303,922	252,754	20.2%
e. Administrative Expense Assumption	<u>1,127,500</u>	<u>1,111,000</u>	1.5%
f. Normal Cost Adjusted to July 1, 2017	\$6,446,958	\$5,534,881	16.5%
<b>Actuarial Accrued Liability as of January 1, 2016</b>			
a. Active Members	\$339,362,115	\$314,583,476	7.9%
b. Inactive Members	10,170,214	9,066,375	12.2%
c. Retired Members and Beneficiaries	<u>396,051,329</u>	<u>352,824,351</u>	12.3%
d. Total	\$745,583,658	\$676,474,202	10.2%
<b>Unfunded Actuarial Accrued Liability</b>			
a. Actuarial Accrued Liability as of January 1, 2016	\$745,583,658	\$676,474,202	10.2%
b. Less Actuarial Value of Assets as of January 1, 2016	<u>386,739,097</u>	<u>327,727,973</u>	18.0%
c. Unfunded Actuarial Accrued Liability as of January 1, 2016	\$358,844,560	\$348,746,229	2.9%
d. Adjustment to July 1, 2017	<u>20,341,946</u>	<u>22,508,504</u>	
e. Unfunded Actuarial Accrued Liability as of July 1, 2017	\$379,186,506	\$371,254,733	

\*Excluding State reimbursed COLA

### Data and History of Active Participants

- 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.

Valuation Year	Number	Average Age	Average Past Service	Average Ann'l Compensation
2016	2,738	49.0	11.0	\$46,358
2014	2,714	49.3	11.2	\$44,117
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 1.6 years and service has increased by 1.2 years over the course of the past eight years. This is consistent with the trend in the Commonwealth towards an aging of the employee population. Average annual compensation has grown by 36.4% (4.0% annually) over the same time period. Some of the increase in average compensation may be caused by changes in the law which excluded employees who made less than \$5,000 per year.

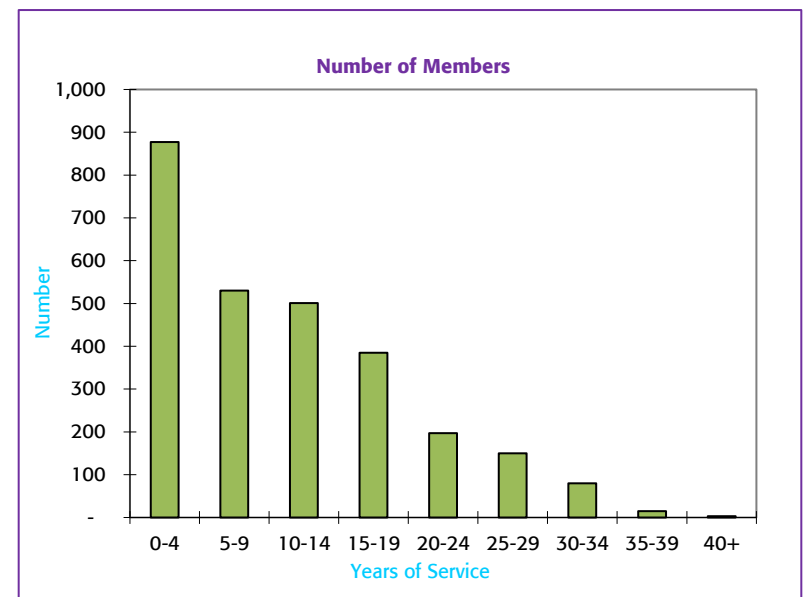
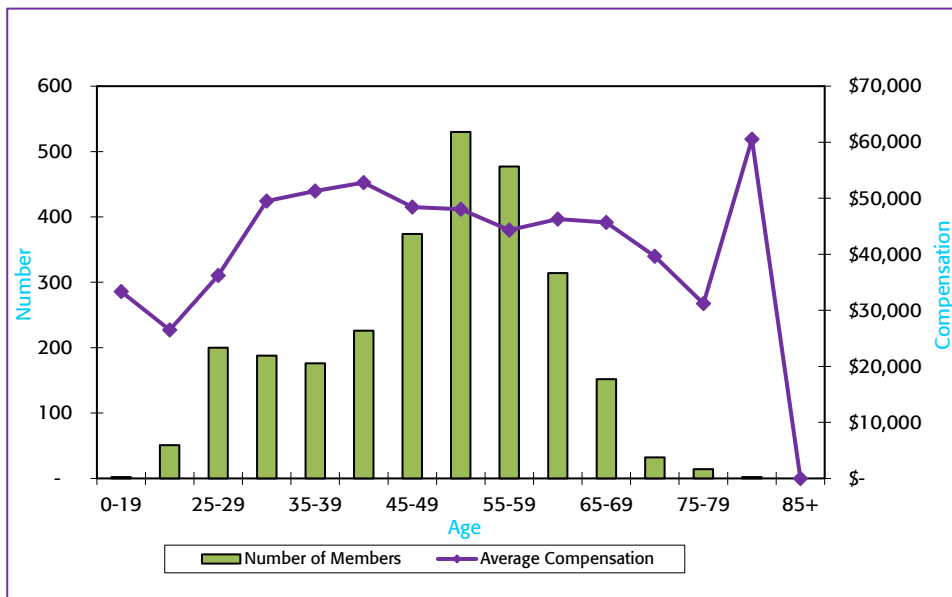
The charts on the following pages summarize demographic information regarding active and retiree members.



## Distribution of Plan Members as of January 1, 2016

### 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	2	-	-	-	-	-	-	-	-	2	\$ 66,691	\$ 33,346
20-24	51	-	-	-	-	-	-	-	-	51	\$ 1,350,703	\$ 26,484
25-29	184	16	-	-	-	-	-	-	-	200	\$ 7,240,194	\$ 36,201
30-34	97	73	18	-	-	-	-	-	-	188	\$ 9,304,739	\$ 49,493
35-39	79	35	48	14	-	-	-	-	-	176	\$ 9,028,133	\$ 51,296
40-44	88	37	53	36	12	-	-	-	-	226	\$ 11,933,770	\$ 52,804
45-49	111	82	65	54	39	22	1	-	-	374	\$ 18,115,145	\$ 48,436
50-54	129	124	92	77	34	53	20	1	-	530	\$ 25,463,519	\$ 48,044
55-59	73	87	120	88	47	32	26	3	1	477	\$ 21,132,152	\$ 44,302
60-64	50	54	60	68	30	22	21	8	1	314	\$ 14,526,203	\$ 46,262
65-69	11	17	37	35	29	12	7	3	1	152	\$ 6,941,162	\$ 45,666
70-74	2	3	6	7	3	8	3	-	-	32	\$ 1,268,216	\$ 39,632
75-79	-	1	2	6	3	1	1	-	-	14	\$ 436,991	\$ 31,214
80-84	-	1	-	-	-	-	1	-	-	2	\$ 121,071	\$ 60,536
85+	-	-	-	-	-	-	-	-	-	-	\$ -	\$ -
<b>TOTAL</b>	<b>877</b>	<b>530</b>	<b>501</b>	<b>385</b>	<b>197</b>	<b>150</b>	<b>80</b>	<b>15</b>	<b>3</b>	<b>2,738</b>	<b>\$ 126,928,690</b>	<b>\$ 46,358</b>



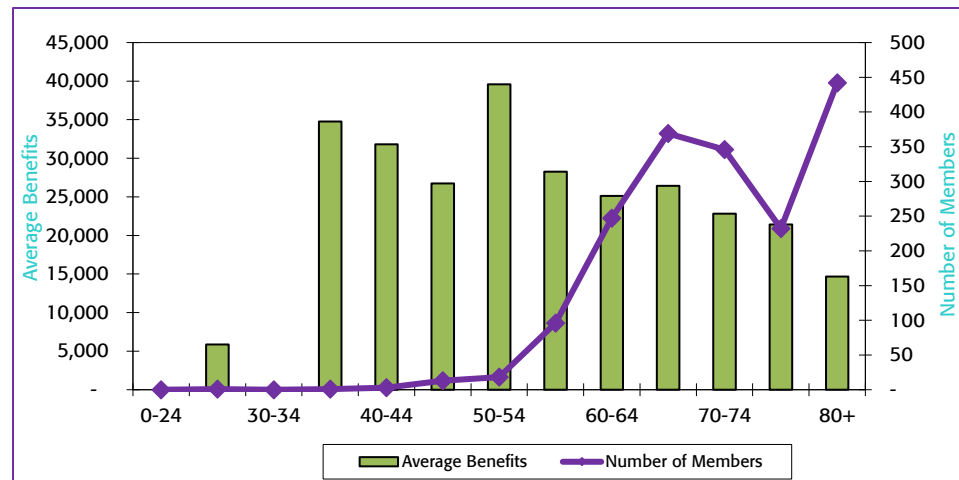
## Distribution of Plan Members as of January 1, 2016

### RETIRED MEMBERS

Retired Members and Beneficiaries			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	1	5,872	5,872
30-34	-	-	-
35-39	1	34,752	34,752
40-44	1	37,023	37,023
45-49	5	19,041	95,203
50-54	11	41,906	460,967
55-59	79	26,406	2,086,042
60-64	221	24,216	5,351,685
65-69	347	26,145	9,072,472
70-74	325	22,441	7,293,231
75-79	220	21,557	4,742,525
80+	429	14,415	6,184,131
<b>TOTAL</b>	<b>1,640</b>	<b>\$ 21,563</b>	<b>\$ 35,363,904</b>

Disabled Members			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	2	29,205	58,410
45-49	8	31,572	252,575
50-54	7	35,984	251,890
55-59	17	36,988	628,791
60-64	26	32,825	853,439
65-69	22	30,901	679,825
70-74	21	28,778	604,347
75-79	12	18,657	223,888
80+	13	22,903	297,739
<b>TOTAL</b>	<b>128</b>	<b>\$ 30,085</b>	<b>\$ 3,850,903</b>

Total			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	1	5,872	5,872
30-34	-	-	-
35-39	1	34,752	34,752
40-44	3	31,811	95,434
45-49	13	26,752	347,777
50-54	18	39,603	712,857
55-59	96	28,280	2,714,834
60-64	247	25,122	6,205,125
65-69	369	26,429	9,752,297
70-74	346	22,825	7,897,577
75-79	232	21,407	4,966,413
80+	442	14,665	6,481,871
<b>TOTAL</b>	<b>1,768</b>	<b>\$ 22,180</b>	<b>\$ 39,214,807</b>



Benefits shown are net of State reimbursed COLA.

## 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

	January 1, 2016	% of Payroll*
Gross Normal Cost (GNC)	\$ 16,634,897	13.1%
Employees Contribution	11,619,360	9.2%
Net Normal Cost (NNC)	5,015,537	4.0%
Adjusted to Beginning of Fiscal Year 2018	303,922	
Administrative Expense	<u>1,127,500</u>	0.9%
Adjusted Net Normal Cost With Admin. Expense	\$ 6,446,958	

\*Payroll paid in 2015 for employees as of January 1, 2016 is \$126,928,690. Payroll for new hires in 2015 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, 2016	Percentage Change
<b>Active Actuarial Accrued Liability</b>	\$	339,362,115	7.9%
Superannuation	\$ 312,553,912		
Death	\$ 6,787,015		
Disability	\$ 16,481,687		
Withdrawal	\$ 3,539,501		
<b>Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability</b>	\$	406,221,543	12.2%
Retirees and Beneficiaries	\$ 351,636,558		
Disabled	\$ 44,414,771		
Inactive	\$ 10,170,214		
<b>Total Actuarial Accrued Liability (AAL)</b>	\$	745,583,658	10.2%
<b>Actuarial Value of Assets (AVA)</b>	\$	386,739,097	18.0%
<b>Unfunded Actuarial Accrued Liability</b>	\$	358,844,560	2.9%
<b>Funded Ratio (AVA / AAL)</b>			
2016 (7.75% interest rate):	52%		
2014 (8.00% interest rate):	48%		

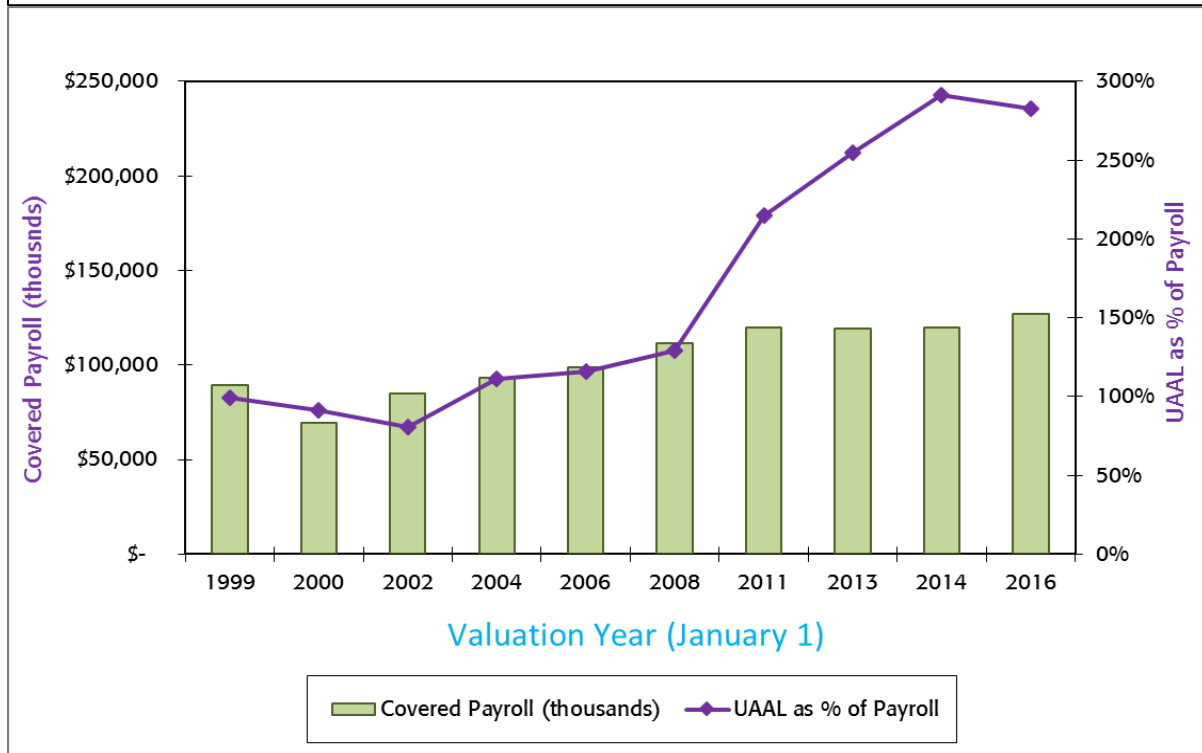
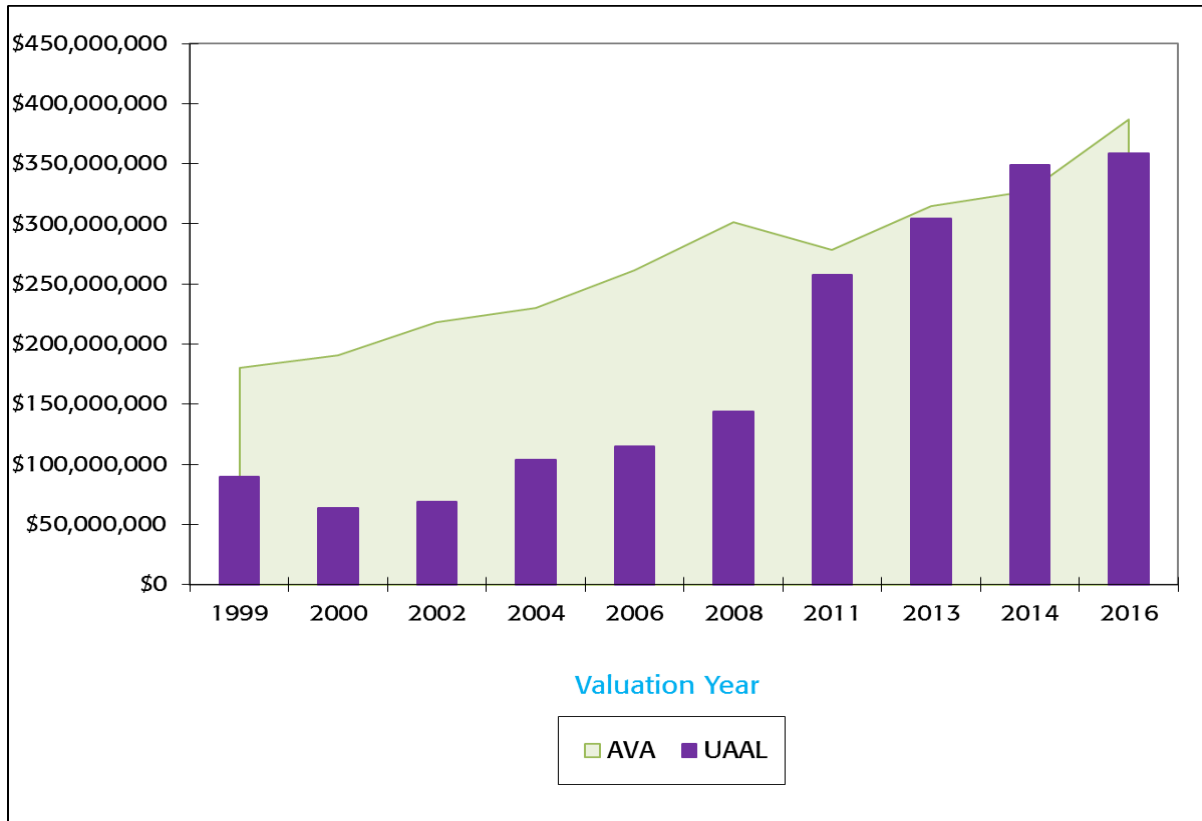
- Actuarial Accrued Liability (AAL) is the “price” of benefits attributable to benefits earned in past years, or in other words, represents today’s value of all benefits earned by active and inactive members.

The total AAL is \$745,583,658. This along with an actuarial value of assets of \$386,739,097 produces a funded status of 52%. This compares to a funded status of 48% for the 2014 valuation. The funded status with Market Value of Assets (MVA) is 51%.

The UAAL and funded ratio are measures of the plan’s funded status. These measures reflect the plan’s position as of January 1, 2016. We believe these measures, by themselves, are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan’s benefit obligations or assessing the need for or the amount of future contributions. However, we believe these measures, in conjunction with the plan’s funding schedule, are appropriate for assessing the amount of future contributions.

The chart on the following page contains a history of the unfunded actuarial accrued liability (UAAL), the valuation assets (AVA), and covered payroll over the course of the past ten actuarial valuations.

### Charts of Selected Actuarial and Demographic Statistics



### Development of Funding Schedule

Net Employer Normal Cost for Fiscal 2018 (including admin. expenses)	6,446,958
Net 3(8)(c) Payments	1,081,739
Amortization	24,081,393
Total Appropriation required for Fiscal 2018	32,199,894

- 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 at the beginning of the fiscal year. The 3(8)(c) payments are the amount that the Essex Regional Retirement System pays to or receives from other retirement boards for service that a retiree had with a different retirement system. The net 3(8)(c) payments is the difference between what the Essex Regional Retirement System paid out minus what was received by the System.
- The contribution amount for Fiscal 2018 is \$32,199,894. The funding schedule is presented on page 11. The schedule's length is eighteen (18) years (for the fresh start base) which is equal to the remainder of the 20-year schedule from the January 1, 2014 valuation. The maximum funding schedule length allowed by Section 22F of Chapter 32 of the Massachusetts General Laws is twenty-three years to Fiscal 2040.
- In the time since the prior valuation, the Essex Agricultural and Technical School ceased to be a participating employer in the Essex Regional Retirement System. The contribution for Fiscal 2018 differs from the amount shown in the January 1, 2014 valuation report for this reason. A letter study was performed by Stone Consulting, Inc. to determine the effect of the Agricultural School's departure and to adjust the ERRS funding schedule accordingly. The successor agency to the Essex Agricultural and Technical High School is the Essex Technical High School (ETHS). The ETHS has agreed to make level annual payments of \$421,947 to the ERRS for 17 years. The present value of the payments to be made by the ETHS has been reflected as an asset which reduces the UAAL.
- 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 contribution is set to increase by 7.41% for five years, followed by a 6.36% increase, and 4.00% increases until the final year (Fiscal 2035) when the contribution increases by 3.89%.

# ESSEX REGIONAL CONTRIBUTORY RETIREMENT SYSTEM

## FUNDING SCHEDULE

Fiscal Year	Normal Cost	Unfunded Liability*	Funding Amortization of UAAL	Net 3(8)(c) Payments	Schedule Contribution**	Adjusted Payments	% Change
2018	6,446,958	379,186,506	24,081,393	1,081,739	31,610,090	32,199,894	7.41%
2019	6,704,836	382,625,759	26,165,823	1,081,739	33,952,398	34,585,906	7.41%
2020	6,973,030	382,960,554	28,413,502	1,081,739	36,468,271	37,148,722	7.41%
2021	7,251,951	382,024,448	30,836,880	1,081,739	39,170,569	39,901,442	7.41%
2022	7,542,029	387,929,969	33,449,341	1,081,739	42,073,109	42,858,139	7.41%
2023	7,843,710	381,952,877	35,823,509	1,081,739	44,748,958	45,583,917	6.36%
2024	8,157,459	372,954,393	37,299,719	1,081,739	46,538,917	47,407,273	4.00%
2025	8,483,757	361,667,911	38,834,978	1,081,739	48,400,473	49,303,564	4.00%
2026	8,823,107	347,852,486	40,431,646	1,081,739	50,336,492	51,275,707	4.00%
2027	9,176,031	331,245,955	42,092,182	1,081,739	52,349,952	53,326,735	4.00%
2028	9,543,073	311,563,191	43,819,138	1,081,739	54,443,950	55,459,804	4.00%
2029	9,924,796	288,494,217	45,615,173	1,081,739	56,621,708	57,678,197	4.00%
2030	10,321,787	261,702,169	47,483,050	1,081,739	58,886,576	59,985,324	4.00%
2031	10,734,659	230,821,101	49,425,642	1,081,739	61,242,039	62,384,737	4.00%
2032	11,164,045	195,453,607	51,445,937	1,081,739	63,691,721	64,880,127	4.00%
2033	11,610,607	155,168,265	53,547,044	1,081,739	66,239,390	67,475,332	4.00%
2034	12,075,031	109,496,866	55,732,195	1,081,739	68,888,965	70,174,345	4.00%
2035	12,558,033	57,931,433	57,931,433	1,081,739	71,571,205	72,906,632	3.89%
2036	13,060,354	-	-	1,081,739	14,142,093	14,405,966	-80.24%

### Amortization of Unfunded Liability as of July 1, 2017

Year	Type	Original Amort. Amount	Percentage Increasing	Original # of Years	Current Amort. Amount	Years Remaining
2003	2002 ERI	4,357	4.50%	26	8,189	11
2003	2002 ERI	336,771	0.00%	17	330,234	2
2004	2003 ERI	4,229	4.50%	25	7,605	11
2004	2003 ERI	193,085	0.00%	17	189,132	3
2018	Fresh Start	N/A	N/A	18	N/A	18

### 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.

\* Includes recognition of the following asset gains/(losses) in Fiscal 2020 and 2022:

2020	1,125,028
2022	(9,525,364)

\*\* Contribution is set to be the amount resulting from a 7.41% increase on the prior year's contribution, followed by four years of 7.41% increases, one increase of 6.36% in FY2023, and 4% increases thereafter. The contribution in FY2035 increases by 3.89%.

## 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, 2016 Valuation
Interest Rate	7.75% (same as prior valuation).
Salary Increase	3.75% Ultimate rate, with the following steps: <ul style="list-style-type: none"> <li>• 7.50% in year one</li> <li>• 6.50% in year two</li> <li>• 6.00% in year three</li> <li>• 5.50% in year four</li> <li>• 5.00% in year five</li> </ul>
COLA	3% of \$13,000
COLA Frequency	Granted every year
Mortality	RP-2000 table projected with Generational Mortality, scale BB, with a base year of 2000. 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 RP-2000 table projected with Generational Mortality, scale BB, with a base year of 2000, ages set forward 2 years. Prior valuation used the same assumption.
Overall Disability	Groups 1 and 2 45% ordinary disability 55% accidental disability  Group 4 10% ordinary disability 90% accidental disability
Retirement Rates	Groups 1 and 2 Ages 55 – 70  Group 4 Ages 50 – 65
Administrative Expense	\$1,127,500 budget estimated for FY 2018 provided by Essex Regional Retirement Board.



## Assets

	Cash	\$	2,401,994.41
	Fixed Income Securities		5,184.16
	Equities		.74
	Pooled Alternative Investments		14,860,341.01
	Pooled Real Estate Funds		6,011,638.27
	PRIT Cash		1,750,709.72
	PRIT FUND		<u>348,472,537.65</u>
A	Sub-Total:	\$	373,502,405.96
	Interest Due and Accrued		130.17
	Accounts Receivable		1,374,955.34
	Buildings		390,830.00
	Accumulated Depreciation - Buildings		-185,405.00
	Accounts Payable		<u>(900,909.28)</u>
B	Sub-Total:	\$	679,601.23
	Market Value of Assets [(A) + (B)]	\$	374,182,007.19

- We were furnished with the System's annual report by the Board. The market value of assets as of December 31, 2015 (adjusted for payables and receivables) is \$374,182,007.19.
- The asset allocation is approximately 20% fixed income, cash, receivables and payables and 80% equities, alternative investments, hedge funds and similar types of 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 7.75% interest rate assumption is within the reasonable assumption range. We encourage close monitoring for changes in investment performance against expectations.
- Actuarial value of assets (AVA) of \$386,739,097 is based on a five-year smoothing method. Investment gains or losses above or below the expected rate of investment return are recognized over 5 years, 20% per year. The AVA must be no more than 110% of the market value of assets and no less than 90% of the market value of assets.

## Calculation of Valuation Assets as of January 1, 2016

### FIVE-YEAR ASSET SMOOTHING

1. Market value of assets including receivable/payable as of 01/01/2016 378,338,762

2. Phase-in of asset gains and losses

	Plan Year (1)	Original Amount (2)	Percent Unrecognized (3)	Amount Unrecognized (2) x (3)
a.	2015	(\$24,998,788)	80%	(\$19,999,030)
b.	2014	\$2,370,758	60%	\$1,422,455
c.	2013	\$19,002,120	40%	\$7,600,848
d.	2012	\$12,876,959	20%	\$2,575,392
e.	2011	(\$18,485,248)	0%	\$0
f.	2010	\$8,650,025	0%	\$0
g.	Total	(\$9,234,198)		(\$8,400,335)

3. Valuation assets without corridor as of 01/01/2016  
(1. - 2.g.) \$386,739,097

4. Corridor Check

a. 90% of Market Value \$340,504,886  
b. 110% of Market Value \$416,172,638

5. Valuation assets with corridor as of 01/01/2016  
(3. within Corridor) \$386,739,097

6. Calculation of return on valuation assets

a. Valuation assets as of 01/01/2014 \$327,727,973  
b. ER contribs + EE contribs - Ben Pymts - Expenses \$(89,939)  
c. Actual return on valuation assets \$59,101,064  
5. - (6.a. + 6.b.)  
d. Weighted value of valuation assets \$312,077,771  
e. Return on valuation assets 18.9%  
(6.c. / 6.d.)  
f. Annualized return on assets 9.1%

## Disclosure Information

### 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
1/1/2016	\$386,739	\$745,584	\$358,845	52%	\$126,929	283%
1/1/2014	\$327,728	\$676,474	\$348,746	48%	\$119,734	291%
1/1/2013	\$314,566	\$619,339	\$304,773	51%	\$119,292	255%
1/1/2011	\$278,332	\$536,116	\$257,784	52%	\$119,702	215%
1/1/2008	\$301,421	\$445,171	\$143,751	68%	\$111,727	129%

### NOTES TO SCHEDULES

Additional information as of the latest actuarial valuation follows:

Valuation Date	1/1/2016
Actuarial cost method	Entry Age Normal
Amortization method	7.41% contribution increases for five years, 6.36% for one year, 4.00% increases thereafter
Remaining amortization period	18 years for the fresh start base
Asset valuation method	Market value adjusted by accounts payable and receivables adjusted to phase in over 5 years investment gains or losses above or below the expected rate of investment return. The actuarial value of assets must be no less than 90% of the adjusted market value nor more than 110% of the adjusted market value. Market value of assets is \$374,182,007.19
<b>Actuarial assumptions:</b>	
Investment Rate of Return	7.75% per year (8.00% in prior valuation)
Projected Salary Increases	3.75% Ultimate rate, with the following steps: <ul style="list-style-type: none"> <li>• 7.50% in year one</li> <li>• 6.50% in year two</li> <li>• 6.00% in year three</li> <li>• 5.50% in year four</li> <li>• 5.00% in year five</li> </ul>

### PERAC Information Disclosure

The most recent actuarial valuation of the System was prepared by Stone Consulting, Inc. as of January 1, 2016

The normal cost for employees on that date was:	\$11,619,360	9.2% of payroll
The normal cost for the employer was:	\$5,015,537	4.0% of payroll

The actuarial liability for active members was:	\$339,362,115
The actuarial liability for retired members was (includes inactives):	\$406,221,543
Total actuarial accrued liability:	\$745,583,658
System assets as of that date (\$374,182,007.19 Market Value):	\$386,739,097
Unfunded actuarial accrued liability:	\$358,844,560

The ratio of system's assets to total actuarial liability was:	52%
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As of that date the total covered employee payroll was:	\$126,928,690
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The principal actuarial assumptions used in the valuation are as follows:

Investment Return:	7.75% per annum (8.00% in prior valuation)
Rate of Salary Increase:	Select and ultimate rate (3.75% ultimate rate)

### SCHEDULE OF FUNDING PROGRESS (Dollars in \$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)
1/1/2016	\$386,739	\$745,584	\$358,845	52%	\$126,929	283%
1/1/2014	\$327,728	\$676,474	\$348,746	48%	\$119,734	291%
1/1/2013	\$314,566	\$619,339	\$304,773	51%	\$119,292	255%
1/1/2011	\$278,332	\$536,116	\$257,784	52%	\$119,702	215%
1/1/2008	\$301,421	\$445,171	\$143,751	68%	\$111,727	129%

## Actuarial Methods and Assumptions

### ACTUARIAL METHODS

#### 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.

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.

#### 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 finally 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.

As part of the Market Value of Assets, we included a receivable of \$4,156,754.81. This amount represents the present value of the expected payments from the Essex Technical High School. These payments are to compensate the ERRS for the net liability associated with the retirees of the former Essex Agricultural and Technical High School (EATHS). The Essex Technical High School is the successor employer following the dissolution of the EATHS. The existing retirees stayed with the ERRS while the new school became part of the Salem Retirement System. Therefore, payments have been agreed upon to reimburse the ERRS with the cost of paying the retiree benefits.

#### Fiscal Year Adjustment

The actuarial results are adjusted by the valuation interest rate and salary scale to the beginning of Fiscal Year 2018. The unfunded actuarial accrued liability is rolled forward with normal cost and further adjusted by anticipated contributions and interest.

### ACTUARIAL ASSUMPTIONS

#### Investment Return

7.75% per year net of investment expenses.

#### Regular Interest Rate Credited to Annuity Savings Account

2% per year.

#### Salary Increases

3.75% Ultimate rate, with the following steps:

- 7.50% in year one; 6.50% in year two; 6.00% in year three; 5.50% in year four; 5.00% in year five

## Actuarial Methods and Assumptions (Continued)

### 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%
25	1.0%	0.0%
30+	0.0%	0.0%

### 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)

### Rates of Retirement

The rates shown at the following ages illustrate the assumption regarding the incidence of retirement, once the member has achieved 10 years of service:

Age	Group 1 & 2 Male	Group 1 & 2 Female	Group 4	Hired after 4/1/2012		
				Group 1 & 2 Male	Group 1 & 2 Female	Group 4
50	1%	1.5%	2%	0%	0%	0%
51	1%	1.5%	2%	0%	0%	0%
52	1%	2.0%	2%	0%	0%	0%
53	1%	2.5%	2%	0%	0%	0%
54	2%	2.5%	7.5%	0%	0%	0%
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

### Mortality

RP-2000 table projected with Generational Mortality, scale BB, with a base year of 2000 (sex-distinct). Prior valuation used the same assumption. During employment the healthy employee mortality table is used. Post-employment the healthy annuitant table is used. In-service death is assumed to be 55% accidental for group 1 and 2 and 90% accidental for group 4.

### Disabled Life Mortality

RP-2000 table projected with Generational Mortality, scale BB for healthy annuitants, with a base year of 2000, set-forward by 2 years (sex-distinct). Death is assumed to be due to the same cause as the disability 40% of the time. Prior valuation used the same assumption.

## Actuarial Methods and Assumptions (Continued)

### 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).

### Cost-of-Living Increases

Calculations were performed assuming that a 3% COLA on the first \$14,000 of a member's retirement allowance is granted every year. The COLA Base is currently \$13,000 but is assumed to increase to \$14,000.

### Administrative Expenses

Estimated budgeted amount of \$1,127,500 for the Fiscal Year 2018 excluding investment management fees and custodial fee is added to the Normal Cost.

### Net 3(8)(c)

Net 3(8)(c) payments are assumed to be the same level as the past calendar year for all future years.

### Step Increases

Step increases are assumed to be part of the salary increase assumption.

### Credited Service

All service is assumed to be due to employment with the municipality.

### Contribution Timing

Contributions are assumed to be made at the beginning of the fiscal year.

### Total Payroll Increase

The total payroll is assumed to increase at 4.00% per year.

### Valuation Date

January 1, 2016.



## 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:

- **Group 1:** general employees
- **Group 2:** employees in specified hazardous occupations (e.g., electricians)
- **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 three consecutive years that produce the highest average or, if greater, during the last three years (whether or not consecutive) preceding retirement. For members hired after April 1, 2012, five-year averages will be used.

### 4. CREDITED SERVICE

Period during which an employee contributes to the retirement system plus certain periods of military service and "purchased" service.

### 5. SERVICE RETIREMENT

#### a. Eligibility

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.

## Summary of Principal Provisions (Continued)

### 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

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

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

## 6. DEFERRED VESTED RETIREMENT

### a. Eligibility

Completion of 10 years of credited service (for elected and appointed members, 6 years in the event of involuntary termination).

### b. Retirement Allowance

Determined in the same manner as "Service Retirement" section above with the member eligible to start collecting a benefit at age 55, (or age 57 for post-April 1, 2012 hires) or defer until later at his or her discretion. If a member chooses, his or her contributions with interest may be withdrawn. The amount of interest he or she will receive depends on length of service and whether or not the termination of employment was voluntary.

## Summary of Principal Provisions (Continued)

### 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 "Service Retirement" section and calculated as if the member had attained age 55 (or age 57 for those hired after April 1, 2012), if younger. 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).

### 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) and member had attained age 55 (or age 57 for those hired after April 1, 2012) if younger. Minimum monthly benefits provided as follows: spouse - \$500, first child - \$120, each additional child - \$90

### 10. OCCUPATIONAL DEATH

#### a. Eligibility

Dies as a result of an occupational injury.

#### b. Benefit Amount

72% of pay plus refund of annuity savings fund balance. In the case of an accidental disability retiree who dies of the same cause, the beneficiary receives 72% of the last 12 months salary or the current pension amount, whichever is greater.

## Summary of Principal Provisions (Continued)

### 11. COST-OF-LIVING INCREASES

An increase of up to 3% applied to the first \$13,000 of annual benefit. Funded by the employer 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. As noted, the COLA Base has been assumed to increase to \$14,000.

### 12. OPTIONAL FORMS OF PAYMENT

- Option A

Allowance payable monthly for the life of the member.

- Option B

Allowance payable monthly for the life of the member with a guarantee of remaining member contributions with interest.

- 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

- Actuarial Accrued Liability

The portion of the Present Value of Benefits that is attributable to past service.

- 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 finally 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.

- 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.

- 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.

- GASB

Government Accounting Standards Board (issues guidance for disclosure of retirement system liabilities).

- Normal Cost

The portion of the Present Value of Benefits that is attributable to benefits to be earned in the coming year.

- PERAC

Public Employee Retirement Administration Commission, a division of the State government which has regulatory authority over the administration of the retirement system.

- 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.

- PRIT

Pension Reserves Investment Trust Fund is the state controlled and administered fund for the investment of assets for members of the retirement system.

- Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability not covered by System Assets.