January 1, 2017

Actuarial Valuation Report

Leominster Retirement System

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January 16, 2018

Leominster Retirement Board
City Hall, Room 15
25 West Street
Leominster, MA 01453

Dear Leominster Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2017 actuarial valuation of the Leominster Retirement System. This valuation and report was prepared using generally accepted actuarial principles and practices.

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 unless noted in the text.

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.

- The contribution amount for Fiscal Year 2019 is $9,074,412, which is equal to the anticipated contribution amount from the prior funding schedule.

- The length of the funding schedule contained in this actuarial valuation report is three years (fully funded in Fiscal 2021).

- The contribution in Fiscal 2019 is set equal to the anticipated contribution from the prior valuation. The amortization of the unfunded liability remains level for Fiscal 2020, and in Fiscal 2021 the remainder of the unfunded liability is amortized.

- We anticipate over time the contribution level to decrease as a percentage of payroll.

PERAC and GASB guidelines indicate that actuarial valuations should be conducted at least every other year. The Leominster Retirement Board conducted their previous actuarial valuation effective January 1, 2015.

Stone Consulting, Inc. is completely independent of the City of Leominster and the Leominster Retirement System. This includes any officers and key personnel. Neither we or anyone else closely associated with us has any relationship with the City of Leominster or the Leominster Retirement System that would impair our independence, other than this or related assignments.

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 use of these results may not be appropriate for all circumstances.

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

Lawrence B. Stone

Lawrence B. Stone
Member, American Academy of Actuaries

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Introduction

This report presents the results of the actuarial valuation of the Leominster Retirement System. The valuation was performed at the request of the Retirement Board as of January 1, 2017 for the purpose of determining the contribution requirements for Fiscal Year 2019 and beyond. The contribution requirements are based on:

- The financial condition of the system as of December 31, 2016;
- 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, 2017);
- Economic assumptions regarding salary increases and investment earnings; and
- Other actuarial assumptions (e.g., withdrawals, retirement, death, etc.)

Valuation Summary

	January 1, 2017 Valuation	January 1, 2015 Valuation	Change
Contribution Fiscal 2019	$9,074,412	$9,074,412	same
Funding Schedule Length (as of Fiscal 2019)	3 years	3 years	same
Amortization Increase	Level	Level	same
Funding Ratio	90%	83%	7%
Interest Rate Assumption	5.50%	5.50%	0.00%

Summary of Funding Schedule and Funding Progress

- The funding level of the Leominster Retirement System is 90% compared to 83% for the January 1, 2015 actuarial valuation. The funding level is estimated to be in the top quartile of Massachusetts' Contributory Retirement Systems.
- The schedule length is three (3) years, a length consistent with the 3 years remaining from the 5-year schedule from the January 1, 2015 valuation. The maximum period allowed is twelve years (Fiscal 2030).
- The Fiscal Year 2019 contribution is equal to the planned 2019 contribution. The amortization of the unfunded liability remains level in Fiscal 2020, and in Fiscal 2021 the remaining unfunded liability is amortized.

Summary of Changes to Assumptions, Methodology, and Plan Provisions

- The discount rate assumption is 5.50%
  - Consistent with prior valuation
  - Reflects the Retirement Board's assumption

- The salary increase assumption is based on a select and ultimate table
  - Fire employees receive two years of 9% increases, one year of 6%, and 4% increases thereafter.
  - Police employees receive two years of 9% increases, one year of 5%, one year of 7%, and 4% increases thereafter.
  - All other employees receive 7 years of 7.5% increases, and 3.75% increases thereafter.
  - This assumption is consistent with the prior valuation.

- The mortality assumption is based upon the RP-2014 table adjusted to 2006 and projected generationally with MP-2016.
  - Previous valuation used the RP-2000 table projected from 2000 with Generational mortality, Scale BB.
  - Net effect of this change decreased the liability by $1.1 million.

- No Cost-of-Living increases have been assumed, consistent with the prior valuation.

Summary of Experience

- Annual market value return in calendar 2016: 4.58% vs. a 5.50% assumption.
  - $2,557,971 net actuarial loss in calendar years 2015 and 2016.

- The System's asset portfolio effective December 31, 2016 is approximately 87% equities and 13% fixed income, cash, and short-term investments.

- Total compensation increased by 6.0% over the prior valuation (two years).
  - average annual compensation (compensation divided by number of active members) increased by 3.7%.
  - Salary gain of $900 thousand (less liability than expected when compared to salary projected from the prior valuation data with the prior assumption).

January 1, 2017 Actuarial Valuation Results

	January 1, 2017	January 1, 2015	Percentage Change
Funding			
Contribution for Fiscal 2019	$9,074,412		0.0%
Contribution for Fiscal 2019 based on current schedule		$9,074,412	
Members			
▪ Actives			
a. Number	633	619	2.3%
b. Annual Compensation	$29,054,906	$27,401,323	6.0%
c. Average Annual Compensation	$45,900	$44,267	3.7%
d. Average Attained Age	45.7	45.8	-0.3%
e. Average Past Service	11.4	11.6	-1.8%
▪ Retired, Disabled and Beneficiaries			
a. Number	390	388	0.5%
b. Total Benefits*	$8,803,533	$8,305,240	6.0%
c. Average Benefits*	$22,573	$21,405	5.5%
d. Average Age	73.2	73.9	-0.9%
▪ Inactives			
a. Number	164	127	29.1%
Normal Cost			
a. Total Normal Cost as of January 1, 2017	$4,431,549	$4,564,989	-2.9%
b. Less Expected Members' Contributions	2,668,756	2,487,755	7.3%
c. Normal Cost to be funded by the Municipality	$1,762,793	$2,077,234	-15.1%
d. Adjustment to July 1, 2018	100,081	117,933	-15.1%
e. Administrative Expense Assumption	212,412	211,355	0.5%
f. Normal Cost Adjusted to July 1, 2018	$2,075,286	$2,406,522	-13.8%
Actuarial Accrued Liability as of January 1, 2017			
a. Active Members	$97,983,386	$97,053,737	1.0%
b. Inactive Members	971,204	750,629	29.4%
c. Retired Members and Beneficiaries	95,985,718	89,337,147	7.4%
d. Total	$194,940,308	$187,141,513	4.2%
Unfunded Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of January 1, 2017	$194,940,308	$187,141,513	4.2%
b. Less Actuarial Value of Assets as of January 1, 2017	175,724,624	155,808,105	12.8%
c. Unfunded Actuarial Accrued Liability as of January 1, 2017	$19,215,684	$31,333,408	-38.7%
d. Adjustment to July 1, 2018	-4,787,090	-3,018,288	
e. Unfunded Actuarial Accrued Liability as of July 1, 2018	$14,428,594	$28,315,120	

*Excluding State reimbursed COLA

NOTE: for all tables in this report, totals may not sum due to rounding.

Development of Funding Schedule

The appropriation for Fiscal 2019 is as follows:

Net Employer Normal Cost for Fiscal 2019 (including admin. expenses)	$	2,075,286
Net 3(8)(c) Payments		85,840
Amortization of the unfunded liability		6,913,285
Total Appropriation required for Fiscal 2019	$	9,074,412

- The funding schedule is presented on the following page. The schedule's length is three (3) years which is equal to the remainder of the 5-year schedule from the January 1, 2015 valuation.
- The maximum funding schedule length allowed by Section 22D of Chapter 32 of the Massachusetts General Laws is twelve years to Fiscal 2040.
- The Fiscal 2019 contribution is set equal to the expected contribution from the funding schedule in the previous valuation.
- The contribution is assumed to be made at the beginning of the fiscal year.

The funding contribution is composed of three components:

- Net Normal Cost, including administrative expense
- Amortization of the Unfunded Liability
- Net 3(8)(c) payments

These three components are discussed in greater detail in the pages following the funding schedule.

FUNDING SCHEDULE

Fiscal Year	Normal Cost	Unfunded Liability	Funding Amortization of UAAL	Net 3(8)(c) Payments	Schedule Contribution*
2019	2,075,286	14,428,594	6,913,285	85,840	9,074,412
2020	2,153,109	7,928,650	6,913,285	85,840	9,152,235
2021	2,233,851	1,071,210	1,071,210	85,840	3,390,901
2022	2,317,620	-	-	85,840	2,403,460

Amortization of Unfunded Liability as of July 1, 2017

Year	Type	Original Amort. Amount	Percentage Increasing	Original # of Years	Current Amort. Amount	Years Remaining
2019	Fresh Start	6,913,285	0.00%	3	6,913,285	3

<u>Notes on Amortization of Unfunded Liability</u>

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.

* The Fiscal 2019 contribution is set equal to the planned contribution from the 2015 valuation funding schedule. The amortization in the folowing year remains level, and in Fiscal 2021 the remainder of the unfunded liability is amortized.

Components of the Funding Schedule

The components of the funding contribution are developed from the results on page 6 as follows:

Net Normal Cost

	January 1, 2017	% of Payroll*
Gross Normal Cost (GNC)	$ 4,431,549	15.3%
Employees Contribution	2,668,756	9.2%
Net Normal Cost (NNC)	$ 1,762,793	6.1%
Adjusted to Beginning of Fiscal Year 2019	100,081	
Expected Administrative Expense	212,412	0.7%
Adjusted Net Normal Cost With Admin. Expense	$ 2,075,286	

- The gross normal cost (GNC) is the "price" of benefits accruing in the current year if the valuation assumptions are realized. For an individual, this is the value in benefits which they are earning with their current year of service.
- The GNC only relates to current actives; retirees are done earning their benefit and inactives are not earning any credited service.
- The GNC for the whole system is split into two parts: the portion which is paid for by the employees (Employee Contributions), and the portion which must be paid for by the Retirement System (Net Normal Cost, or NNC).
- The NNC is adjusted from January 1, 2017 to Fiscal 2019 by rolling it forward with a salary increase factor of 3.75%.
- Finally, the expected administrative expense is added to the adjusted NNC. This is the amount seen in the funding schedule.

*Payroll paid in 2016 for employees as of January 1, 2017 is $29,054,906. Payroll for new hires in 2016 was annualized.

Unfunded Actuarial Accrued Liability

			January 1, 2017	Percentage Change
Active Actuarial Accrued Liability			$ 97,983,386	1.0%
Superannuation	$	89,921,395		
Death	$	1,994,503		
Disability	$	5,423,846		
Withdrawal	$	643,642		
Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability			$ 96,956,922	7.6%
Retirees and Beneficiaries	$	77,674,636		
Disabled	$	18,311,082		
Inactive	$	971,204		
Total Actuarial Accrued Liability (AAL)			$ 194,940,308	4.2%
Actuarial Value of Assets (AVA)			$ 175,724,624	12.8%
Unfunded Actuarial Accrued Liability			$ 19,215,684	-38.7%
Funded Ratio (AVA / AAL)				
2017 (5.50% interest rate):	90%			
2015 (5.50% interest rate):	83%			

- 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 $194,940,308. This along with an actuarial value of assets of $175,724,624 produces a funded status of 90%. This compares to a funded status of 83% for the 2015 valuation.

- The Unfunded AAL is the portion of the AAL which is not covered by the Plan assets. The UAAL for Leominster as of January 1, 2017 is $19,215,684. This is adjusted to July 1, 2018 to produce the Unfunded Liability seen in Fiscal Year 2019 in the funding schedule.

- 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. This can result in a funding schedule in which the changes in contribution amounts from year to year are more consistent.

Net 3(8)(c) Payments

- 3(8)(c) payments are benefits which the Leominster 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 are the difference between what the Leominster Retirement System paid out minus what was received by the System, calculated based on the December 31, 2016 PERAC annual statement.
- The amount of net 3(8)(c) payments is assumed to remain level in future years.

Assets

Cash	$	510,844.82
Pooled Domestic Equity Funds		9,954,116.28
Pooled International Equity Funds		14,633,285.96
Pooled Global Equity Funds		35,832,233.70
PRIT FUND		114,768,903.07
Market Value of Assets	$	175,724,624.17

- The asset allocation is approximately 13% fixed income, cash, receivables and payables and 87% equities, alternative investments, hedge funds and similar types of investments.

Alternate Results

We believe a 5.50% discount rate is appropriate for disclosure purposes. For funding purposes a rate that is closer to the expected rate of return on assets would be more reasonable. To provide additional information as well as satisfy our professional responsibility under the actuarial standards of practice, the following are actuarial results using a 6.75% discount rate and a 7.50% discount rate.

Discount Rate	6.75%	7.50%
Actuarial Accrued Liability	$ 170,300,437	$ 157,826,379
Unfunded Actuarial Accrued Liability	$ (5,424,187)	$ (17,898,245)
Gross Normal Cost (w/o expenses)	$ 3,344,472	$ 2,846,185
Net Normal Cost (w/o expenses)	$ 675,716	$ 177,429
Fiscal 2019 Appropriation*	$ -	$ -

* In both scenarios the plan would be fully funded and the excess of funds would exceed the net normal cost. In such an event the net normal cost may be contributed.

The Leominster Retirement Board has requested that the following actuarial results be included in the valuation report. The results are based on the Citigroup Pension Liability Index Standard rates (4.06% Equivalent Discount Rate). The Equivalent Discount Rates are discount rates that give the same Present Value of Future Benefits as the yield curve, and are used to determine the portion of the PVFB that has been allocated to the AAL and the Gross Normal Cost. These results are for illustrative purposes.

Discount Rate Equivalency	CPLI (4.06%)
Actuarial Accrued Liability	$ 222,504,147
Unfunded Actuarial Accrued Liability	$ 46,779,523
Gross Normal Cost (w/o expenses)	$ 7,409,992
Net Normal Cost (w/o expenses)	$ 4,741,236
Fiscal 2019 Appropriation*	$ 15,705,238

* Based on a five-year, level amortization schedule.

In these calculations, we used the existing actuarial assumptions and methods other than the discount rate. The following is a list of the spot discount rates that were used for the CPLI results:

Year	CPLI Rate		Year	CPLI Rate
0	1.1509%		16	3.8348%
1	1.4317%		17	3.9266%
2	1.7048%		18	4.0257%
3	2.0126%		19	4.1299%
4	2.3491%		20	4.2412%
5	2.5981%		21	4.3052%
6	2.8104%		22	4.3846%
7	2.9631%		23	4.4476%
8	3.1239%		24	4.4739%
9	3.2291%		25	4.4735%
10	3.3251%		26	4.4589%
11	3.4493%		27	4.4453%
12	3.5440%		28	4.4378%
13	3.6123%		29	4.4160%
14	3.6766%		30+	4.3790%
15	3.7511%			

APPENDICES

Appendix A – 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.

Fiscal Year Adjustment

The actuarial results are adjusted by the valuation interest rate and salary scale to the beginning of Fiscal Year 2019. The unfunded actuarial accrued liability is rolled forward with normal cost and further adjusted by anticipated contributions and interest.

ACTUARIAL ASSUMPTIONS

Valuation Date

January 1, 2017.

Investment Return

5.50% per year net of investment expenses.

Regular Interest Rate Credited to Annuity Savings Account

2% per year.

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.

COLA Adjustments

No cost of living adjustments have been assumed. This is consistent with the Board's practice in the recent past.

Salary Increases

Select and Ultimate assumption, based on years of credited service:

Fire:
- 9.00% increases for years 1-2
- 6.00% increase in year 3
- 4.00% increases in all other years.

Police:
- 9.00% increases for years 1-2
- 5.00% increase for year 3
- 7.00% increase for year 4
- 4.00% increases in all other years.

All Others:
- 7.50% increase in years 1-7
- 3.75% increases in all other years.

Step increases are assumed to be part of the salary increase assumption. The total payroll is assumed to increase at 3.75% per year.

Credited Service

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

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).

Administrative Expenses

Estimated budgeted amount of $212,412 for the Fiscal Year 2019 is added to the Normal Cost. 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.

Contribution Timing

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

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%

In-Service Disability and Death

Both Disability and In-Service Death are 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:

				Hired after 4/1/2012		
Age	Group 1& 2 Male	Group 1 & 2 Female	Group 4	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-2014 table adjusted to 2006 and projected generationally with MP-2016 (sex-distinct). (Prior valuation used RP-2000 table projected from 2000 with Generational mortality, Scale BB). During employment the healthy employee mortality table is used. Post-employment the healthy annuitant table is used.

Mortality for disabled retirees follows the same table as non-disabled retirees, set forward 2 years. Death is assumed to be due to the same cause as the disability 40% of the time.

Appendix B – 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.

Summary of Principal Provisions (Continued)

5. SERVICE RETIREMENT

a. Eligibility

<u>Hired prior to April 2, 2012:</u>

- Attainment of age 55 and completion of ten years of credited service,
- or at any age with completion of 20 years of service.
- If hired prior to 1978 or a member of Group 4, the completion of ten years of service is not required.

<u>Hired after April 1, 2012:</u>

- Group 1 – Age 60 and Completion of 10 years of credited service;
- Group 2 – Age 55 and completion of 10 years of service;
- Group 4 – Age 55.

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

Summary of Principal Provisions (Continued)

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.

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).

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) 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.

11. 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.

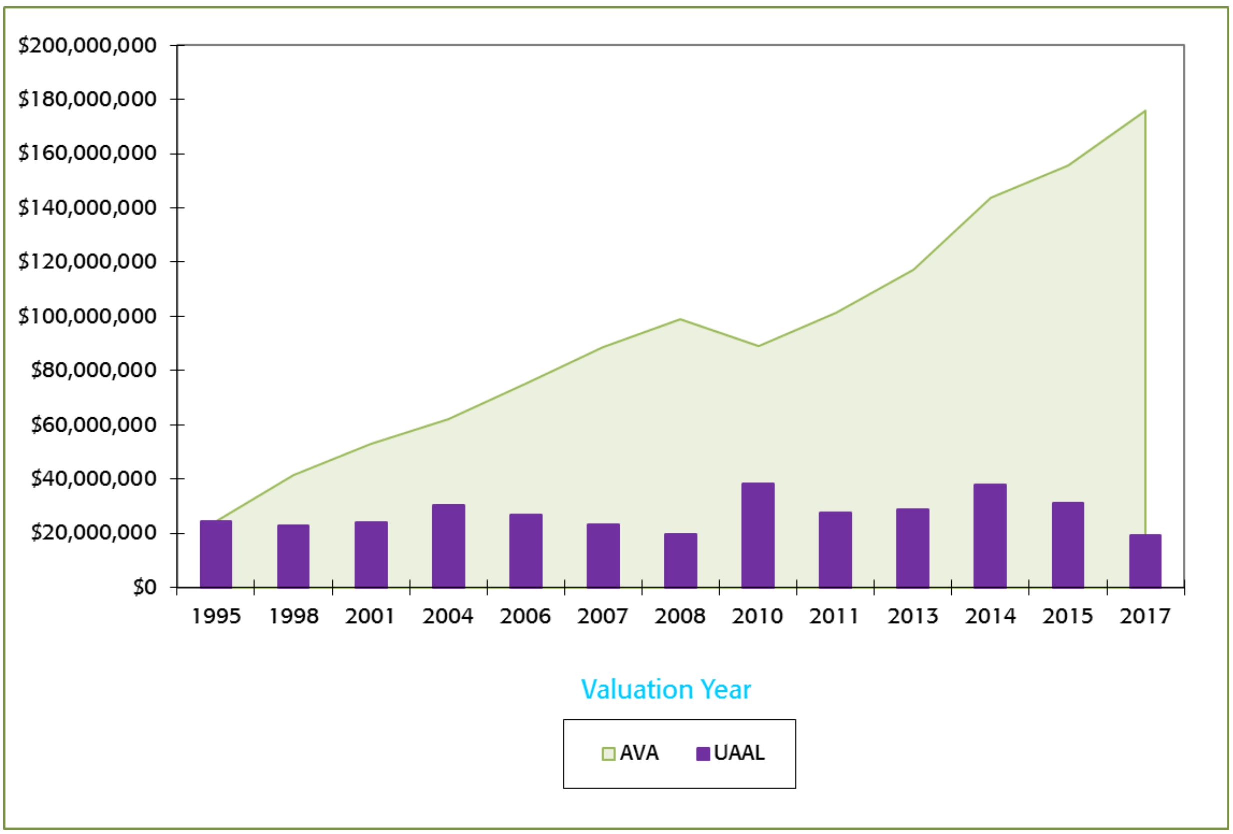
Appendix C – Charts of Selected Actuarial Statistics

History of Demographic Statistics

Valuation Year	Number	Average Age	Average Past Service	Average Ann'l Compensation
2017	633	45.7	11.4	$45,900
2015	619	45.8	11.6	$44,267
2014	592	46.5	12.2	$44,198
2013	577	46.9	12.3	$43,060
2011	530	46.9	12.4	$42,279
2010	581	46.5	11.6	$42,004
2008	632	45.7	10.6	$37,231
2007	616	45.7	10.8	$36,973
2006	660	45.0	10.0	$33,498
2004	613	45.4	10.2	$33,700
2001	610	44.3	9.6	$29,800

- Both employee age and service have begun to decrease in recent years, following years of increases. This pattern has appeared in the experience of several systems in the Commonwealth. Average annual compensation has grown by 54.0% (2.7% annually) over the past sixteen years.

History of Assets and Unfunded Liability

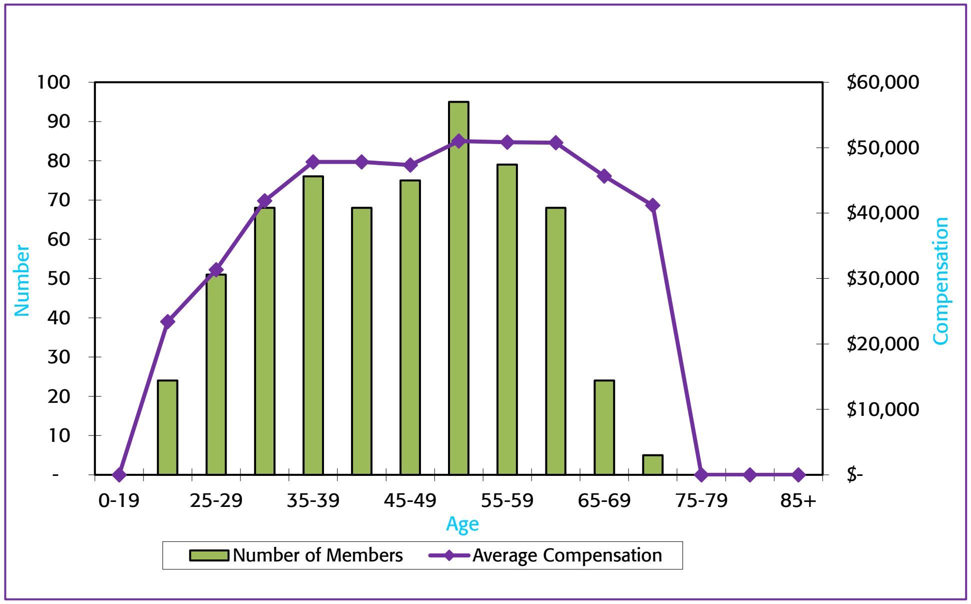


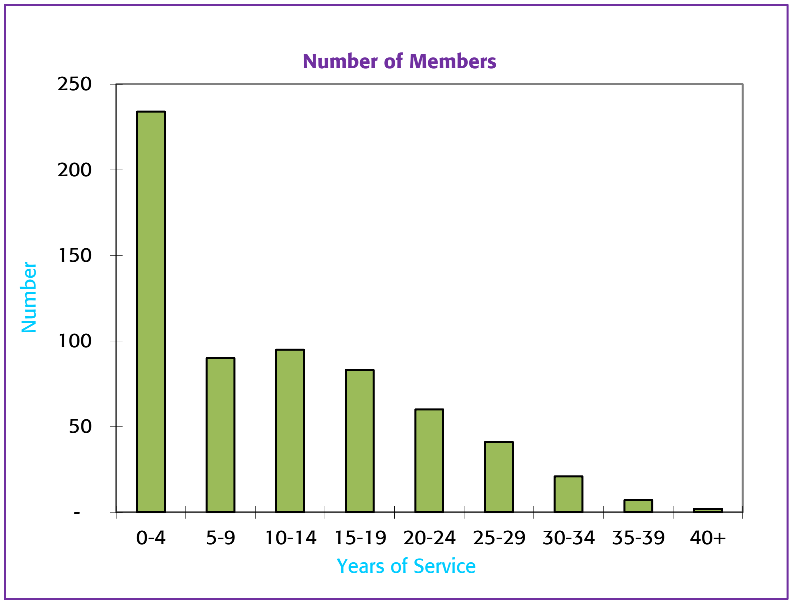
stoneconsulting,inc

Distribution of Plan Members as of January 1, 2017

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	24	-	-	-	-	-	-	-	-	24	$ 561,740	$ 23,406
25-29	46	5	-	-	-	-	-	-	-	51	$ 1,597,353	$ 31,321
30-34	46	18	4	-	-	-	-	-	-	68	$ 2,846,869	$ 41,866
35-39	36	16	20	4	-	-	-	-	-	76	$ 3,634,015	$ 47,816
40-44	17	7	22	18	4	-	-	-	-	68	$ 3,251,486	$ 47,816
45-49	25	14	12	7	16	-	1	-	-	75	$ 3,550,804	$ 47,344
50-54	20	11	15	15	11	19	4	-	-	95	$ 4,845,254	$ 51,003
55-59	11	7	15	19	8	8	9	2	-	79	$ 4,014,949	$ 50,822
60-64	6	11	6	15	15	4	6	4	1	68	$ 3,451,271	$ 50,754
65-69	2	1	1	5	5	7	1	1	1	24	$ 1,095,303	$ 45,638
70-74	1	-	-	-	1	3	-	-	-	5	$ 205,861	$ 41,172
75-79	-	-	-	-	-	-	-	-	-	-	$ -	$ -
80-84	-	-	-	-	-	-	-	-	-	-	$ -	$ -
85+	-	-	-	-	-	-	-	-	-	-	$ -	$ -
TOTAL	234	90	95	83	60	41	21	7	2	633	$ 29,054,906	$ 45,900





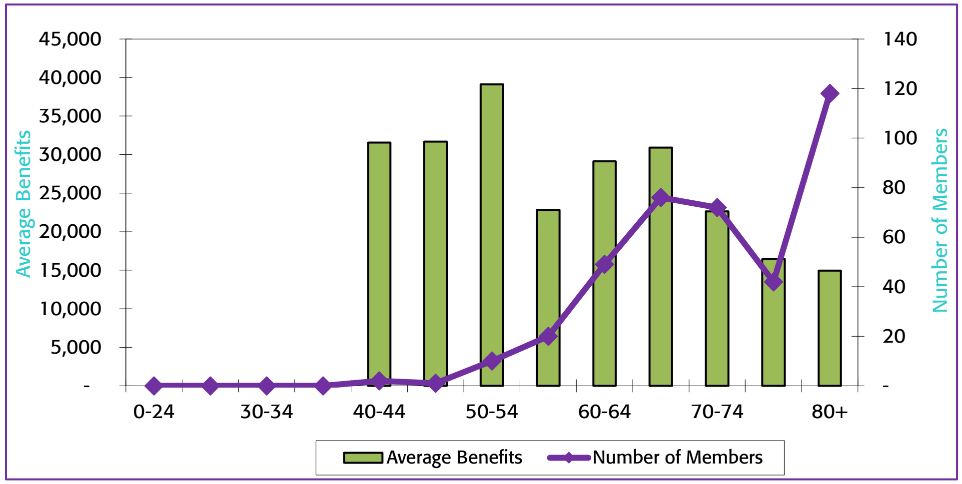
Distribution of Plan Members as of January 1, 2017

RETIRED MEMBERS

Retired Members and Beneficiaries			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	35,491	35,491
45-49	-	-	-
50-54	4	31,687	126,749
55-59	18	20,602	370,837
60-64	42	26,261	1,102,967
65-69	67	29,660	1,987,203
70-74	66	22,541	1,487,682
75-79	41	16,247	666,138
80+	109	14,248	1,553,077
TOTAL	**348**	**$ 21,064**	**$ 7,330,145**

Disabled Members			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	27,659	27,659
45-49	1	31,677	31,677
50-54	6	44,072	264,435
55-59	2	42,812	85,623
60-64	7	46,483	325,382
65-69	9	40,200	361,796
70-74	6	23,761	142,566
75-79	1	24,258	24,258
80+	9	23,332	209,992
TOTAL	**42**	**$ 35,081**	**$ 1,473,389**

Total			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	2	31,575	63,150
45-49	1	31,677	31,677
50-54	10	39,118	391,184
55-59	20	22,823	456,461
60-64	49	29,150	1,428,349
65-69	76	30,908	2,348,998
70-74	72	22,642	1,630,249
75-79	42	16,438	690,396
80+	118	14,941	1,763,069
TOTAL	**390**	**$ 22,573**	**$ 8,803,533**



Benefits shown are net of State reimbursed COLA.

Appendix D – 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.

- **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.

Disclosures

- Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as:
    - 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,
    - 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.

- Stone Consulting, Inc. was furnished member data by the Leominster Retirement System's administrative staff. Although examined under broad parameters for 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. With the assistance of the staff of the Leominster Retirement Board, we were able to develop a database sufficient for valuation purposes.

- The investment return assumption is a long-term assumption and is based on capital market expectations by asset class, historical returns, and professional judgement.

- 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 7% to 8% for equities and 4% to 6% for fixed income securities. In light of these projections, as well as historical investment returns, the 5.50% interest rate assumption is within the reasonable assumption range. We encourage close monitoring for changes in investment performance against expectations.

- The salary increase assumption reflects prior experience including PERAC's 2002 local experience study, current expectations, and professional judgement.

- 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.

- The UAAL and funded ratio are measures of the plan's funded status. These measures reflect the plan's position as of January 1, 2017. 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.

PERAC Information Disclosure

The most recent actuarial valuation of the System was prepared by Stone Consulting, Inc. as of January 1, 2017

The normal cost for employees on that date was:	$2,668,756	9.2%	of payroll
The normal cost for the employer was:	$1,762,793	6.1%	of payroll

The actuarial liability for active members was:	$97,983,386
The actuarial liability for retired members was (includes inactives):	$96,956,922
Total actuarial accrued liability:	$194,940,308
System assets as of that date ($175,724,624.17 Market Value):	$175,724,624
Unfunded actuarial accrued liability:	$19,215,684

The ratio of system's assets to total actuarial liability was:	90%

As of that date the total covered employee payroll was:	$29,054,906

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

Investment Return:	5.50% per annum
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)
1/1/2017	$175,725	$194,940	$19,215	90%	$29,055	66%
1/1/2015	$155,808	$187,142	$31,333	83%	$27,401	114%
1/1/2014	$143,849	$181,569	$37,720	79%	$26,165	144%
1/1/2013	$117,110	$146,037	$28,927	80%	$24,846	116%
1/1/2011	$101,218	$128,738	$27,521	79%	$22,408	123%