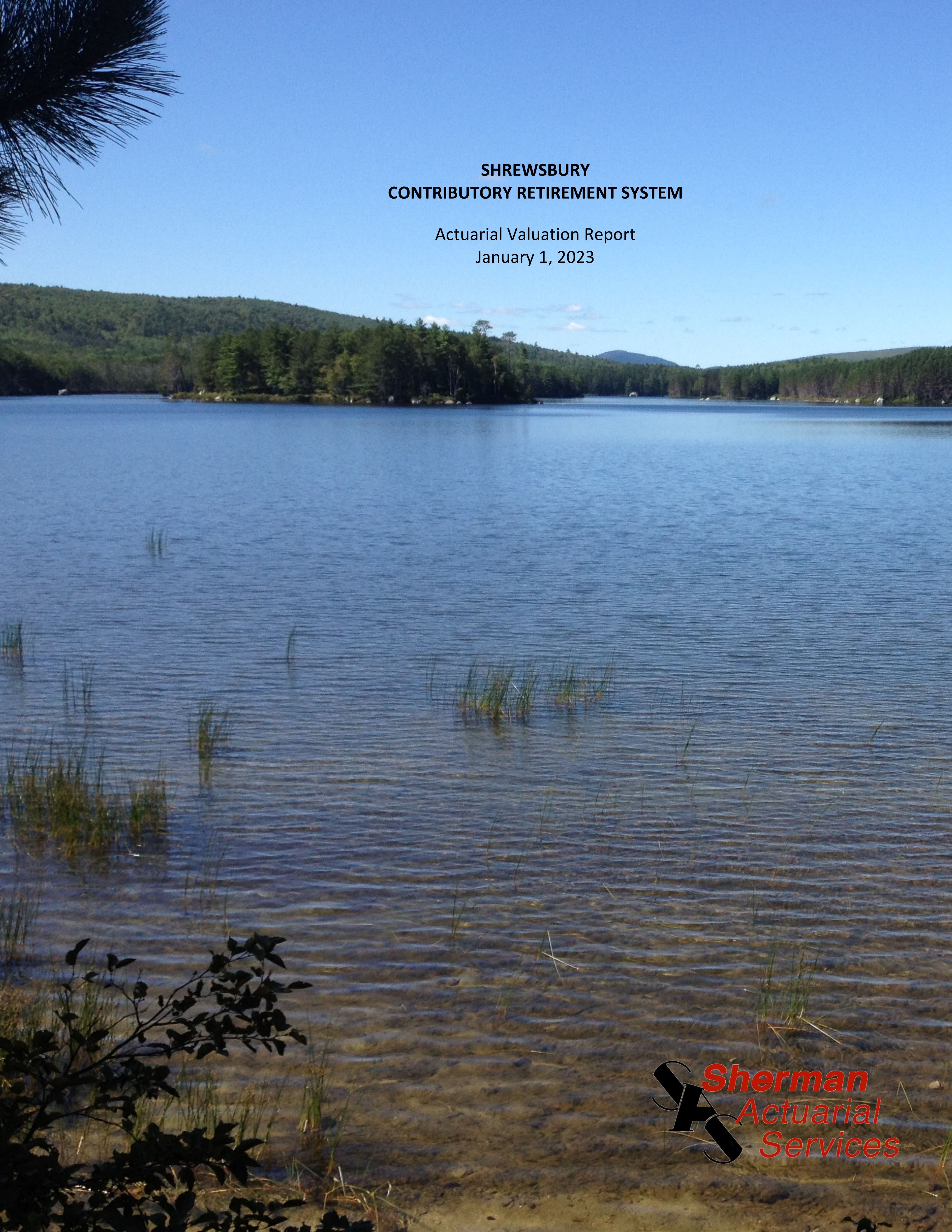
SHREWSBURY
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report
January 1, 2023



Sherman Actuarial Services

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Report Summary:

Highlights	**January 1, 2022**	**January 1, 2023**
Contributions		
Funding Schedule FY 2024	$1,298,388	$1,298,388
Funding Schedule FY 2025	(1,616,974)	1,800,000
Funded Ratios		
GAS No. 25	105.8%	95.4%
Participants		
Actives	433	443
Retirees and Beneficiaries	277	305
Inactives	109	121
Disabled	28	28
Total	847	897
Payroll		
Payroll of Active Members	$27,225,370	$30,311,282
Average Payroll	62,876	68,423
Normal Cost		
Employer	440,851	515,461
Employee	2,471,101	2,767,518
Administrative Expenses	175,000	175,000
Total	3,086,952	3,457,979
Actuarial Accrued Liabilities		
Actives	60,132,083	63,680,521
Retirees, Beneficiaries, Disabilities and Inactives	94,614,421	110,076,368
Total	154,746,504	173,756,889
Actuarial Value of Assets	163,760,328	165,778,166
Unfunded Actuarial Accrued Liabilities	($9,013,824)	$7,978,723

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2023, of Shrewsbury Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2023.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Shrewsbury 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, 2023.

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, based on the 2022 actuarial assumptions and plan provisions, the total actuarial accrued liability surplus of $9,013,824 to an unfunded liability of $5,841,780. The change was the result of net unfavorable actuarial experience during the preceding year. The sources of actuarial (gains) and losses are as follows:

Assets	3,013,324
Salary Increases	1,576,120
New Participants	443,149
Active - Retirements	1,700,670
Active - Terminations	(854,604)
Active - Mortality	(24,273)
Active - Disabilities	(245,561)
Inactive - Mortality	844,788
Inactive - Data adjustments	7,631,849
Other, including data changes, service purchases, etc.	4,354,652
Benefit Payments	(1,152,251)
Total (Gain) / Loss	17,287,863

In addition, the system made two modifications to the plan provisions. The COLA based was increased to $14,000 and the COLA for 2023 was increased to 5% on a one-year basis. These changes increased the employer Normal Cost by $21,152 and the actuarial accrued liability by $2,136,943.

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, 2022	January 1, 2023
Superannuation	$1,677,932	$1,938,471
Termination	922,747	1,000,122
Death	77,117	87,880
Disability	234,156	256,506
Administrative Expenses	175,000	175,000
Total Normal Cost	3,086,952	3,457,979
% of Pay	11.3%	11.4%
Employee Contributions	2,471,101	2,767,518
% of Pay	9.1%	9.1%
Employer Normal Cost	$615,851	$690,461
% of Pay	2.3%	2.3%

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, 2022	January 1, 2023
Actives		
Superannuations	$58,286,244	$61,673,882
Termination	(1,728,936)	(1,736,376)
Death	982,263	983,354
Disability	2,592,512	2,759,661
Retirees and Inactives		
Retirees and Beneficiaries	81,742,501	96,301,656
Terminated (Refund)	2,444,158	3,206,859
Disabled	10,427,762	10,567,853
Total	$154,746,504	$173,756,889

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, 2022	January 1, 2023
Actives		
Superannuation	$70,507,911	$75,810,451
Termination	5,560,565	6,210,102
Death	1,561,985	1,651,303
Disability	4,361,630	4,732,691
Retirees and Inactives		
Retirees and Beneficiaries	81,742,501	96,301,656
Terminated (Refund)	2,444,158	3,206,859
Disabled	10,427,762	10,567,853
Total	$176,606,512	$198,480,915

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, 2022	January 1, 2023
Cash equivalents	$824,904	$965,193
Short term investments	0	0
Fixed income securities	6,098,647	4,979,638
Equities	48,921,174	41,103,132
International	7,802,583	6,373,552
Real Estate	19,575,361	20,945,339
Venture Capital	0	0
Other	98,655,203	80,984,881
Accounts receivable	78,048	61,032
Accounts payable	0	0
Accrued income	0	0
Total Market Value	$181,955,920	$155,412,767
Total Actuarial Value	$163,760,328	$165,778,166

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 (7.5%) 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 10%. The calculation of the actuarial value of assets as of January 1, 2023 is presented in Table V.

Table V

		January 1, 2023
(1)	Market value at January 1, 2022	$181,955,920
(2)	2022 Contributions	$4,713,024
(3)	2022 Payments	($11,706,377)
(4)	Net interest adjustment at 7.5% on (1), (2), and (3) to December 31, 2022	$13,384,443
(5)	Expected market value on January 1, 2023 (1) + (2) + (3) + (4)	$188,347,010
(6)	Actual market value on January 1, 2023	$155,412,767
(7)	2022 (Gain) / Loss	$32,934,243
(8)	80% of 2022 (Gain) / Loss	$26,347,395
(9)	2021 (Gain) / Loss	($17,740,574)
(10)	60% of 2021 (Gain) / Loss	($10,644,344)
(11)	2020 (Gain) / Loss	($6,904,089)
(12)	40% of 2020 (Gain) / Loss	($2,761,636)
(13)	2019 (Gain) / Loss	($12,880,077)
(14)	20% of 2019 (Gain) / Loss	($2,576,015)
(15)	Actuarial value on January 1, 2023, (6) + (8) + (10) + (12) + (14) but not less than 90% nor greater than 110% of (6)	$165,778,166
(16)	Ratio of actuarial value to market value	106.67%
(17)	Actuarial Value Return for 2021	14.56%
(18)	Actuarial Value Return for 2022	5.62%
(19)	Market Value Return for 2021	18.90%
(20)	Market Value Return for 2022	-10.95%

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, 2022	January 1, 2023
Actuarial Accrued Liability	$154,746,504	$173,756,889
Actuarial Assets	163,760,328	165,778,166
Unfunded Actuarial Accrued Liability	($9,013,824)	$7,978,723
Funded Status	105.8%	95.4%

Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Section 22D of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2030, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Twice Employer normal cost,
- Adminstrative Expenses
- Fixed costs until fully amortized
- Interest adjustment for payments deposited at the various times in the year

The pension appropriation is shown in Table VII.

Table VII

	January 1, 2022	January 1, 2023
Normal cost	$615,851	$690,461
Amortization payment of the prior accrued liability	(394,875)	(2,129,744)
Amortization payment of current (gains)/losses	(919,610)	3,710,977
Total cost	($698,634)	$2,271,694
% of Pay	-2.6%	7.5%
Fiscal 2024 cost	$1,298,388	$1,298,388
Fiscal 2025 cost	($1,616,974)	$1,800,000

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 4.0% per year. The employee contribution rate is expected to increase to 10.5% by 2042 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 remain level for 6 years. The total cost represents about 5% of payroll, until the time the deficit is fully paid off, leaving only a normal cost of about 1.5% thereafter. The decrease in the 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/Shrewsbury/Val23/[Shrew23_Val 14k 5pct.xlsm]Approp. Results

Appropriation Forecast

Fiscal Year Ending	Payroll*	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %**
2024	$30,311,282	$2,767,518	$726,753	$571,635	$1,298,388	4.3	96.9
2025	$31,523,733	$2,907,004	$725,525	$1,074,475	$1,800,000	5.7	97.1
2026	$32,784,683	$3,053,220	$723,036	$1,076,964	$1,800,000	5.5	97.5
2027	$34,096,070	$3,206,483	$719,188	$1,080,812	$1,800,000	5.3	98.0
2028	$35,459,913	$3,367,121	$713,874	$1,086,126	$1,800,000	5.1	98.4
2029	$36,878,309	$3,535,480	$706,985	$1,093,015	$1,800,000	4.9	98.9
2030	$38,353,442	$3,711,920	$698,402	$1,084,005	$1,782,407	4.6	99.5
2031	$39,887,579	$3,896,819	$688,002	$0	$688,002	1.7	100.0
2032	$41,483,082	$4,090,571	$675,652	$0	$675,652	1.6	100.0
2033	$43,142,406	$4,293,588	$661,213	$0	$661,213	1.5	100.0
2034	$44,868,102	$4,506,301	$644,539	$0	$644,539	1.4	100.0
2035	$46,662,826	$4,729,162	$625,472	$0	$625,472	1.3	100.0
2036	$48,529,339	$4,962,642	$603,849	$0	$603,849	1.2	100.0
2037	$50,470,513	$5,207,233	$579,495	$0	$579,495	1.1	100.0
2038	$52,489,333	$5,463,451	$552,226	$0	$552,226	1.1	100.0
2039	$54,588,906	$5,731,835	$521,849	$0	$521,849	1.0	100.0
2040	$56,772,463	$5,961,109	$542,723	$0	$542,723	1.0	100.0
2041	$59,043,361	$6,199,553	$564,432	$0	$564,432	1.0	100.0
2042	$61,405,096	$6,447,535	$587,010	$0	$587,010	1.0	100.0
2043	$63,861,300	$6,705,436	$610,490	$0	$610,490	1.0	100.0
2044	$66,415,751	$6,973,654	$634,909	$0	$634,909	1.0	100.0
2045	$69,072,382	$7,252,600	$660,306	$0	$660,306	1.0	100.0
2046	$71,835,277	$7,542,704	$686,718	$0	$686,718	1.0	100.0
2047	$74,708,688	$7,844,412	$714,187	$0	$714,187	1.0	100.0
2048	$77,697,035	$8,158,189	$742,754	$0	$742,754	1.0	100.0
2049	$80,804,917	$8,484,516	$772,464	$0	$772,464	1.0	100.0
2050	$84,037,113	$8,823,897	$803,363	$0	$803,363	1.0	100.0
2051	$87,398,598	$9,176,853	$835,498	$0	$835,498	1.0	100.0
2052	$90,894,542	$9,543,927	$868,917	$0	$868,917	1.0	100.0
2053	$94,530,324	$9,925,684	$903,674	$0	$903,674	1.0	100.0
2054	$98,311,537	$10,322,711	$939,821	$0	$939,821	1.0	100.0
2055	$102,243,998	$10,735,620	$977,414	$0	$977,414	1.0	100.0

* Calendar basis

** Beginning of Fiscal Year

EXHIBITS

https://shermanactuary-my.sharepoint.com/personal/dan_shermanactuary_com/Documents/Recovered Data/Shrewsbury/Val23/Report/[ACT1.xls]Actives

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2023

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
	52,229	0	0	0	0	0	0	0	0	52,229
20-24	15	0	0	0	0	0	0	0	0	15
	58,518	0	0	0	0	0	0	0	0	58,518
25-29	37	1	0	0	0	0	0	0	0	38
	56,985	87,356	0	0	0	0	0	0	0	57,784
30-34	27	17	7	1	0	0	0	0	0	52
	55,673	78,771	75,459	0	0	0	0	0	0	66,131
35-39	23	19	17	5	1	0	0	0	0	65
	63,314	81,474	75,867	66,263	0	0	0	0	0	71,796
40-44	9	8	9	15	5	0	0	0	0	46
	72,636	76,320	122,040	99,185	72,398	0	0	0	0	91,574
45-49	11	7	5	6	7	2	0	0	0	38
	60,993	70,548	94,509	63,376	80,225	116,321	0	0	0	73,994
50-54	10	7	13	11	5	7	3	0	0	56
	63,118	66,733	58,068	49,410	58,491	83,414	130,829	0	0	65,456
55-59	4	9	10	11	11	4	5	3	0	57
	56,851	71,192	71,541	47,413	61,860	72,422	81,030	67,292	0	64,601
60-64	2	1	8	14	8	6	1	2	1	43
	48,253	29,071	42,627	38,673	38,625	63,024	157,757	83,761	139,735	50,237
65-69	1	1	4	4	4	5	3	0	0	22
	64,273	66,310	36,141	41,321	46,794	37,465	98,647	0	0	50,494
70+	0	0	0	3	4	1	1	0	0	9
	0	0	0	26,344	39,830	23,309	0	0	0	39,198
Total Employees	141	70	73	70	45	25	13	5	1	443
Average Salary	59,533	75,459	73,216	57,859	56,711	67,800	96,256	73,880	139,735	66,093

Exhibit 2 - Retiree Distribution as of January 1, 2023

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	1	0	1	22,118	0	22,118
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	0	0	0	0	0
45-49	1	0	1	9,428	0	9,428
50-54	1	0	1	27,552	0	27,552
55-59	9	12	21	151,378	752,810	904,188
60-64	17	21	38	365,701	950,982	1,316,683
65-69	34	27	61	708,342	1,351,709	2,060,051
70-74	35	36	71	810,443	1,676,267	2,486,711
75-79	27	21	48	712,575	932,243	1,644,818
80-84	13	8	21	276,656	207,864	484,520
85-89	11	6	17	197,852	178,020	375,872
90-94	11	9	20	190,550	208,090	398,640
95+	3	2	5	26,629	26,236	52,866
Total	163	142	305	3,499,225	6,284,222	9,783,447
Average (Age/Payment)	73.49	72.39	73.34	21,468	44,255	32,077
Frequency Percent	53.4	46.6	100.0	35.8	64.2	100.0

Exhibit 3 - Disabled Retiree Distribution as of January 1, 2023

	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	61,832	61,832
45-49	1	0	1	26,161	0	26,161
50-54	0	1	1	0	45,101	45,101
55-59	0	3	3	0	137,485	137,485
60-64	2	2	4	27,246	73,109	100,355
65-69	0	6	6	0	297,456	297,456
70-74	0	3	3	0	66,451	66,451
75-79	0	6	6	0	219,002	219,002
80-84	0	2	2	0	69,694	69,694
85-89	0	1	1	0	38,656	38,656
90-94	0	0	0	0	0	0
95-99	0	0	0	0	0	0
Total	3	25	28	53,407	1,008,787	1,062,193
Average (Age/Payment)	57.98	68.06	66.98	17,802	40,351	37,935
Frequency Percent	10.7	89.3	100.0	5.0	95.0	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
2023	$15,426,691	$2,767,518	$1,298,388	$12,240,904	$880,119
2024	12,614,018	2,907,004	1,800,000	12,207,052	4,300,038
2025	13,031,046	3,053,220	1,800,000	12,597,372	4,419,546
2026	13,350,371	3,206,483	1,800,000	12,920,435	4,576,547
2027	13,750,169	3,367,121	1,800,000	13,252,538	4,669,490
2028	14,055,128	3,535,480	1,800,000	13,595,344	4,875,696
2029	14,382,462	3,711,920	1,782,407	13,952,671	5,064,536
2030	14,751,520	3,896,819	688,002	14,299,938	4,133,239
2031	15,060,121	4,090,571	675,652	14,602,933	4,309,035
2032	15,343,338	4,293,588	661,213	14,920,302	4,531,765
2033	15,631,882	4,506,301	644,539	15,254,447	4,773,405
2034	15,925,851	4,729,162	625,472	15,606,797	5,035,580
2035	16,225,349	4,962,642	603,849	15,978,903	5,320,044
2036	16,530,480	5,207,233	579,495	16,372,448	5,628,696
2037	16,841,348	5,463,451	552,226	16,789,260	5,963,588
2038	17,158,063	5,731,835	521,849	17,231,317	6,326,938
2039	17,480,734	5,961,109	542,723	17,698,044	6,721,142
2040	17,809,473	6,199,553	564,432	18,194,277	7,148,789
2041	18,144,394	6,447,535	587,010	18,722,525	7,612,676
2042	18,485,614	6,705,436	610,490	19,285,510	8,115,823
2043	18,833,250	6,973,654	634,909	19,886,180	8,661,493
2044	19,187,424	7,252,600	660,306	20,527,724	9,253,206
2045	19,548,259	7,542,704	686,718	21,213,601	9,894,765
2046	19,915,879	7,844,412	714,187	21,947,552	10,590,272
2047	20,290,412	8,158,189	742,754	22,733,627	11,344,157
2048	20,671,990	8,484,516	772,464	23,576,207	12,161,198
2049	21,060,743	8,823,897	803,363	24,480,034	13,046,551
2050	21,456,806	9,176,853	835,498	25,450,234	14,005,779
2051	21,860,318	9,543,927	868,917	26,492,356	15,044,882
2052	22,512,902	9,925,684	903,674	27,603,500	15,919,956

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2023, 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. <u>Salary</u>

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

4. <u>Member Contributions</u>

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. <u>Average Salary</u>

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. <u>Creditable Service</u>

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

7. <u>Service Retirement</u>

a. <u>Eligibility</u>:

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 $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, 2023.

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 7.5% 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 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

The mortality assumptions were changed from the prior valuation. 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-2018 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 30% of all disabilities are ordinary (70% are service connected). For police and fire employees, 5% of all disabilities are assumed to be ordinary (95% 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 2023 is $175,000 and is anticipated to increase at 4.0% 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 Shrewsbury Retirement System contributing as of January 1, 2023, 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

September, 2023

BREAKOUTS

Breakouts

	Total	Housing	Light	Cable	Water	Sewer	Custodians	All Others	School Employees	School Lunch	Stormwater
(1) Participants											
(a) Actives	443	8	35	24	13	2	24	212	109	13	3
(b) Inactives	121	0	7	10	1	1	2	33	63	4	0
(c) Retirees and Benefiaries	305	7	36	12	13	0	21	138	64	14	0
(d) Disabled Retirees	28	0	2	0	0	1	2	20	2	1	0
(e) Total	897	15	80	46	27	4	49	403	238	32	3
(2) Payroll of Active Participants	$30,311,282	$497,110	$3,500,176	$2,268,288	$865,111	$130,374	$1,468,408	$15,818,925	$5,131,096	$450,399	$181,396
(3) Normal Cost											
(a) Total Normal Cost	3,282,979	45,308	342,079	232,387	82,302	20,638	204,180	1,674,097	613,052	54,592	14,341
(b) Expected Employee Contributions	2,767,518	46,383	310,742	214,962	78,217	11,781	133,687	1,460,368	458,312	36,773	16,294
(c) Administrative Expenses	175,000	2,415	18,235	12,387	4,387	1,100	10,884	89,238	32,679	2,910	764
(d) Net Employer Normal Cost (a) - (b) + (c)	690,461	1,340	49,572	29,812	8,472	9,957	81,377	302,967	187,419	20,729	(1,189)
(4) Actuarial Accrued Liability	173,756,889	3,235,518	27,287,787	8,400,438	5,749,927	531,431	8,176,247	89,774,110	26,580,732	3,971,674	49,023
(5) Assets*	165,778,166	2,955,348	29,629,077	8,072,563	5,252,030	485,413	7,468,251	83,963,888	24,279,057	3,627,759	44,778
(6) Unfunded Actuarial Accrued Liability (4) - (5)	7,978,723	280,170	(2,341,290)	327,875	497,897	46,018	707,996	5,810,222	2,301,675	343,915	4,245
(7) Amortizations	0	0	0	0	0	0	0	0	0	0	0
(8) Total Required Employer Contributions *	1,205,922	265	80,909	47,237	12,557	18,814	151,870	516,696	342,159	38,548	(3,142)
(9) Fiscal 2024 Cost	1,298,388	0	0	0	0	0	0	1,298,388	0	0	0
(10) Fiscal 2025 Cost	1,800,000	0	0	0	0	0	0	1,800,000	0	0	0
(11) Fiscal 2026 Cost	1,800,000	0	0	0	0	0	0	1,800,000	0	0	0
(12) Fiscal 2027 Cost	1,800,000	0	0	0	0	0	0	1,800,000	0	0	0
(13) Fiscal 2028 Cost	1,800,000	0	0	0	0	0	0	1,800,000	0	0	0
(14) Fiscal 2029 Cost	1,800,000	0	0	0	0	0	0	1,800,000	0	0	0
(15) Fiscal 2030 Cost	1,782,407	0	0	0	0	0	0	1,782,407	0	0	0
(16) Fiscal 2031 Cost	688,002	0	0	0	0	0	0	688,002	0	0	0
(17) Fiscal 2032 Cost	675,652	0	0	0	0	0	0	675,652	0	0	0
(18) Percentage of Total Cost	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
(19) Funded Ratio	95.41%	91.34%	108.58%	96.10%	91.34%	91.34%	91.34%	93.53%	91.34%	91.34%	91.34%