CITY OF WALTHAM
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report

January 1, 2017

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Report Summary:

Highlights	**January 1, 2016**	**January 1, 2017**
Contributions		
Funding Schedule FY 2018	$17,233,644	$17,233,644
Funding Schedule FY 2019	17,733,644	17,785,000
Funded Ratios		
GAS No. 25	56.2%	57.7%
Participants		
Actives	915	910
Retirees and Beneficiaries	659	661
Inactives	128	130
Disabled	104	105
Total	1,806	1,806
Payroll		
Payroll of Active Members	$59,292,926	$61,634,166
Average Payroll	64,801	67,730
Normal Cost		
Employer	$1,440,626	$1,409,505
Employee	5,236,367	5,471,450
Administrative Expenses	525,000	625,000
Total	$7,201,993	$7,505,955
Actuarial Accrued Liabilities		
Actives	$167,799,628	$179,235,714
Retirees, Beneficiaries, Disabilities and Inactives	203,476,109	208,567,438
Total	$371,275,737	$387,803,152
Actuarial Value of Assets	208,774,746	223,584,317
Unfunded Actuarial Accrued Liabilities	$162,500,991	$164,218,835

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2017, of Waltham Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2017.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the City of Waltham Contributory Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2017.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The cost of these benefits has been assumed by the State under Proposition Two and One-Half.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last year, the total unfunded actuarial accrued liability increased by 0.5% to $164,218,835. The increase is the result of net unfavorable actuarial experience during the preceding years and a change in actuarial assumptions. The sources of actuarial (gains) and losses are as follows:

Assets	(184,547)
Salary Increases	2,405,068
New Participants	248,691
Active - Retirements	(939,079)
Active - Terminations	1,043,453
Active - Mortality	(203,713)
Active - Disabilities	105,729
Inactive - Mortality and data adjustments	3,725,034
Other, includes data adjustments, buybacks, interest on ASF	278,437
Benefit Payments	81,333
Total Actuarial (Gain) / Loss	6,560,406

Actuarial Costs and Liabilities:

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which 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 terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

Table I

	January 1, 2016	January 1, 2017
Superannuation	$4,049,448	$4,186,601
Termination	1,788,826	1,831,361
Death	386,692	389,928
Disability	452,027	473,065
Administrative Expenses	$525,000	$625,000
Total Normal Cost	$7,201,993	$7,505,955
% of Pay	12.1%	12.2%
Employee Contributions	$5,236,367	$5,471,450
% of Pay	8.8%	8.9%
Employer Normal Cost	$1,965,626	$2,034,505
% of Pay	3.3%	3.3%

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Present Value of Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

Table II

	January 1, 2016	January 1, 2017
Actives		
Superannuations	$163,738,171	$174,914,382
Termination	(4,911,757)	(5,067,623)
Death	6,005,893	6,258,816
Disability	2,967,321	3,130,139
Retirees and Inactives		
Retirees and Beneficiaries	$165,773,456	$170,944,115
Terminated (Refund)	1,073,723	1,201,147
Disabled	36,628,930	36,422,176
Total	$371,275,737	$387,803,152

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Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

Table III

	January 1, 2016	January 1, 2017
Actives		
Superannuation	$190,732,600	$202,450,815
Termination	8,353,865	8,432,393
Death	8,473,818	8,715,925
Disability	6,094,650	6,393,402
Retirees and Inactives		
Retirees and Beneficiaries	$165,773,456	$170,944,115
Terminated (Refund)	1,073,723	1,201,147
Disabled	36,628,930	36,422,176
Total	$417,131,042	$434,559,973

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Funded Status and Appropriations:

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV

	January 1, 2016	January 1, 2017
Cash equivalents	$2,606,428	$37,766
Fixed income securities	0	26,202,350
Equities	0	47,258,623
International	0	19,533,268
Real Estate	5,243,072	11,547,756
Other	2,612,442	8,137,005
PRIT Fund	192,040,012	104,180,688
Accounts receivable	223,553	11,442
Accounts payable	(14,775)	(76,807)
Accrued income	0	90,501
Total Market Value	$202,710,732	$216,922,592
Total Actuarial Value	$208,774,746	$223,584,317

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Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (7.75%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a five year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 20%. The calculation of the actuarial value of assets as of January 1, 2017 is presented in Table V.

Table V

		January 1, 2017
(1)	Market value at January 1, 2016	$202,710,732
(2)	2016 Contributions	$23,728,525
(3)	2016 Payments	($25,226,578)
(4)	Net interest adjustment at 7.75% on (1), (2) and (3) to December 31, 2016	$15,652,032
(5)	Expected market value on January 1, 2017 (1) + (2) + (3) + (4)	$216,864,711
(6)	Actual market value on January 1, 2017	$216,922,592
(7)	2016 (Gain) / Loss	($57,881)
(8)	80% of 2016 (Gain) / Loss	($46,305)
(9)	2015 (Gain) / Loss	$14,820,773
(10)	60% of 2015 (Gain) / Loss	$8,892,464
(11)	2014 (Gain) / Loss	($23,281)
(12)	40% of 2014 (Gain) / Loss	($9,312)
(13)	2013 (Gain) / Loss	($10,875,609)
(14)	20% of 2013 (Gain) / Loss	($2,175,122)
(15)	Actuarial value on January 1, 2017, (6) + (8) + (10) + (12) + (14) but not less than 80% nor greater than 120% of (6)	$223,584,317
(16)	Ratio of actuarial value to market value	103.07%
(17)	Actuarial Value Return for 2015	7.74%
(18)	Actuarial Value Return for 2016	7.84%
(19)	Market Value Return for 2015	0.90%
(20)	Market Value Return for 2016	7.78%

Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

Table VI

	January 1, 2016	January 1, 2017
Actuarial Accrued Liability	$371,275,737	$387,803,152
Actuarial Assets	208,774,746	223,584,317
Unfunded Actuarial Accrued Liability	$162,500,991	$164,218,835
Funded Status	56.2%	57.7%

Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2033
  $ 161,675,285 over 18 years with increasing payments
- Level amortization of the 2002 Early Retirement Incentive by June 30, 2018
  $ 1,035,971 over 1 years
- Level amortization of the 2011 Early Retirement Incentive by June 30, 2021
  $ 1,507,579 over 4 years
- Interest adjustment for payments deposited at the beginning of the fiscal year.

The Board decided to have each appropriation $500,000 greater than the previous. The pension appropriation is shown in Table VII.

Table VII

	January 1, 2016	January 1, 2017
Normal cost	$1,965,626	$2,034,505
Amortization payment of the accrued liability	12,207,790	13,005,548
Amortization payment of 2002 ERI liability	1,035,971	1,035,971
Amortization payment of 2011 ERI liability	420,083	420,083
Total cost	$15,629,470	$16,496,107
% of Pay	26.4%	26.8%
Fiscal 2018 cost	$17,233,644	$17,233,644
Fiscal 2019 cost	$17,733,644	$17,785,000

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 3.5% per year. The employee contribution rate is expected to increase to 10.5% by 2035 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to decrease during the next 14 years until the unfunded liabilities are completely paid off, at which time only the normal cost will remain. The total cost represents about 27.9% of payroll, decreasing to about 24.3% by the time the unfunded liabilities are fully paid off, leaving only a long term normal cost of 1.9% thereafter. The decrease in the cost as a percentage of payroll is a result of the increase in member deductions.

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Appropriation Forecast

Fiscal Year Ending	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Unfunded Liability**	Funded Ratio %**
2018	$5,471,450	$2,111,871	$15,121,773	$17,233,644	28.0	$164,108,595	57.7
2019	5,723,841	2,122,580	15,662,420	17,785,000	27.9	161,125,851	59.7
2020	5,987,198	2,131,452	16,203,548	18,335,000	27.8	157,308,266	62.0
2021	6,261,977	2,138,345	16,746,655	18,885,000	27.6	152,679,936	64.3
2022	6,548,657	2,143,109	17,291,891	19,435,000	27.5	147,129,152	66.8
2023	6,847,734	2,145,587	17,839,413	19,985,000	27.3	140,582,212	69.3
2024	7,159,724	2,145,614	18,389,386	20,535,000	27.1	132,959,541	72.0
2025	7,485,164	2,143,014	18,941,986	21,085,000	26.9	124,175,227	74.7
2026	7,824,615	2,137,603	19,497,397	21,635,000	26.7	114,136,515	77.5
2027	8,178,658	2,129,189	20,055,811	22,185,000	26.4	102,743,271	80.4
2028	8,547,899	2,117,567	20,617,433	22,735,000	26.1	89,887,401	83.4
2029	8,932,967	2,102,523	21,182,477	23,285,000	25.9	75,452,223	86.5
2030	9,334,520	2,083,832	21,751,168	23,835,000	25.6	59,311,788	89.8
2031	9,753,238	2,061,258	22,323,742	24,385,000	25.3	41,330,152	93.1
2032	10,189,832	2,034,550	22,172,871	24,207,421	24.3	21,360,593	96.6
2033	10,645,039	2,003,448	0	2,003,448	1.9	0	100.0
2034	11,119,629	1,967,676	0	1,967,676	1.8	(0)	100.0
2035	11,614,400	1,926,946	0	1,926,946	1.7	(0)	100.0
2036	12,020,904	1,994,389	0	1,994,389	1.7	(0)	100.0
2037	12,441,635	2,064,192	0	2,064,192	1.7	(0)	100.0
2038	12,877,093	2,136,439	0	2,136,439	1.7	0	100.0
2039	13,327,791	2,211,215	0	2,211,215	1.7	0	100.0
2040	13,794,264	2,288,607	0	2,288,607	1.7	0	100.0
2041	14,277,063	2,368,708	0	2,368,708	1.7	0	100.0
2042	14,776,760	2,451,613	0	2,451,613	1.7	0	100.0
2043	15,293,947	2,537,420	0	2,537,420	1.7	0	100.0
2044	15,829,235	2,626,229	0	2,626,229	1.7	0	100.0
2045	16,383,258	2,718,147	0	2,718,147	1.7	0	100.0
2046	16,956,672	2,813,282	0	2,813,282	1.7	0	100.0
2047	17,550,155	2,911,747	0	2,911,747	1.7	0	100.0
2048	18,164,411	3,013,658	0	3,013,658	1.7	0	100.0
2049	18,800,165	3,119,136	0	3,119,136	1.7	0	100.0

** Beginning of Fiscal Year

GASB Statements No. 25 and No. 27

Effective for periods beginning after June 15, 1997, the Governmental Accounting Standards Board (GASB) requires the disclosure of pension related liabilities for public employer financial statements in accordance with Statements 25 and 27. These statements, which replace GASB Statement No. 5, must be adhered to by any public employee retirement system that follows Generally Accepted Accounting Principles (GAAP).

These disclosures are intended to establish a reporting framework that distinguishes between:

- current financial information about plan assets and financial activities,
- actuarially determined information from a long-term perspective,
- the funded status of the plan, and
- progress being made in accumulating sufficient assets to pay benefits when due.

Footnote disclosures required by GASB Statement No. 25 and 27 include a description of the plan, a summary of significant accounting policies, and information about contributions, legally required reserves, and investment concentrations. As a result of the oversight of the Public Employees Retirement Administration Commission (PERAC) and the conversion of unpaid contributions to pension related debt, the Net Pension Obligation (NPO) as required by Statement No. 27 will effectively always be equal to $0. The required disclosure information is shown in Table VIII.

Table VIII

		January 1, 2016	January 1, 2017
(1)	Actuarial Accrued Liability	$371,275,737	$387,803,152
(2)	Actuarial Value of Assets	208,774,746	223,584,317
(3)	Unfunded Actuarial Accrued Liability	$162,500,991	$164,218,835
(4)	Funded Ratio: (2)/(1)	56.2%	57.7%
(5)	Covered Payroll	$59,292,926	$61,634,166
(6)	UAAL as a percentage of payroll: (3)/(5)	274.1%	266.4%
(7)	Annual Required Contribution (ARC)	$16,733,644	$17,233,644
(8)	Net Pension Obligation	$0	$0

EXHIBITS

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Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2017

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	2	0	0	0	0	0	0	0	0	2
	31,644	0	0	0	0	0	0	0	0	31,644
20-24	13	0	0	0	0	0	0	0	0	13
	34,479	0	0	0	0	0	0	0	0	34,479
25-29	49	3	0	0	0	0	0	0	0	52
	53,328	62,428	0	0	0	0	0	0	0	53,853
30-34	28	22	9	0	0	0	0	0	0	59
	53,804	59,646	65,637	0	0	0	0	0	0	57,788
35-39	22	16	36	14	0	0	0	0	0	88
	52,896	66,681	76,229	79,912	0	0	0	0	0	69,245
40-44	19	11	16	31	9	0	0	0	0	86
	52,444	60,045	78,787	84,268	86,127	0	0	0	0	73,313
45-49	30	19	17	26	38	11	0	0	0	141
	45,383	44,518	57,425	77,066	83,769	91,571	0	0	0	66,509
50-54	25	29	26	28	30	33	10	0	0	181
	47,930	38,570	54,131	66,248	85,604	90,390	88,223	0	0	66,367
55-59	15	11	16	23	26	29	20	1	0	141
	43,660	36,747	45,566	59,353	72,435	79,297	87,687	124,358	0	65,350
60-64	3	19	11	15	14	6	21	11	2	102
	37,925	45,109	65,917	54,007	67,921	60,529	86,713	122,181	87,595	70,199
65-69	0	3	7	8	5	5	2	1	0	31
	0	54,571	60,661	67,856	58,177	47,332	43,298	52,868	0	58,006
70+	0	0	2	1	5	1	2	0	3	14
	0	0	71,371	17,538	79,332	38,101	38,924	0	64,739	61,936
Total Employees	206	133	140	146	127	85	55	13	5	910
Average Salary	49,125	49,746	64,291	70,722	79,120	81,502	84,025	117,016	73,881	65,439

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Exhibit 2 - Retiree Distribution as of January 1, 2017

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	1	1	0	2,040	2,040
35-39	0	0	0	0	0	0
40-44	0	1	1	0	47,205	47,205
45-49	1	2	3	2,707	32,165	34,872
50-54	3	5	8	14,856	88,439	103,295
55-59	10	18	28	123,294	555,374	678,668
60-64	26	52	78	542,297	2,157,217	2,699,514
65-69	46	88	134	1,098,802	4,474,622	5,573,424
70-74	40	67	107	753,101	2,849,256	3,602,357
75-79	30	48	78	576,381	1,760,863	2,337,245
80-84	36	47	83	570,291	1,457,132	2,027,423
85-89	29	34	63	388,689	946,112	1,334,800
90-94	23	31	54	354,240	718,632	1,072,872
95+	8	15	23	103,391	202,219	305,610
Total	252	409	661	4,528,049	15,291,275	19,819,324
Average (Age/Payment)	75.98	74.33	74.96	17,968	37,387	29,984
Frequency Percent	38.1	61.9	100	22.8	77.2	100

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Exhibit 3 - Disabled Retiree Distribution as of January 1, 2017

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	1	1	0	37,034	37,034
45-49	0	6	6	0	288,745	288,745
50-54	2	5	7	38,837	115,342	154,179
55-59	0	10	10	0	361,731	361,731
60-64	4	8	12	108,051	405,210	513,262
65-69	1	17	18	23,156	801,911	825,067
70-74	2	17	19	48,946	598,825	647,771
75-79	0	15	15	0	550,995	550,995
80-84	0	10	10	0	286,926	286,926
85-89	0	3	3	0	94,590	94,590
90-94	0	4	4	0	105,656	105,656
95-99	0	0	0	0	0	0
Total	9	96	105	218,990	3,646,963	3,865,954
Average (Age/Payment)	62.86	69.52	68.95	24,332	37,989	36,819
Frequency Percent	8.6	91.4	100	5.7	94.3	100

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EXHIBIT 4 - CASHFLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net change in plan assets
2017	$24,171,706	$5,471,450	$17,233,644	$16,827,446	$15,360,834
2018	23,987,401	5,723,841	17,785,000	18,084,349	17,605,789
2019	24,830,703	5,987,198	18,335,000	19,386,835	18,878,330
2020	25,669,136	6,261,977	18,885,000	20,834,983	20,312,824
2021	26,564,376	6,548,657	19,435,000	22,392,183	21,811,464
2022	27,490,423	6,847,734	19,985,000	24,064,403	23,406,714
2023	28,484,719	7,159,724	20,535,000	25,857,713	25,067,718
2024	29,499,937	7,485,164	21,085,000	27,779,018	26,849,245
2025	30,587,241	7,824,615	21,635,000	29,835,722	28,708,096
2026	31,638,225	8,178,658	22,185,000	32,037,949	30,763,382
2027	32,644,802	8,547,899	22,735,000	34,401,241	33,039,339
2028	33,683,402	8,932,967	23,285,000	36,939,805	35,474,369
2029	34,755,046	9,334,520	23,835,000	39,665,940	38,080,414
2030	35,860,785	9,753,238	24,385,000	42,592,873	40,870,326
2031	37,001,703	10,189,832	24,207,421	45,707,158	43,102,709
2032	38,178,919	10,645,039	2,003,448	48,155,627	22,625,195
2033	39,393,589	11,119,629	1,967,676	49,858,822	23,552,538
2034	40,646,903	11,614,400	1,926,946	51,632,409	24,526,851
2035	41,940,093	12,020,904	1,994,389	53,475,832	25,551,032
2036	43,274,425	12,441,635	2,064,192	55,396,776	26,628,178
2037	44,651,209	12,877,093	2,136,439	57,399,286	27,761,609
2038	46,071,796	13,327,791	2,211,215	59,487,662	28,954,872
2039	47,537,579	13,794,264	2,288,607	61,666,479	30,211,771
2040	49,049,997	14,277,063	2,368,708	63,940,601	31,536,376
2041	50,610,532	14,776,760	2,451,613	66,315,208	32,933,049
2042	52,220,716	15,293,947	2,537,420	68,795,815	34,406,466
2043	53,882,128	15,829,235	2,626,229	71,388,297	35,961,633
2044	55,596,398	16,383,258	2,718,147	74,098,916	37,603,922
2045	57,365,209	16,956,672	2,813,282	76,934,345	39,339,090
2046	58,864,551	17,550,155	2,911,747	79,914,090	41,511,440

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2017, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

(i) Group 1: Most general employees in State and local government

(ii) Group 2: Certain specified hazardous duty positions

(iii) Group 3: State police officers and inspectors

(iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. Salary

Salary is defined as gross regular compensation. Salary does not include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. Member Contributions

Member contributions vary depending upon date hired as follows:

Date of Hire	Member Contribution Rate
Prior to 1975	5.0% of Salary
1975 to 1983	7.0% of Salary
1984 to 1996	8.0% of Salary
1996 and Later plus	9.0% of Salary
1979 and Later	2.0% of Salary in excess of $30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. Average Salary

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. Creditable Service

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. **Service Retirement**

a. Eligibility:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

(i) completion of 20 years of service

(ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member

(iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service

(iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

Age at	Percentage of Average Salary		
Retirement	Group 1	Group 2	Group 4
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
54	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.001	.001	.001

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

Age at Retirement	Percentage of Average Salary Group 1	Group 2	Group 4
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at Retirement	Percentage of Average Salary Group 1	Group 2	Group 4
67 or Over	.02500	.02500	.02500
66	.02375	.02500	.02500
65	.02250	.02500	.02500
64	.02125	.02500	.02500
63	.02000	.02500	.02500
62	.01875	.02500	.02500
61	.01750	.02375	.02500
60	.01625	.02250	.02500
59		.02125	.02500
58		.02000	.02500
57		.01875	.02500
56		.01750	.02375
55		.01625	.02250
54			.02125
53			.02000
52			.01875
51			.01750
50			.01625

8. Deferred Vested Retirement

a. Eligibility:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions, with interest.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus $450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. Eligibility:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of $250 per month to the surviving spouse, plus $120 for the first child, plus $90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of $250 per month plus $120 for the first child and $90 for each additional child.

c. Refund of Contributions:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. Cost-of-Living Increases

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is $14,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

(i) Option A – Life annuity

(ii) Option B – Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member

(iii) Option C – Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 6 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

1. Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. Valuation Date

January 1, 2017.

3. Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.75% per annum.

5. Salary Scale

It is assumed that salaries including longevity will increase at a rate of 3.5% per year.

6. Cost-of-Living Increases

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and $14,000 per year.

7. Value of Investments

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a four-year smoothing of asset returns greater than or less than the assumed rate of return.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

Service	General Employees	Police and Fire Employees
0	0.2080	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
30	0.0000	0.0000

9. Annual Rate of Mortality

It is assumed that both pre-retirement mortality and beneficiary mortality is represented by the RP-2014 Blue Collar Mortality with Scale MP-2014, fully generational. Mortality for retired members for Group 1 and 2 is represented by the RP-2000 Mortality Table set forward five years for males and 3 years for females, fully generational. Mortality for retired members for Group 4 is represented by the RP-2000 Mortality Table set forward three years for males, and six years for females, fully generational. Mortality for disabled members for Group 1 and 2 is represented by the RP-2000 Mortality Table set forward six years. Mortality for disabled members for Group 4 is represented by the RP-2000 Mortality Table set forward two years. Generational adjusting is based on Scale MP-2014.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.00000
66	0.2682	0.1959	1.00000
67	0.2500	0.2000	1.00000
68	0.2500	0.2000	1.00000
69	0.2500	0.2000	1.00000
70 to 76	0.2500	0.2500	1.00000
77 to 79	0.3500	0.2500	1.00000
80	1.0000	1.0000	1.00000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	0.2500
66	0.1224	0.1038	0.3000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70 to 76	0.2615	0.1939	1.0000
77 to 79	0.2682	0.1959	1.0000
80	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained Age	General Employees	Police and Fire Employees
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 20% of all disabilities are ordinary (80% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2017 is $625,000 and is anticipated to increase at 3.5% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. Actuarial Accrued Liability

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

3. Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. Actuarial Present Value

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. Forecast

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

6. **Normal Cost**

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

7. **Unfunded Actuarial Accrued Liability**

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

8. **Valuation Method**

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

9. **Vested Liability**

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

CERTIFICATION:

This report fairly represents the actuarial position of the City of Waltham Retirement System contributing as of January 1, 2017, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

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 the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC

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Daniel W. Sherman, ASA, MAAA

August, 2017