January 1, 2016

Actuarial Valuation Report

Stoneham Retirement System

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November 28, 2016

Stoneham Contributory Retirement System
Town Hall
35 Central Street
Stoneham, MA 02180

Dear Stoneham Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2016 actuarial valuation of the Stoneham 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 except where noted in the text.

As part of performing the valuation, Stone Consulting, Inc. was furnished member data by the Stoneham 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 seven years (fully funded by 2024). The total appropriation is set to increase by 7.85% annually, with the exception of the final year, when it decreases by 42.78%.

The contribution amount for Fiscal Year 2018 is $6,137,624 which is equal to 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 Stoneham 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

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 Stoneham 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	$6,137,624	$6,137,624	same
Funding Schedule Length (as of Fiscal 2018)	7 years	6 years	1 year increase
Contribution Increase	7.85%	7.85%	Same
Funding Ratio	70%	65%	6%
Interest Rate Assumption	7.75%	7.875%	-0.125%
Salary Increase Rate Assumption	4.25% ultimate rate, plus the following steps: Group 4: 4.50% steps for years 1-5 Others: 2.00% steps for years 1-8	Same select and ultimate assumption	No change

- The Fiscal Year 2018 contribution is equal 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 4.0% annual return on the market value of assets versus our assumption of 7.875%. There was a $5,515,640 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 $1.3 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 4.25% ultimate rate. Employees in Group 4 receive 4.50% steps for their first five years of service, and all other employees receive 2.00% steps for the first eight years of service. This assumption is consistent with the prior valuation. Total compensation changed by 7.2% over the prior valuation; average annual compensation (compensation divided by number of active members) changed by 6.8%.

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

- The funding level of the Stoneham Retirement System is 70% compared to 65% 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 seven (7) years, a one year increase over the 6 years remaining from the 8 year schedule from the January 1, 2014 valuation. The maximum period permitted under Section 22D of Chapter 32 of the Massachusetts General Laws is twenty-three years (Fiscal 2040). The total contribution increases by 7.85% each year, with exception of the final year where it decreases by 42.78%.

- The funding schedule includes recognition of the following asset gains/(losses) in Fiscal 2020 and 2022:
  Fiscal 2020: ($55,281)
  Fiscal 2022: ($2,170,179)

- The mortality assumption is based upon the RP-2000 mortality table projected with Generational Mortality, Scale BB, with a base year of 2000. This is consistent with the mortality assumption from the prior valuation.

January 1, 2016 Actuarial Valuation Results

	January 1, 2016	January 1, 2014	Percentage Change
Funding			
Contribution for Fiscal 2018	$6,137,624		0.0%
Contribution for Fiscal 2018 based on current schedule		$6,137,624	
Members			
Actives			
a. Number	274	273	0.4%
b. Annual Compensation	$13,760,816	$12,838,959	7.2%
c. Average Annual Compensation	$50,222	$47,029	6.8%
d. Average Attained Age	50.0	49.9	0.2%
e. Average Past Service	13.2	12.9	2.3%
Retired, Disabled and Beneficiaries			
a. Number	282	285	-1.1%
b. Total Benefits*	$6,983,714	$6,782,445	3.0%
c. Average Benefits*	$24,765	$23,798	4.1%
d. Average Age	75.5	74.9	0.8%
Inactives			
a. Number	74	75	-1.3%
Normal Cost			
a. Total Normal Cost as of January 1, 2016	$1,959,395	$1,810,794	8.2%
b. Less Expected Members' Contributions	1,253,008	1,156,074	8.4%
c. Normal Cost to be funded by the Municipality	$706,387	$654,720	7.9%
d. Adjustment to July 1, 2017	48,214	44,687	7.9%
e. Administrative Expense Assumption	304,666	265,149	14.9%
f. Normal Cost Adjusted to July 1, 2017	$1,059,267	$964,556	9.8%
Actuarial Accrued Liability as of January 1, 2016			
a. Active Members	$42,880,121	$39,010,546	9.9%
b. Inactive Members	658,031	633,417	3.9%
c. Retired Members and Beneficiaries	64,493,178	63,333,146	1.8%
d. Total	$108,031,330	$102,977,109	4.9%
Unfunded Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of January 1, 2016	$108,031,330	$102,977,109	4.9%
b. Less Actuarial Value of Assets as of January 1, 2016	76,068,713	66,425,894	14.5%
c. Unfunded Actuarial Accrued Liability as of January 1, 2016	$31,962,617	$36,551,215	-12.6%
d. Adjustment to July 1, 2017	(837,357)	523,559	
e. Unfunded Actuarial Accrued Liability as of July 1, 2017	$31,125,260	$37,074,774	

*Excluding State reimbursed COLA

Data and History of Active Participants

- The data was supplied by the Stoneham Retirement Board. The data was checked under broad parameters for reasonableness. With the assistance of the staff of the Stoneham 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	274	50.0	13.2	$50,222
2014	273	49.9	12.9	$47,029
2012	256	49.2	13.0	$45,405
2011	268	N/A	N/A	$44,015

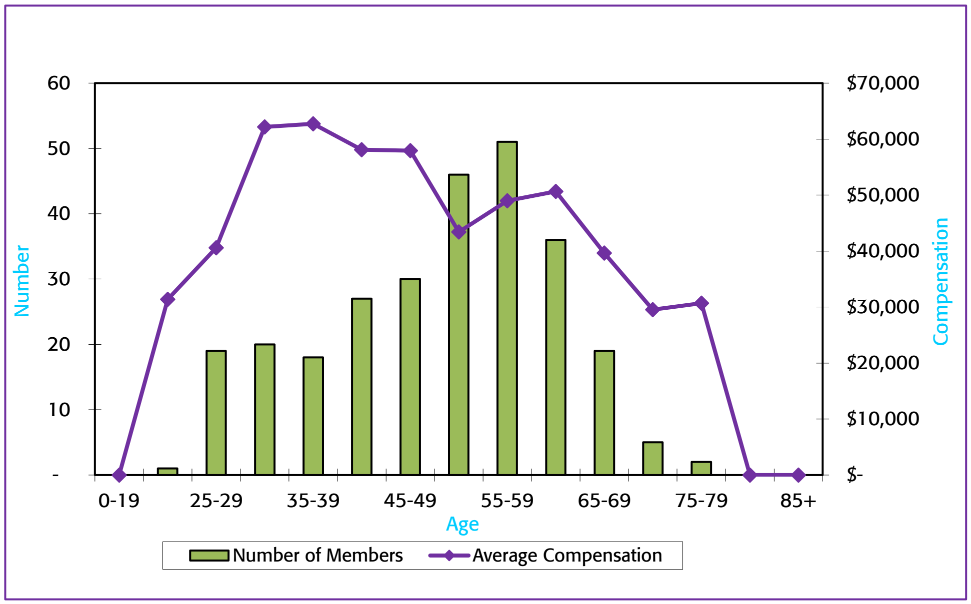
- Employee age has increased by 0.8 years and service has increased by 0.2 years over the course of the past four years. This is consistent with the trend in the Commonwealth towards an aging of the employee population. We are starting to see a change in this trend amongst our clients. This has not occurred in Stoneham yet. Average annual compensation has grown by 14.1% (2.7% annually) over the past five years.

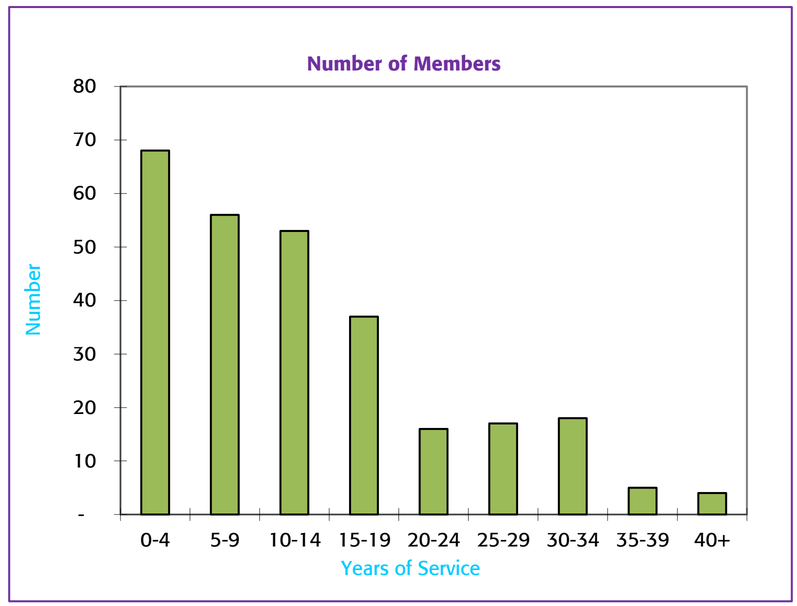
The charts on the following pages summarize demographic information regarding active and retiree members.

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	-	-	-	-	-	-	-	-	-	-	$ -	$ -
20-24	1	-	-	-	-	-	-	-	-	1	$ 31,361	$ 31,361
25-29	15	4	-	-	-	-	-	-	-	19	$ 770,738	$ 40,565
30-34	6	13	1	-	-	-	-	-	-	20	$ 1,243,062	$ 62,153
35-39	4	5	7	2	-	-	-	-	-	18	$ 1,129,204	$ 62,734
40-44	5	5	10	7	-	-	-	-	-	27	$ 1,568,506	$ 58,093
45-49	11	4	4	5	5	1	-	-	-	30	$ 1,738,161	$ 57,939
50-54	10	11	10	7	2	4	2	-	-	46	$ 1,997,043	$ 43,414
55-59	7	8	13	6	2	4	9	1	1	51	$ 2,497,204	$ 48,965
60-64	8	3	4	6	4	3	4	3	1	36	$ 1,823,429	$ 50,651
65-69	1	3	4	3	3	3	-	1	1	19	$ 753,017	$ 39,632
70-74	-	-	-	1	-	1	2	-	1	5	$ 147,737	$ 29,547
75-79	-	-	-	-	-	1	1	-	-	2	$ 61,354	$ 30,677
80-84	-	-	-	-	-	-	-	-	-	-	$ -	$ -
85+	-	-	-	-	-	-	-	-	-	-	$ -	$ -
TOTAL	68	56	53	37	16	17	18	5	4	274	$ 13,760,816	$ 50,222





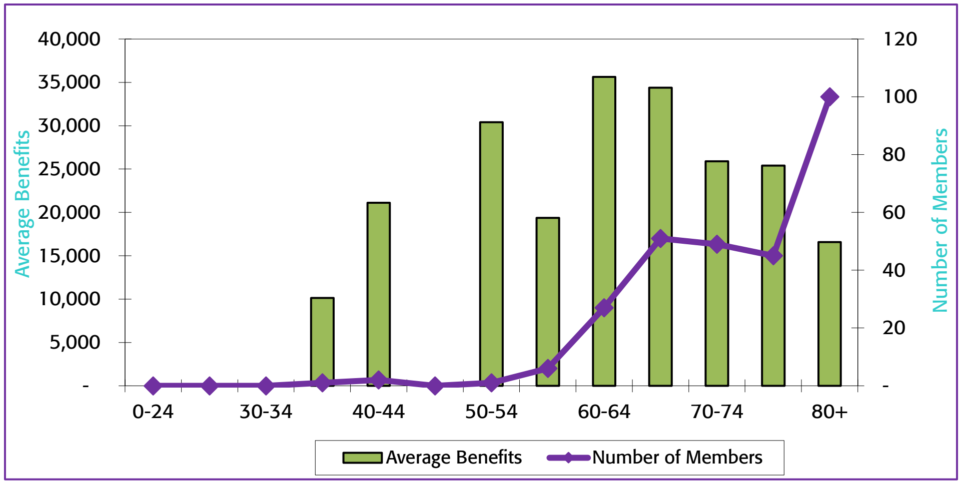
Distribution of Plan Members as of January 1, 2016

RETIRED MEMBERS

Retired Members and Beneficiaries					
Age	Number		Average Benefit		Total Benefit
0-24	-		-		-
25-29	-		-		-
30-34	-		-		-
35-39	1		10,136		10,136
40-44	2		21,121		42,242
45-49	-		-		-
50-54	-		-		-
55-59	5		13,446		67,231
60-64	21		34,109		716,285
65-69	47		33,490		1,574,013
70-74	44		25,101		1,104,437
75-79	41		25,273		1,036,175
80+	99		16,506		1,634,083
TOTAL	260	$	23,787	$	6,184,603

Disabled Members					
Age	Number		Average Benefit		Total Benefit
0-24	-		-		-
25-29	-		-		-
30-34	-		-		-
35-39	-		-		-
40-44	-		-		-
45-49	-		-		-
50-54	1		30,412		30,412
55-59	1		49,015		49,015
60-64	6		40,952		245,709
65-69	4		44,910		179,642
70-74	5		32,904		164,518
75-79	4		26,686		106,742
80+	1		23,074		23,074
TOTAL	22	$	36,323	$	799,111

Total					
Age	Number		Average Benefit		Total Benefit
0-24	-		-		-
25-29	-		-		-
30-34	-		-		-
35-39	1		10,136		10,136
40-44	2		21,121		42,242
45-49	-		-		-
50-54	1		30,412		30,412
55-59	6		19,374		116,246
60-64	27		35,629		961,994
65-69	51		34,385		1,753,655
70-74	49		25,897		1,268,955
75-79	45		25,398		1,142,917
80+	100		16,572		1,657,156
TOTAL	282	$	24,765	$	6,983,714



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)	$1,959,395	14.2%
Employees Contribution	$1,253,008	9.1%
Net Normal Cost (NNC)	$706,387	5.1%
Adjusted to Beginning of Fiscal Year 2018	$48,214	
Administrative Expense	$304,666	2.2%
Adjusted Net Normal Cost With Admin. Expense	$1,059,267	

*Payroll paid in 2015 for employees as of January 1, 2016 is $13,760,816. 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
Active Actuarial Accrued Liability			$	42,880,121	9.9%
Superannuation	$	39,380,455			
Death	$	866,687			
Disability	$	2,262,253			
Withdrawal	$	370,726			
Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability			$	65,151,209	1.9%
Retirees and Beneficiaries	$	56,074,997			
Disabled	$	8,418,181			
Inactive	$	658,031			
Total Actuarial Accrued Liability (AAL)			$	108,031,330	4.9%
Actuarial Value of Assets (AVA)			$	76,068,713	14.5%
Unfunded Actuarial Accrued Liability			$	31,962,617	-12.6%
Funded Ratio (AVA / AAL)					
2016 (7.75% interest rate):		70%			
2014 (7.875% interest rate):		65%			

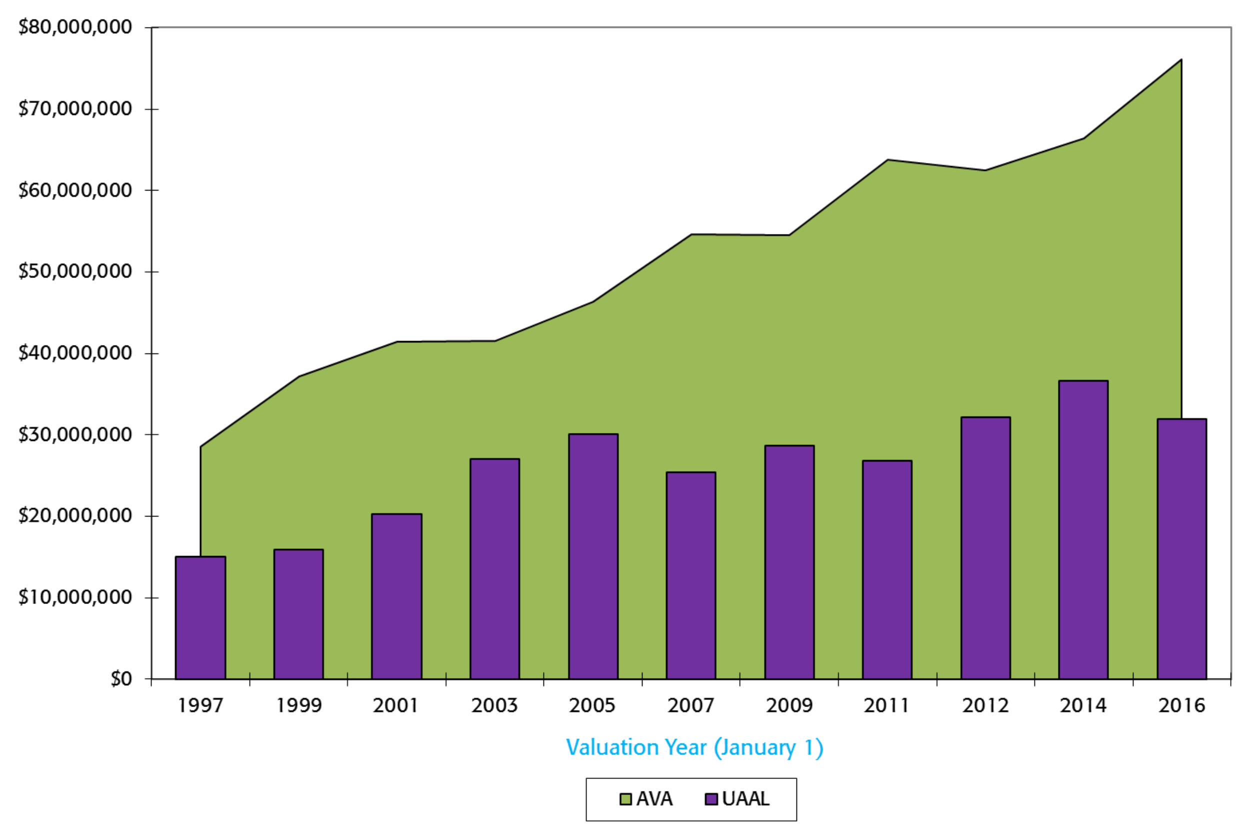
- Actuarial Accrued Liability (AAL) is the "price" of benefits attributable to benefits earned in past years, or in other words, represents today's value of all benefits earned by active and inactive members.

The total AAL is $108,031,330. This along with an actuarial value of assets of $76,068,713 produces a funded status of 70%. This compares to a funded status of 65% for the 2014 valuation. The funded status using Market Value of Assets is 68%.

The UAAL and funded ratio are measures of the plan's funded status. These measure 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) and the valuation assets (AVA) over the course of the past eleven actuarial valuations

Charts of Selected Actuarial and Demographic Statistics



Development of Funding Schedule

Net Employer Normal Cost for Fiscal 2018 (including admin. expenses)	1,059,267
Net 3(8)(c) Payments	66,595
Amortization	4,973,702
Timing adjustment for August 1 Payment Date	38,060
Total Appropriation required for Fiscal 2018	6,137,624

- 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 on August 1st. The 3(8)(c) payments are the amount that the Stoneham 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 Stoneham Retirement System paid out minus what was received by the System.

- The contribution amount for Fiscal 2018 is $6,137,624. The funding schedule is presented on page 11. The schedule's length is seven (7) years (for the fresh start base) which is a one year increase over the remainder of the 8 year schedule from the January 1, 2014 valuation. The maximum funding schedule length allowed by Section 22D of Chapter 32 of the Massachusetts General Laws is twenty-three years to Fiscal 2040.

- In developing the funding schedule, we used an approach in which the contributions are set to be the amount which results in a 7.85% increase in the total contribution each year, with the exception of the final year when the contribution decreases by 42.78%. The net of the total contribution minus the net normal cost, expenses, and the 3(8)(c) payment is used to reduce the UAAL each year until the UAAL is reduced to $0. This UAAL payment amount is allocated first to the amortization of any early retirement incentives and then to the rest of the UAAL.

FUNDING SCHEDULE

Fiscal Year	Normal Cost	Unfunded Liability*	Funding Amortization of UAAL	Net 3(8)(c) Payments	Schedule Contribution**	Adjusted Payments for August 1	% Change
2018	1,059,267	31,125,260	4,973,702	66,595	6,099,564	6,137,624	7.85%
2019	1,106,934	28,178,303	5,404,851	66,595	6,578,380	6,619,427	7.85%
2020	1,156,746	24,593,676	5,871,442	66,595	7,094,783	7,139,052	7.85%
2021	1,208,800	20,173,208	6,376,329	66,595	7,651,723	7,699,468	7.85%
2022	1,263,196	17,036,316	6,922,593	66,595	8,252,384	8,303,876	7.85%
2023	1,320,039	10,897,537	7,513,561	66,595	8,900,196	8,955,730	7.85%
2024	1,379,441	3,646,234	3,646,234	66,595	5,092,270	5,124,044	-42.78%
2025	1,441,516	-	-	66,595	1,508,111	1,517,521	-70.38%

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	73,542	3.50%	18	133,694	3
2018	Fresh Start	N/A	N/A	7	N/A	7

<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.

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

2020	$	(55,281)
2022	$	(2,170,179)

** Contribution is set to be the amount resulting from a 7.85% increase on the prior year's contribution, with 7.85% increases thereafter. The contribution in FY2024 decreases by -42.78%.

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% (7.875% in prior valuation).
Salary Increase	4.25% Ultimate rate, with the following steps: Group 4: 5 years of 4.50% steps Others: 8 years of 2.00% steps
COLA	3% of $13,000
COLA Frequency	Granted every year
Mortality	RP-2000 mortality 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 mortality 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 55% ordinary disability 45% 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	$304,666 budget estimated for FY 2018 provided by Stoneham Retirement Board.

Assets

	Cash	$	32,478.19
	PRIT Cash		110,132.40
	PRIT FUND		73,587,335.23
A	Sub-Total:	$	73,729,945.82
	Prepaid Expenses		6,345.71
	Accounts Receivable		108,874.86
	Accounts Payable		(1,914.00)
B	Sub-Total:	$	113,306.57
	Market Value of Assets [(A) + (B)]	$	73,843,252.39

- 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 $73,843,252.39.

- 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, 10.00% to 11.00% has been the expected long-term rate of return for equities, and 6.00% to 7.00% 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 $76,068,713 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 115% of the market value of assets and no less than 85% 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 73,843,252

2. Phase-in of asset gains and losses

	Plan Year (1)	Original Amount (2)	Percent Unrecognized (3)	Amount Unrecognized (2) x (3)
a.	2015	($5,335,254)	80%	($4,268,204)
b.	2014	($180,386)	60%	($108,232)
c.	2013	$4,015,308	40%	$1,606,123
d.	2012	$2,724,258	20%	$544,852
e.	2011	($4,652,559)	0%	$0
f.	2010	$2,400,120	0%	$0
g.	Total	($3,428,633)		($2,225,460)

3. Valuation assets without corridor as of 01/01/2016 (1. - 2.g.) $76,068,713

4. Corridor Check
   a. 85% of Market Value $62,766,765
   b. 115% of Market Value $84,919,740

5. Valuation assets with corridor as of 01/01/2016 (3. within Corridor) $76,068,713

6. Calculation of return on valuation assets
   a. Valuation assets as of 01/01/2014 $66,425,894
   b. ER contribs + EE contribs - Ben Pymts - Expenses $(1,715,467)
   c. Actual return on valuation assets 5. - (6.a. + 6.b.) $11,358,286
   d. Weighted value of valuation assets $64,720,715
   e. Return on valuation assets (6.c. / 6.d.) 17.5%
   f. Annualized return on assets 8.4%

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	$76,069	$108,031	$31,962	70%	$13,761	232%
1/1/2014	$66,426	$102,977	$36,551	65%	$12,839	285%
1/1/2012	$62,496	$94,616	$32,120	66%	$11,624	276%
1/1/2011	$63,752	$90,520	$26,768	70%	$12,386	216%
1/1/2009	$54,534	$83,201	$28,667	66%	$11,800	243%

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	7.85% contribution increase
Remaining amortization period	7 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 85% of the adjusted market value nor more than 115% of the adjusted market value. Market value of assets is $73,843,252.39
Actuarial assumptions:	
Investment Rate of Return	7.75% per year (7.875% in prior valuation)
Projected Salary Increases	4.25% Ultimate rate, with the following steps: Group 4: 5 years of 4.50% steps Others: 8 years of 2.00% steps

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:	$1,253,008	9.1% of payroll
The normal cost for the employer was:	$706,387	5.1% of payroll

The actuarial liability for active members was:	$42,880,121
The actuarial liability for retired members was (includes inactives):	$65,151,209
Total actuarial accrued liability:	$108,031,330
System assets as of that date ($73,843,252.39 Market Value):	$76,068,713
Unfunded actuarial accrued liability:	$31,962,617

The ratio of system's assets to total actuarial liability was:	70%

As of that date the total covered employee payroll was:	$13,760,816

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

Investment Return:	7.75% per annum (7.875% in prior valuation)
Rate of Salary Increase:	Select and ultimate rate (4.25% 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	$76,069	$108,031	$31,962	70%	$13,761	232%
1/1/2014	$66,426	$102,977	$36,551	65%	$12,839	285%
1/1/2012	$62,496	$94,616	$32,120	66%	$11,624	276%
1/1/2011	$63,752	$90,520	$26,768	70%	$12,386	216%
1/1/2009	$54,534	$83,201	$28,667	66%	$11,800	243%

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 85%, or more than 115% of the market value of assets plus payables and receivables.

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 (7.875% in prior valuation).

Regular Interest Rate Credited to Annuity Savings Account

2% per year.

Salary Increases

4.25% Ultimate rate, with the following steps:
Group 4: 5 years of 4.50% steps
Others: 8 years of 2.00% steps

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 55% ordinary and 45% 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-2000 mortality 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 45% accidental for group 1 and 2 and 90% accidental for group 4.

Disabled Life Mortality

RP-2000 mortality table projected with Generational Mortality, Scale BB, with a base year of 2000, for healthy annuitants, 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

A 3% COLA on the first $13,000 of a member's retirement allowance is assumed to be granted every year.

Administrative Expenses

Estimated budgeted amount of $304,666 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 4.50% 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 (annualized on a pay period basis).

3. PAY

a. Pay

Gross regular compensation excluding bonuses, overtime, severance pay, unused sick pay, and other similar compensation. For those hired after 12/31/2010, covered pay is limited to 64% of the IRS Code Section 401(a)(17) pay limit.

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 joining the MGL Chapter 32 Retirement System 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

1) 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.

2) System member after April 1, 2012 and 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.

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 % X Average Pay X Years of Service = Benefit, limited at 80% of average pay

BENEFIT % BASED ON ATTAINED AGE AT RETIREMENT			
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 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

- 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 85%, or more than 115% 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.