



## stoneconsulting,inc

October 3, 2018

Concord Retirement Board  
55 Church Street  
West Concord, MA 01742

Dear Concord Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2018 actuarial valuation of the Concord 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.

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 2020 is \$5,918,336, which is \$151,499 greater than the anticipated contribution amount from the prior funding schedule.
- The length of the funding schedule contained in this actuarial valuation report is ten years (fully funded in FY2029).
- The amortization of the unfunded liability is set to remain level. We anticipate over time the contribution level to decrease as a percentage of payroll.
- The discount rate was maintained at 7.00%.

PERAC and GASB guidelines indicate that actuarial valuations should be conducted at least every other year. The Concord Retirement Board conducted their previous actuarial valuation effective January 1, 2017.

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.

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

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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 Concord Retirement System. The valuation was performed at the request of the Retirement Board as of January 1, 2018 for the purpose of determining the contribution requirements for Fiscal Year 2020 and beyond. The contribution requirements are based on:

- The financial condition of the system as of December 31, 2017;
- 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, 2018);
- Economic assumptions regarding salary increases and investment earnings; and
- Other actuarial assumptions (e.g., withdrawals, retirement, death, etc.)

**Valuation Summary**

	January 1, 2018 Valuation	January 1, 2017 Valuation	Change
Contribution Fiscal 2020	\$5,918,336	\$5,766,837	\$151,499 increase
Funding Schedule Length (as of Fiscal 2020)	10 years	10 years	Same
Amortization Increase	0.00%	0.00%	Same
Funding Ratio	87%	85%	1%
Interest Rate Assumption	7.00%	7.00%	0.00%

Summary of Funding Schedule and Funding Progress

- The funding level of the Concord Retirement System is 87% compared to 85% using Actuarial Value of Assets (AVA) for the January 1, 2017 actuarial valuation. Using Market Value of Assets (MVA), the funding level is 90%. The funding level is estimated to be in the top quartile for Massachusetts' Contributory Retirement Systems.
- The schedule length is ten (10) years, a length consistent with the 10 years remaining from the 11-year schedule from the January 1, 2017 valuation. The maximum period allowed under Section 22D is eleven years (Fiscal 2030).
- The amortization of the unfunded liability is set to remain level. The Fiscal Year 2020 contribution is \$151,499 greater than the planned 2020 contribution.

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Summary of Changes to Assumptions, Methodology, and Plan Provisions

- The discount rate assumption is 7.00%
  - Consistent with prior valuation
  - Reflects anticipated future market performance
  
- The salary increase assumption is select and ultimate
  - 4.00% ultimate rate, reduced to 3.50% while receiving the following steps:
  - Group 1 and 2: 7 years of 4.3% steps
  - Fire: 3 years of 4.7% steps
  - Police: 5.2% step in year one, 5.6% in year two, 7.3% in year three, 5.0% in year four, 4.8% in year five
  - This assumption has been maintained from the prior valuation
  
- The mortality assumption is based upon the RP-2014 adjusted to 2006 and projected generationally with MP-2016
  - This is consistent with the prior valuation

Summary of Experience

- Annual return in calendar 2017 - 14.5% vs. a 7.00% assumption.
  - \$10,915,237 net actuarial gain in Calendar Year 2017 (market value)
  - 7.7% annual return on Actuarial Value of Assets
  
- The System's asset portfolio effective December 31, 2017 is approximately 70% equities and 30% fixed income and short-term investments.
  
- Total compensation changed by 1.6% over the prior valuation
  - Average annual compensation (pay divided by number of active members) changed by 4.8%
  - Salary loss of \$477 thousand (more liability than expected when compared to salary projected from the prior valuation data with the prior assumption)
  - A subset of active members had their compensation adjusted upward to reflect retros expected to be paid in 2018 for service performed in 2017.

**January 1, 2018 Actuarial Valuation Results**

	January 1, 2018	January 1, 2017	Percentage Change
<b>Funding</b>			
Contribution for Fiscal 2020	\$5,918,336		2.6%
Contribution for Fiscal 2020 based on current schedule		\$5,766,837	
<b>Members</b>			
■ Actives			
a. Number	519	535	-3.0%
b. Annual Compensation	\$32,139,839	\$31,625,584	1.6%
c. Average Annual Compensation	\$61,926	\$59,113	4.8%
d. Average Attained Age	49.6	49.0	1.1%
e. Average Past Service	12.0	11.5	4.4%
■ Retired, Disabled and Beneficiaries			
a. Number	300	288	4.2%
b. Total Benefits*	\$8,163,671	\$7,525,724	8.5%
c. Average Benefits*	\$27,212	\$26,131	4.1%
d. Average Age	73.6	73.4	0.4%
■ Inactives			
a. Number	157	143	9.8%
<b>Normal Cost</b>			
a. Total Normal Cost	\$4,965,432	\$4,859,779	2.2%
b. Less Expected Members' Contributions	<u>3,013,479</u>	<u>2,921,540</u>	3.1%
c. Normal Cost to be funded by the Municipality	\$1,951,953	\$1,938,239	0.7%
d. Adjustment to July 1, 2019	125,750	124,866	0.7%
e. Administrative Expense Assumption	<u>306,357</u>	<u>264,766</u>	15.7%
f. Normal Cost Adjusted to July 1, 2019	\$2,384,060	\$2,327,871	2.4%
<b>Actuarial Accrued Liability as of January 1, 2018</b>			
a. Active Members	\$97,465,727	\$93,473,733	4.3%
b. Inactive Members	2,479,768	2,467,030	0.5%
c. Retired Members and Beneficiaries	<u>84,778,486</u>	<u>78,448,853</u>	8.1%
d. Total	\$184,723,981	\$174,389,616	5.9%
<b>Unfunded Actuarial Accrued Liability</b>			
a. Actuarial Accrued Liability	\$184,723,981	\$174,389,616	5.9%
b. Less Actuarial Value of Assets	<u>159,852,855</u>	<u>148,500,222</u>	7.6%
c. Unfunded Actuarial Accrued Liability	\$24,871,127	\$25,889,394	-3.9%
d. Adjustment to July 1, 2019	<u>88,030</u>	<u>401,692</u>	
e. Adjusted Unfunded Actuarial Accrued Liability	\$24,959,157	\$26,291,086	

\*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 2020 is as follows:

Net Employer Normal Cost for Fiscal 2020 (including admin. expenses)	\$ 2,384,060
Net 3(8)(c) Payments	213,133
Amortization	<u>3,321,142</u>
Total Appropriation required for Fiscal 2020	\$ 5,918,336

- The funding schedule is presented on the following page. The schedule's length is ten (10) years which is consistent with the remainder of the 11-year schedule from the January 1, 2017 valuation.
- The maximum funding schedule length allowed by Section 22D of Chapter 32 of the Massachusetts General Laws is eleven years to Fiscal 2030.
- The amortization of the unfunded liability is level from year to year. 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

The funding schedule is based on AVA, so it does not reflect gains/losses which are currently unrecognized. There are over \$6.5 million of unrecognized gains. These will be recognized over the next three years and will reduce the contribution level. Details of the pattern of recognition can be found in the pattern of recognition can be found in the four-year asset smoothing section of this report.

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

# CONCORD CONTRIBUTORY RETIREMENT SYSTEM

## FUNDING SCHEDULE

Fiscal Year	Normal Cost	Unfunded Liability	Funding Amortization of UAAL	Net 3(8)(c) Payments	Schedule Contribution*
2020	2,384,060	24,959,157	3,321,142	213,133	5,918,336
2021	2,485,383	23,152,675	3,321,142	213,133	6,019,658
2022	2,591,011	21,219,740	3,321,142	213,133	6,125,287
2023	2,701,129	19,151,499	3,321,142	213,133	6,235,405
2024	2,815,927	16,938,482	3,321,142	213,133	6,350,203
2025	2,935,604	14,570,553	3,321,142	213,133	6,469,880
2026	3,060,367	12,036,870	3,321,142	213,133	6,594,643
2027	3,190,433	9,325,828	3,321,142	213,133	6,724,709
2028	3,326,026	6,425,014	3,321,142	213,133	6,860,302
2029	3,467,383	3,321,142	3,321,142	213,133	7,001,658
2030	3,614,746	-	-	213,133	3,827,880

### Amortization of Unfunded Liability as of July 1, 2019

Year	Type	Original Amort. Amount	Percentage Increasing	Original # of Years	Current Amort. Amount	Years Remaining
2020	Fresh Start	3,321,142	0.00%	10	3,321,142	10

#### 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.



**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, 2018	% of Payroll*
Gross Normal Cost (GNC)	\$ 4,965,432	15.4%
Employees Contribution	<u>3,013,479</u>	9.4%
Net Normal Cost (NNC)	\$ 1,951,953	6.1%
Adjusted to Beginning of Fiscal Year 2020	125,750	
Administrative Expense	<u>306,357</u>	1.0%
Adjusted Net Normal Cost With Admin. Expense	\$ 2,384,060	

- 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, 2018 to Fiscal 2020 by rolling it forward with a salary increase factor of 4.25%.
- Finally, administrative expense is added to the adjusted NNC. This is the amount seen in the funding schedule.

\*Payroll paid in 2017 for employees as of January 1, 2018 is \$32,139,839. Payroll for new hires in 2017 was annualized.

■ Concord Retirement Board

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Unfunded Actuarial Accrued Liability

		January 1, 2018	Percentage Change
Active Actuarial Accrued Liability		\$ 97,465,727	4.3%
Superannuation	\$ 90,684,132		
Death	\$ 1,950,858		
Disability	\$ 3,833,199		
Withdrawal	\$ 997,538		
Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability		\$ 87,258,254	7.8%
Retirees and Beneficiaries	\$ 77,623,150		
Disabled	\$ 7,155,336		
Inactive	\$ 2,479,768		
Total Actuarial Accrued Liability (AAL)		\$ 184,723,981	5.9%
Actuarial Value of Assets (AVA)		\$ 159,852,855	7.6%
Unfunded Actuarial Accrued Liability		\$ 24,871,127	-3.9%
Funded Ratio (AVA / AAL)			
2018 (7.00% interest rate):		87%	
2017 (7.00% interest rate):		85%	

- 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 \$184,723,981. This along with an actuarial value of assets of \$159,852,855 produces a funded status of 87%. This compares to a funded status of 85% for the 2017 valuation.
- The Unfunded AAL is the portion of the AAL which is not covered by the Actuarial Value of Assets (AVA). The UAAL for Concord as of January 1, 2018 is \$24,871,127. This is adjusted to July 1, 2019 to produce the Unfunded Liability seen in Fiscal Year 2020 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.

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

Net 3(8)(c) Payments

- 3(8)(c) payments are benefits which the Concord 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 Concord Retirement System paid out minus what was received by the System, calculated based on the December 31, 2017 PERAC annual statement.
- The amount of net 3(8)(c) payments is assumed to remain level in future years.

**Assets**

	Cash	\$	4,416,532.02
	Fixed Income Securities		33,588,616.18
	Pooled Domestic Equity Funds		52,239,715.62
	Pooled International Equity Funds		4,339,963.23
	Pooled Alternative Investments		1,724,973.97
	Pooled Real Estate Funds		7,980,863.33
	PRIT FUND		<u>61,954,860.19</u>
A	Sub-Total:	\$	166,245,524.54
	Interest Due and Accrued		214,705.99
	Accounts Receivable		95,868.98
	Accounts Payable		<u>(140,258.42)</u>
B	Sub-Total:	\$	170,316.55
	Market Value of Assets [(A) + (B)]	\$	166,415,841.09

- The asset allocation is approximately 30% fixed income, cash, receivables and payables and 70% equities, alternative investments, hedge funds and similar types of investments.

■ Concord Retirement Board  
Actuarial Valuation as of January 1, 2018

Four-Year Asset Smoothing

1. Market value of assets including receivable/payable as of 01/01/2018 \$166,415,841

2. Phase-in of asset gains and losses

	Plan Year (1)	Original Amount (2)	Percent Unrecognized (3)	Amount Unrecognized (2) x (3)
a.	2017	\$10,915,237	75%	\$8,186,428
b.	2016	\$1,359,962	50%	\$679,981
c.	2015	(\$9,213,689)	25%	(\$2,303,422)
d.	2014	\$1,702,738	0%	\$0
e.	Total	\$4,764,247		\$6,562,986

3. Valuation assets without corridor as of 01/01/2018  
(1. - 2.e.) \$159,852,855

4. Corridor Check

a. 90% of Market Value \$149,774,257  
b. 110% of Market Value \$183,057,425

5. Valuation assets with corridor as of 01/01/2018  
(3. within Corridor) \$159,852,855

6. Calculation of return on valuation assets

a. Valuation assets as of 01/01/2017 \$148,500,222

b. ER contribs + EE contribs - Ben Pymts - Expenses \$(11,750)

c. Actual return on valuation assets  
5. - (6.a. + 6.b.) \$11,364,383

d. Weighted value of valuation assets \$148,494,347

e. Return on valuation assets  
(6.c. / 6.d.) 7.7%

f. Annualized return on assets 7.7%

## 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 the actuarial value of assets.

##### Asset Valuation Method

Market Value of Assets, adjusted for payables and receivables, adjusted to phase in investment gains and losses over four years (shown on page 12).

##### Fiscal Year Adjustment

The actuarial results are adjusted by the valuation interest rate and salary scale to the beginning of Fiscal Year 2020. 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, 2018.

##### Investment Return and Discount Rate

7.00% per year net of investment expenses (consistent with prior valuation).

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

2% per year.

##### Cost-of-Living Increases

A 3% COLA on the first \$12,000 of a member's retirement allowance is assumed to be granted every year.

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

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Salary Increases

Select and Ultimate assumption.

- 4.00% ultimate rate, reduced to 3.50% while receiving the following steps:
- Group 1 and 2: 7 years of 4.3% steps
- Fire: 3 years of 4.7% steps
- Police: 5.2% step in year one, 5.6% in year two, 7.3% in year three, 5.0% in year four, 4.8% in year five

Step increases are assumed to be part of the salary increase assumption. The total payroll is assumed to increase at 4.25% 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 \$306,357 for the Fiscal Year 2020 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.

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.

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:

Age				Hired after 4/1/2012		
	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 adjusted to 2006 and projected generationally with MP-2016 (sex-distinct). This is the same as the prior valuation. 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.

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

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**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.

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

**Summary of Principal Provisions (Continued)**

5. SERVICE RETIREMENT

a. Eligibility

Hired prior to April 2, 2012:

- 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.

Hired after April 1, 2012:

- 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
<b>Hired after April 1, 2012*</b>			
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

■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

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**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. COST-OF-LIVING INCREASES

An increase of up to 3% applied to the first \$12,000 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.

#### 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.

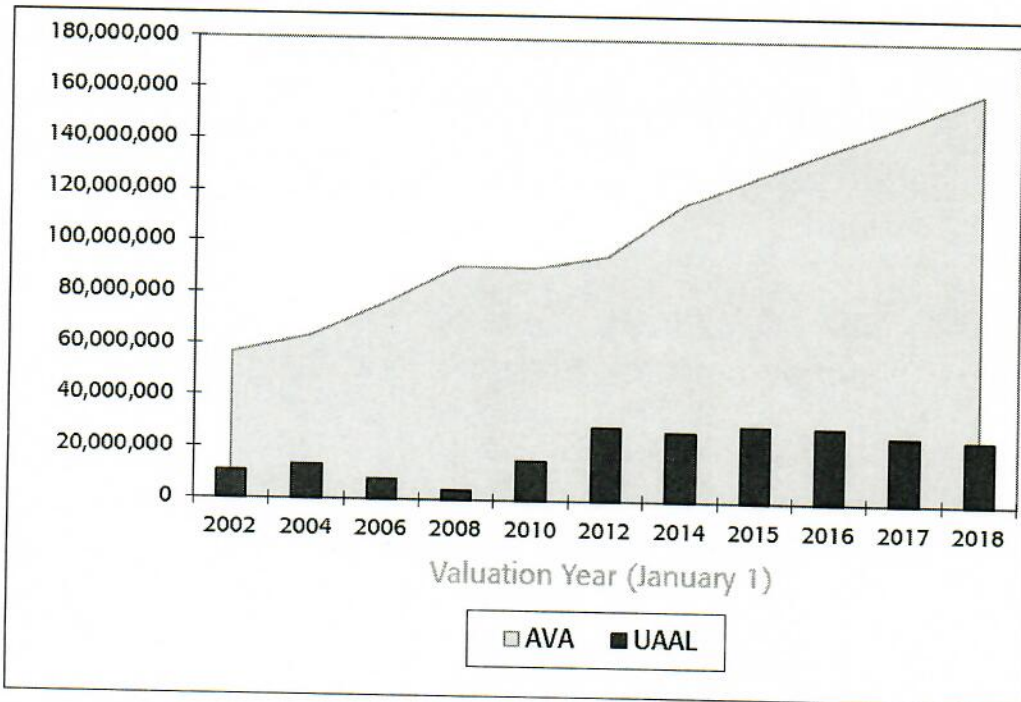
**Appendix C – Charts of Selected Actuarial Statistics**

History of Demographic Statistics

Valuation Year	Number	Average Age	Average Past Service	Average Ann'l Compensation
2018	519	49.6	12.0	\$61,926
2017	535	49.0	11.5	\$59,113
2016	519	49.4	12.0	\$57,690
2015	513	49.6	12.2	\$57,083
2014	502	49.5	12.3	\$54,809
2012	493	49.3	12.0	\$51,159
2010	488	48.7	11.7	\$49,378
2008	461	48.2	11.3	\$46,193
2006	451	47.8	11.1	\$41,963
2004	438	47.1	10.5	\$41,086
2002	444	46.2	10.0	\$37,784
2000	434	45.6	9.7	\$34,119

- 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 81.5% (3.4% annually) over the past eighteen years.

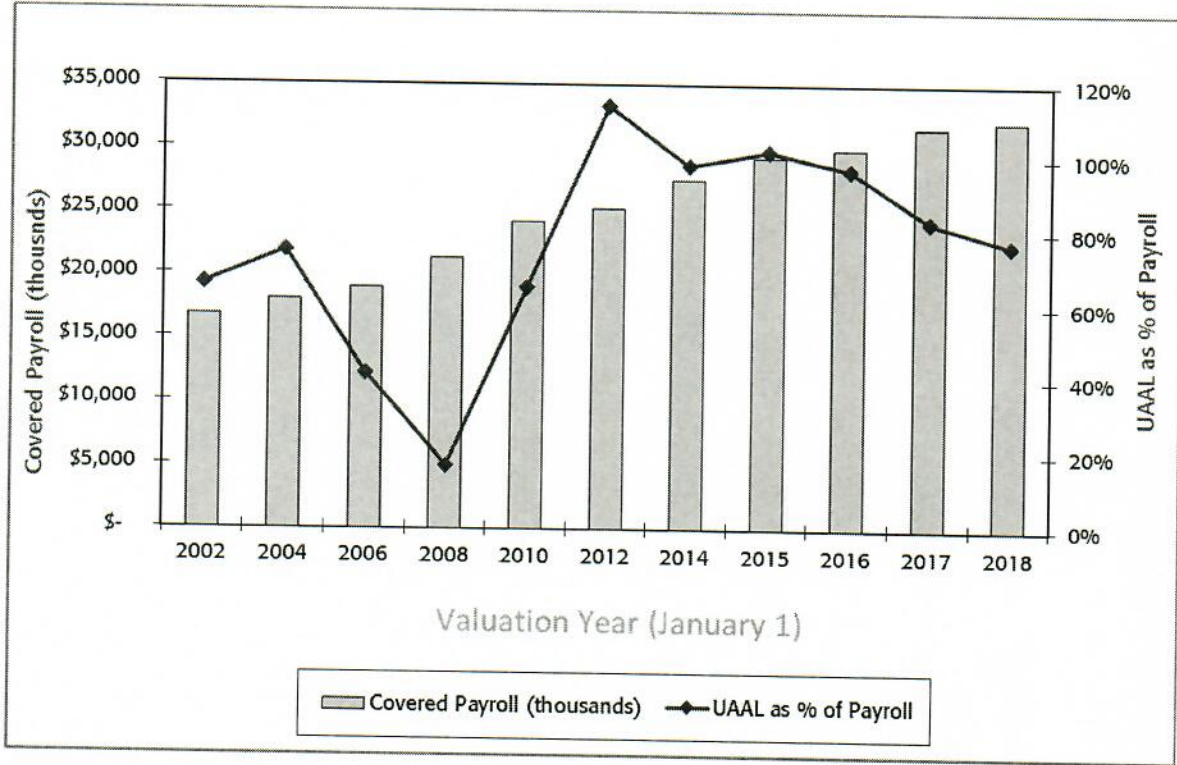
History of Assets and Unfunded Liability



■ Concord Retirement Board

Actuarial Valuation as of January 1, 2018

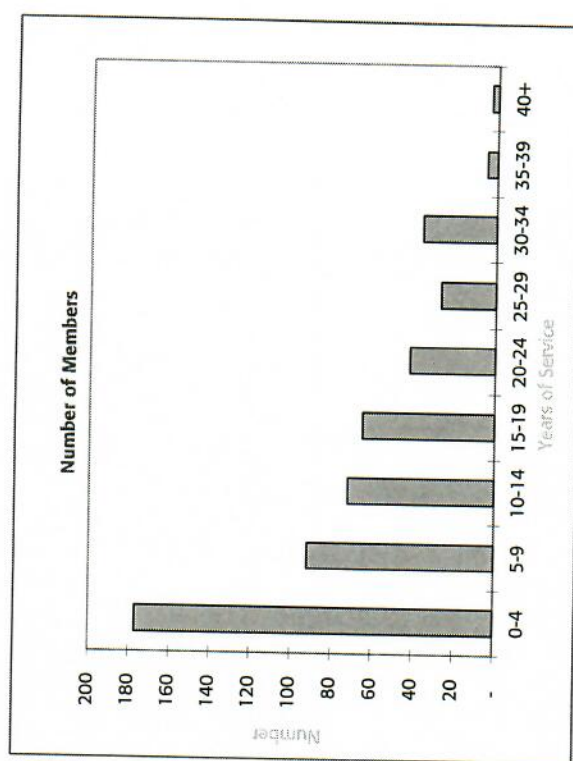
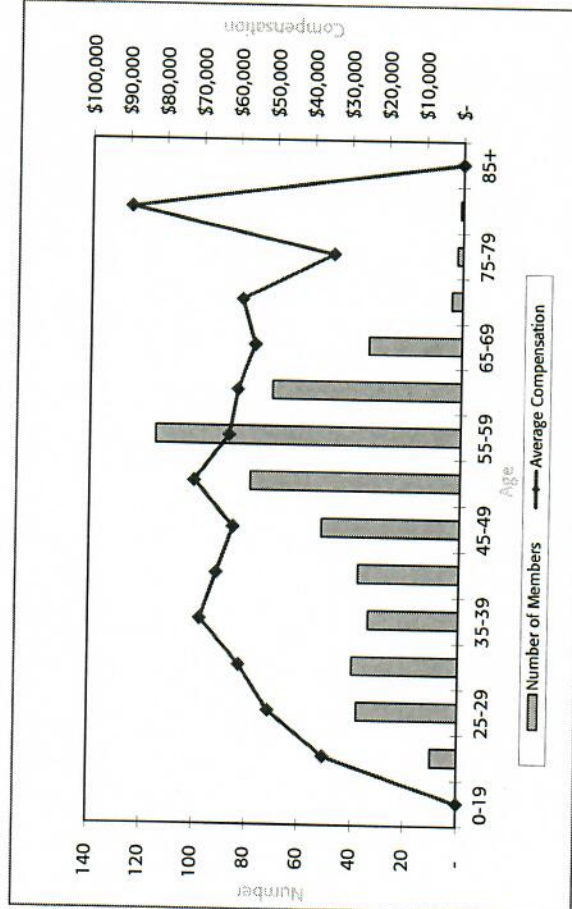
History of Unfunded Liability and Covered Payroll



## Distribution of Plan Members as of January 1, 2018

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	10	-	-	-	-	-	-	-	-	10	\$ 361,059	\$ 36,106
25-29	34	4	-	-	-	-	-	-	-	38	\$ 1,942,716	\$ 51,124
30-34	26	12	2	-	-	-	-	-	-	40	\$ 2,363,748	\$ 59,094
35-39	10	12	11	1	-	-	-	-	-	34	\$ 2,370,115	\$ 69,709
40-44	13	8	4	11	2	-	-	-	-	38	\$ 2,487,879	\$ 65,471
45-49	20	13	3	4	8	2	-	-	-	52	\$ 3,178,270	\$ 61,121
50-54	18	11	10	16	8	6	10	-	-	79	\$ 5,662,244	\$ 71,674
55-59	24	15	25	16	10	9	13	3	-	115	\$ 7,166,293	\$ 62,316
60-64	14	15	10	11	3	7	9	2	-	71	\$ 4,266,587	\$ 60,093
65-69	8	2	6	4	8	3	2	-	2	35	\$ 1,945,910	\$ 55,597
70-74	-	-	-	1	2	-	-	-	1	4	\$ 236,467	\$ 59,117
75-79	-	-	-	-	-	-	-	-	-	2	\$ 69,252	\$ 34,626
80-84	-	-	-	-	-	-	-	-	-	1	\$ 89,298	\$ 89,298
85+	-	-	-	-	-	-	-	-	-	-	\$ -	\$ -
<b>TOTAL</b>	<b>177</b>	<b>92</b>	<b>72</b>	<b>65</b>	<b>42</b>	<b>27</b>	<b>36</b>	<b>5</b>	<b>3</b>	<b>519</b>	<b>\$ 32,139,839</b>	<b>\$ 61,926</b>



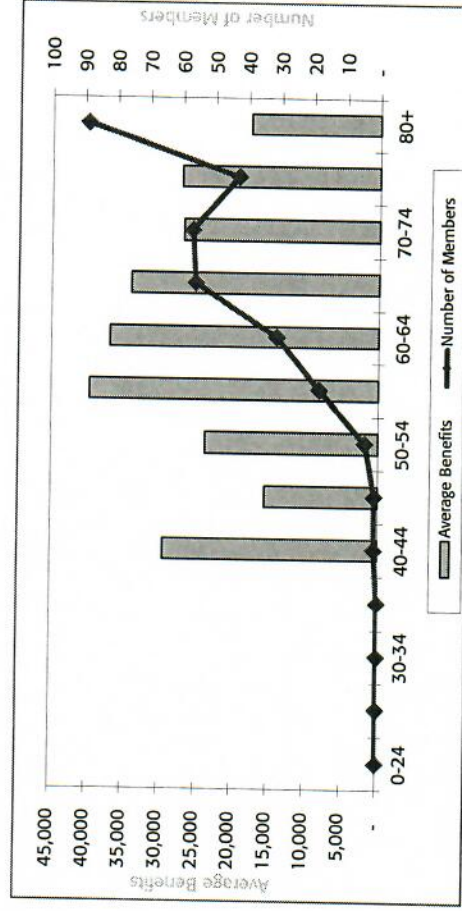
## Distribution of Plan Members as of January 1, 2018

### RETIRED MEMBERS

Retired Members and Beneficiaries			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	-	-	-
45-49	1	15,512	15,512
50-54	2	19,789	39,578
55-59	16	41,038	656,613
60-64	24	40,541	972,987
65-69	53	33,480	1,774,465
70-74	56	26,827	1,502,307
75-79	39	27,089	1,056,463
80+	88	17,556	1,544,915
<b>TOTAL</b>	<b>279</b>	<b>\$ 27,107</b>	<b>\$ 7,562,841</b>

Disabled Members			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	29,439	29,439
45-49	-	-	-
50-54	2	27,681	55,363
55-59	2	28,635	57,271
60-64	7	24,299	170,090
65-69	3	42,134	126,401
70-74	1	27,161	27,161
75-79	4	27,484	109,934
80+	1	25,172	25,172
<b>TOTAL</b>	<b>21</b>	<b>\$ 28,611</b>	<b>\$ 600,831</b>

Total			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	29,439	29,439
45-49	1	15,512	15,512
50-54	4	23,735	94,941
55-59	18	39,660	713,883
60-64	31	36,873	1,143,077
65-69	56	33,944	1,900,866
70-74	57	26,833	1,529,468
75-79	43	27,126	1,166,398
80+	89	17,641	1,570,087
<b>TOTAL</b>	<b>300</b>	<b>\$ 27,212</b>	<b>\$ 8,163,671</b>



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, adjusted to phase in investment gains and losses over four years.
- **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.
- **Funding Ratio**  
The portion of the Actuarial Accrued Liability which is covered by the Actuarial Assets.
- **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 Concord 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 Concord 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 7.00% 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.
- All assumptions and methodologies were selected by the Concord Retirement Board in conjunction with guidance provided by Stone Consulting, Inc.
- 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, 2018. 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.