MEDFORD
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report
January 1, 2022

Sherman Actuarial Services

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Report Summary:

Highlights	January 1, 2020	January 1, 2022
Contributions		
Funding Schedule FY 2023	$15,150,592	$15,150,592
Funding Schedule FY 2024	16,362,639	16,199,535
Funded Ratios		
GAS No. 25	61.3%	66.2%
Participants		
Actives	776	742
Retirees and Beneficiaries	487	502
Inactives	203	266
Disabled	120	118
Total	1,586	1,628
Payroll		
Payroll of Active Members	$46,003,072	$47,592,905
Average Payroll	59,282	64,141
Normal Cost		
Employer	$2,866,822	$2,392,363
Employee	4,085,550	4,308,081
Administrative Expenses	425,000	425,000
Total	$7,377,372	$7,125,444
Actuarial Accrued Liabilities		
Actives	$133,567,594	$127,219,098
Retirees, Beneficiaries, Disabilities and Inactives	201,393,976	220,951,233
Total	$334,961,570	$348,170,331
Actuarial Value of Assets	$205,456,666	$230,597,138
Unfunded Actuarial Accrued Liabilities	$129,504,904	$117,573,193

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2022, the Medford Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2022.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Medford 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, 2022.

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 two years, based on the 2020 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability decreased by 9.21% to $117,573,193. The decrease is the result of contributions to the trust and net favorable actuarial experience during the preceding years. The sources of actuarial (gains) and losses are as follows:

Assets	(3,543,221)
Salary Increases	91,630
New Participants	1,588,704
Retirements	(6,419,076)
Terminations	(1,252,147)
Death while active	256,267
Disabled while active	(264,878)
Inactive Mortality	517,076
Inactive Data Changes	2,027,804
Benefit Payments	308,885
Other	939,502
Total (Gain) / Loss	(5,749,457)

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, 2020	January 1, 2022
Superannuation	$4,850,268	$4,556,728
Termination	928,817	976,173
Death	197,989	203,581
Disability	975,298	963,962
Administrative Expenses	$425,000	$425,000
Total Normal Cost	$7,377,372	$7,125,444
% of Pay	16.0%	15.0%
Employee Contributions	$4,085,550	$4,308,081
% of Pay	8.9%	9.1%
Employer Normal Cost	$3,291,822	$2,817,363
% of Pay	7.2%	5.9%

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, 2020	January 1, 2022
Actives		
Superannuations	$129,893,190	$123,220,181
Termination	(2,572,245)	(2,710,713)
Death	1,901,955	2,037,608
Disability	4,344,694	4,672,022
Retirees and Inactives		
Retirees and Beneficiaries	$141,008,789	$160,457,049
Terminated (Refund)	1,517,753	2,496,987
Disabled	58,867,434	57,997,197
Total	$334,961,570	$348,170,331

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, 2020	January 1, 2022
Actives		
Superannuation	$166,772,849	$159,766,173
Termination	4,814,159	5,313,521
Death	3,495,222	3,738,730
Disability	12,986,634	13,527,473
Retirees and Inactives		
Retirees and Beneficiaries	$141,008,789	$160,457,049
Terminated (Refund)	1,517,753	2,496,987
Disabled	58,867,434	57,997,197
Total	$389,462,840	$403,297,130

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, 2020	January 1, 2022
Cash equivalents	$2,089,354	$1,944,473
Short term investments	0	2,484,541
Fixed income securities	57,696,946	66,107,738
Equities	54,631,895	75,080,971
International	51,194,578	44,342,405
Real Estate	15,778,943	24,804,795
Venture Capital	0	0
Other	26,138,752	45,297,638
Accounts receivable	182,713	120,692
Accounts payable	(775,391)	(135,639)
Accrued income	121,032	134,952
Total Market Value	$207,058,822	$260,182,566
Total Actuarial Value	$205,456,666	$230,597,138

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 (7.25%) 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 15%. The calculation of the actuarial value of assets as of January 1, 2022 is presented in Table V.

Table V

		January 1, 2022
(1)	Market value at January 1, 2021	$205,456,666
(2)	2021 Contributions	$19,790,484
(3)	2021 Payments	($23,759,998)
(4)	Net interest adjustment at 7.25% on (1), (2), and (3) to December 31, 2021	$14,751,713
(5)	Expected market value on January 1, 2022 (1) + (2) + (3) + (4)	$216,238,866
(6)	Actual market value on January 1, 2022	$260,182,566
(7)	2021 (Gain) / Loss	($43,943,700)
(8)	80% of 2021 (Gain) / Loss	($35,154,960)
(9)	2020 (Gain) / Loss	$11,796,981
(10)	60% of 2020 (Gain) / Loss	$7,078,188
(11)	2019 (Gain) / Loss	($13,642,486)
(12)	40% of 2019 (Gain) / Loss	($5,456,994)
(13)	2018 (Gain) / Loss	$19,741,692
(14)	20% of 2018 (Gain) / Loss	$3,948,338
(15)	Actuarial value on January 1, 2022, (6) + (8) + (10) + (12) + (14)	$230,597,138
	but not less than 85% nor greater than 115% of (6)	$230,597,138
(16)	Ratio of actuarial value to market value	88.63%
(17)	Actuarial Value Return for 2020	5.95%
(18)	Actuarial Value Return for 2021	10.27%
(19)	Market Value Return for 2020	1.49%
(20)	Market Value Return for 2021	28.85%

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, 2020	January 1, 2022
Actuarial Accrued Liability	$334,961,570	$348,170,331
Actuarial Assets	205,456,666	230,597,138
Unfunded Actuarial Accrued Liability	$129,504,904	$117,573,193
Funded Status	61.3%	66.2%

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, 2032
  $ 117,002,360 over 10 years with 6.9% increasing payments
- Level amortization of the 2002 Early Retirement Incentive by June 30, 2026
  $ 28,498 over 4 years
- Increasing amortization of the Funding Holiday by June 30, 2023
  $ 542,335 over 1 years with 4.5% increasing payments
- Interest adjustment for payments deposited on July 1st.

The pension appropriation is shown in Table VII. The Board approved a limit of 8% on annual increases.

Table VII

	January 1, 2020	January 1, 2022
Normal cost	$3,291,822	$2,817,363
Amortization payment of the unfunded accrued liability	12,548,132	11,873,087
Amortization payment of 2002 ERI liability	7,889	7,889
Amortization payment of 2010 ERI liability	83,481	0
Amortization payment of Funding Holiday and ERI	496,632	542,335
Total cost	$16,427,956	$15,240,674
% of Pay	35.7%	32.0%
Fiscal 2023 cost	$15,150,592	$15,150,592
Fiscal 2024 cost	$16,362,639	$16,199,535

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 2037 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 increase during the next 10 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 33% of payroll initially, increasing to about 40% until the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 4.6% thereafter. The decrease in the employer Normal Cost as a percentage of payroll is a result of the increase in member deductions.

https://shermanactuary-my.sharepoint.com/personal/dan_shermanactuary_com/Documents/Recovered Data/Medford/Val22/[Medford22_Val.xlsm]Approp. Results

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 Accrued Liability	Funded Ratio %**
2023	$4,308,081	$2,917,706	$12,232,886	$15,150,592	31.8	$118,206,084	66.0
2024	$4,506,417	$2,970,579	$13,228,956	$16,199,535	32.9	$113,452,023	67.8
2025	$4,713,359	$3,023,579	$14,141,191	$17,164,770	33.7	$107,974,361	69.9
2026	$4,929,266	$3,076,650	$15,116,369	$18,193,019	34.5	$101,154,649	72.3
2027	$5,154,514	$3,129,732	$16,150,665	$19,280,397	35.3	$92,830,390	74.9
2028	$5,389,490	$3,182,761	$17,265,061	$20,447,822	36.2	$82,831,268	78.0
2029	$5,634,600	$3,235,668	$18,456,350	$21,692,018	37.1	$70,952,885	81.4
2030	$5,890,266	$3,288,379	$19,729,838	$23,018,217	38.0	$56,979,347	85.3
2031	$6,156,926	$3,340,817	$21,091,197	$24,432,014	39.0	$40,673,613	89.7
2032	$6,435,036	$3,392,897	$22,546,490	$25,939,387	40.0	$21,775,577	94.6
2033	$6,725,072	$3,444,531	$0	$3,444,531	5.1	$0	100.0
2034	$7,027,528	$3,495,622	$0	$3,495,622	5.0	$0	100.0
2035	$7,342,918	$3,546,070	$0	$3,546,070	4.9	$0	100.0
2036	$7,671,776	$3,595,767	$0	$3,595,767	4.8	$0	100.0
2037	$8,014,659	$3,644,600	$0	$3,644,600	4.7	$0	100.0
2038	$8,372,145	$3,692,445	$0	$3,692,445	4.6	$0	100.0
2039	$8,665,170	$3,821,681	$0	$3,821,681	4.6	$0	100.0
2040	$8,968,451	$3,955,440	$0	$3,955,440	4.6	$0	100.0
2041	$9,282,347	$4,093,880	$0	$4,093,880	4.6	$0	100.0
2042	$9,607,229	$4,237,166	$0	$4,237,166	4.6	$0	100.0
2043	$9,943,482	$4,385,467	$0	$4,385,467	4.6	$0	100.0
2044	$10,291,504	$4,538,958	$0	$4,538,958	4.6	$0	100.0
2045	$10,651,707	$4,697,822	$0	$4,697,822	4.6	$0	100.0
2046	$11,024,517	$4,862,246	$0	$4,862,246	4.6	$0	100.0
2047	$11,410,375	$5,032,424	$0	$5,032,424	4.6	$0	100.0
2048	$11,809,738	$5,208,559	$0	$5,208,559	4.6	$0	100.0
2049	$12,223,079	$5,390,859	$0	$5,390,859	4.6	$0	100.0
2050	$12,650,886	$5,579,539	$0	$5,579,539	4.6	$0	100.0
2051	$13,093,667	$5,774,822	$0	$5,774,822	4.6	$0	100.0
2052	$13,551,946	$5,976,941	$0	$5,976,941	4.6	$0	100.0
2053	$14,026,264	$6,186,134	$0	$6,186,134	4.6	$0	100.0
2054	$14,517,183	$6,402,649	$0	$6,402,649	4.6	$0	100.0

** Beginning of Fiscal Year

EXHIBITS

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2022

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	1	0	0	0	0	0	0	0	0	1
	5,318	0	0	0	0	0	0	0	0	5,318
20-24	14	0	0	0	0	0	0	0	0	14
	31,692	0	0	0	0	0	0	0	0	31,692
25-29	62	5	0	0	0	0	0	0	0	67
	45,812	63,818	0	0	0	0	0	0	0	47,156
30-34	39	30	4	0	0	0	0	0	0	73
	61,491	85,852	61,280	0	0	0	0	0	0	71,491
35-39	28	20	19	6	0	0	0	0	0	73
	48,994	82,539	79,153	115,100	0	0	0	0	0	71,467
40-44	26	11	13	11	7	0	0	0	0	68
	41,626	65,144	75,306	98,347	98,494	0	0	0	0	66,899
45-49	22	18	8	3	17	1	0	0	0	69
	39,485	62,578	58,707	88,904	92,371	91,473	0	0	0	63,670
50-54	29	17	5	9	21	18	1	0	0	100
	44,651	56,207	45,757	64,752	102,188	103,773	81,662	0	0	71,575
55-59	15	21	13	13	15	14	15	6	0	112
	44,308	53,014	62,545	55,232	78,064	95,564	111,445	88,944	0	71,636
60-64	18	13	12	13	9	10	8	10	1	94
	37,319	52,132	60,919	50,697	56,262	82,271	102,293	131,510	148,457	67,559
65-69	3	6	10	6	7	3	2	1	3	41
	18,330	54,381	31,604	41,777	54,981	51,402	51,182	82,828	94,358	45,411
70+	5	3	1	3	2	3	4	7	2	30
	22,983	31,152	0	28,770	40,482	46,693	41,029	45,221	68,433	40,438
Total Employees	262	144	85	64	78	49	30	24	6	742
Average Salary	45,082	66,352	62,195	67,749	83,960	90,087	94,606	93,672	94,733	63,817

Exhibit 2 - Retiree Distribution as of January 1, 2022

	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	1	0	1	13,065	0	13,065
35-39	0	0	0	0	0	0
40-44	1	0	1	22,737	0	22,737
45-49	0	0	0	0	0	0
50-54	1	1	2	864	34,560	35,424
55-59	14	3	17	405,699	113,070	518,770
60-64	28	14	42	662,796	730,313	1,393,109
65-69	43	60	103	1,059,733	4,013,113	5,072,846
70-74	52	43	95	1,423,980	1,941,528	3,365,508
75-79	50	40	90	1,040,260	1,884,489	2,924,749
80-84	38	14	52	871,526	397,156	1,268,682
85-89	33	19	52	792,376	662,649	1,455,025
90-94	25	8	33	538,681	243,087	781,768
95+	8	6	14	80,080	184,510	264,590
Total	294	208	502	6,911,796	10,204,476	17,116,272
Average (Age/Payment)	76.02	74.62	75.44	23,510	49,060	34,096
Frequency Percent	58.6	41.4	100.0	40.4	59.6	100.0

https://shermanactuary-my.sharepoint.com/personal/dan_shermanactuary_com/Documents/Recovered Data/Medford/Val22/Report/[DIS1.xls]Disabled

Exhibit 3 - Disabled Retiree Distribution as of January 1, 2022

	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	1	0	1	70,484	0	70,484
45-49	0	1	1	0	49,871	49,871
50-54	1	3	4	18,507	130,218	148,725
55-59	2	7	9	28,181	321,282	349,463
60-64	5	14	19	187,802	762,901	950,703
65-69	3	18	21	82,594	1,018,090	1,100,685
70-74	3	23	26	118,361	1,172,297	1,290,657
75-79	1	19	20	21,789	865,639	887,427
80-84	2	9	11	49,230	382,109	431,338
85-89	2	3	5	36,495	106,906	143,401
90-94	0	1	1	0	33,441	33,441
95-99	0	1	1	0	38,653	38,653
Total	20	99	119	613,443	4,881,406	5,494,849
Average (Age/Payment)	67.84	70.93	70.41	30,672	49,307	46,175
Frequency Percent	16.8	83.2	100.0	11.2	88.8	100.0

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
2022	$27,287,877	$4,308,081	$15,150,592	$16,752,084	$8,922,880
2023	25,718,727	4,506,417	16,199,535	16,838,051	11,825,276
2024	26,759,590	4,713,359	17,164,770	17,691,376	12,809,915
2025	27,536,585	4,929,266	18,193,019	18,627,814	14,213,514
2026	28,277,148	5,154,514	19,280,397	19,669,511	15,827,274
2027	28,955,551	5,389,490	20,447,822	20,833,372	17,715,133
2028	29,626,380	5,634,600	21,692,018	22,137,217	19,837,455
2029	30,228,601	5,890,266	23,018,217	23,600,414	22,280,297
2030	30,633,825	6,156,926	24,432,014	25,250,982	25,206,098
2031	31,055,565	6,435,036	25,939,387	27,116,556	28,435,414
2032	32,142,510	6,725,072	3,444,531	28,332,717	6,359,811
2033	33,267,497	7,027,528	3,495,622	28,754,980	6,010,633
2034	34,431,860	7,342,918	3,546,070	29,150,653	5,607,781
2035	35,636,975	7,671,776	3,595,767	29,515,802	5,146,370
2036	36,884,269	8,014,659	3,644,600	29,846,137	4,621,127
2037	38,175,218	8,372,145	3,692,445	30,136,990	4,026,361
2038	39,511,351	8,665,170	3,821,681	30,380,433	3,355,933
2039	40,894,248	8,968,451	3,955,440	30,573,573	2,603,216
2040	42,325,547	9,282,347	4,093,880	30,710,387	1,761,067
2041	43,806,941	9,607,229	4,237,166	30,784,327	821,781
2042	45,340,184	9,943,482	4,385,467	30,788,288	(222,947)
2043	46,927,091	10,291,504	4,538,958	30,714,560	(1,382,068)
2044	48,569,539	10,651,707	4,697,822	30,554,781	(2,665,229)
2045	50,269,473	11,024,517	4,862,246	30,299,887	(4,082,823)
2046	52,028,904	11,410,375	5,032,424	29,940,060	(5,646,045)
2047	53,849,916	11,809,738	5,208,559	29,464,665	(7,366,954)
2048	55,734,663	12,223,079	5,390,859	28,862,191	(9,258,533)
2049	57,685,376	12,650,886	5,579,539	28,120,186	(11,334,765)
2050	59,704,364	13,093,667	5,774,822	27,225,178	(13,610,697)
2051	61,264,845	13,551,946	5,976,941	26,181,448	(15,554,510)

Breakouts

	Total	All Others	Housing	Water and Sewer
(1) Participants				
(a) Actives	742	713	21	8
(b) Inactives	266	260	3	3
(c) Retirees	444	403	29	12
(d) Disabled Retirees	118	104	7	7
(e) Total	1,628	1,480	60	30
(2) Payroll of Active Participants	$47,592,905	$45,741,905	$1,357,629	$493,371
(3) Percentage of Payroll	100.00%	96.11%	2.85%	1.04%
(4) Accrued Liability	$348,170,331	$344,214,735	$2,766,775	$1,188,821
(5) Assets	$230,597,138	$227,977,302	$1,832,466	$787,370
(6) Unfunded Accrued Liability	$117,573,193	$116,237,433	$934,309	$401,451
(7) Employee Normal Cost	$4,308,081	$4,139,659	$123,027	$45,395
(8) Employer Normal Cost	$2,392,363	$2,308,860	$70,191	$13,312
(9) Administrative Expenses*	$425,000	$420,172	$3,377	$1,451
(10) Appropriation				
(a) ERI & Pension Holiday	550,224	542,335	7,889	0
(b) Remaining Amortizations	11,873,087	11,493,857	338,690	40,540
(c) Employer Normal Cost	2,392,363	2,310,807	68,244	13,312
(d) Administrative Expenses*	425,000	411,425	12,123	1,451
(e) Total	15,240,674	14,758,424	426,947	55,304
(11) Fiscal 2023 Cost	$15,150,592	14,671,193	424,423	54,977
(12) Fiscal 2024 Cost	$16,199,535	15,686,945	453,808	58,783
(13) Percentage of Total Cost	100.00%	96.84%	2.80%	0.36%

* Allocation is based on the ratio of Accrued Liability to Total Accrued Liability.

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2022, 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, if hired before April 2, 2012

(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	Percentage of Average Salary		
Retirement	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 $500 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 $500 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 $16,000. 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, 2022.

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 7.25% 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 $16,000 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 five-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 mortality for is represented by the various SOA Pub-2010 Public Retirement Plans Mortality Tables specific to the Group, Pre-retirement versus Post, Disabled and Beneficiaries, with Scale MP-2019 improvements until 2025.

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	0.2615	0.1939	1.0000
70 to 76	0.2682	0.1959	1.0000
77 to 79	0.2500	0.2000	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 2022 is $425,000 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 Medford Retirement System contributing as of January 1, 2022, 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

Daniel W. Sherman

Daniel W. Sherman, ASA, MAAA

July, 2022

BREAKOUTS