City of Southgate Policemen and Firemen Retirement System

68th Actuarial Valuation Report
as of June 30, 2022

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April 18, 2023

Retirement Board
City of Southgate Policemen and Firemen
Retirement System
Southgate, Michigan

Re: City of Southgate Policemen and Firemen Retirement System Annual Actuarial Valuation as of June 30, 2022

Dear Board Members:

The results of the June 30, 2022 Annual Actuarial Valuation of the City of Southgate Policemen and Firemen Retirement System are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress, to determine the employer contribution rate for the fiscal year ending June 30, 2024, and to determine the excess earnings reserve balance as of June 30, 2022. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The computed contribution amount shown in this report is determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics on page A-8 and in Appendix II, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through June 30, 2022. The valuation was based upon information furnished by the Plan Administrator and City concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Plan Administrator and City.

This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. All actuarial assumptions and methods used in the valuation follow the guidance in the applicable Actuarial Standards of Practice. Additional information about the actuarial assumptions is included in the section of this report entitled Actuarial Cost Methods and Assumptions.

This report was prepared using our proprietary valuation model and related software, which in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the City of Southgate Policemen and Firemen Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Rebecca L. Stouffer, Laura Frankowiak, and James D. Anderson are Members of the American Academy of Actuaries (MAAA). These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation and report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Rebecca L. Stouffer

Rebecca L. Stouffer, ASA, FCA, MAAA

Laura Frankowiak, ASA, FCA, MAAA

James D. Anderson

James D. Anderson, FSA, FCA, EA, MAAA

RLS/LF/JDA:ah

SECTION A

VALUATION RESULTS

Funding Objective

The funding objective of the Retirement System is to establish and receive contributions, expressed as percents of active member payroll, which will remain reasonably stable from year-to-year and will fund pensions over the working lifetimes of participants.

Contribution Rates

The Retirement System is supported by member contributions, City contributions and investment income from Retirement System assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

(1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section C (the normal cost); and

(2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (unfunded actuarial accrued liability).

Computed contribution rates for the fiscal year beginning July 1, 2023 are shown on page A-2.

City's Computed Contributions

Contributions for	**% of Covered Payroll***	
	For the Fiscal Year Beginning July 1,	
	2023	**2022**
Normal Cost of Benefits:		
Age and service	21.81 %	17.56 %
Death before retirement	0.31 %	0.33 %
Disability	1.15 %	1.16 %
Future refunds of member contributions	0.36 %	0.35 %
Total	23.63 %	19.40 %
Members' Contributions	8.07 %	8.08 %
City's Normal Cost	15.56 %	11.32 %
Unfunded Actuarial Accrued Liabilities (UAAL)	104.60 %	88.76 %
Total City Contribution# - %	**120.16 %**	**100.08 %**
- $	**$5,893,459**	**$5,400,300**

* Comparative contribution rates for prior fiscal years are shown on page A-9.

\# *All fiscal calculations are based on the valuation payroll including increases in payroll at the assumed rate of wage inflation. The dollar amount is adjusted for the lag in time between the valuation date and payment date.*

The Unfunded Actuarial Accrued Liabilities (UAAL) were amortized as a level percent of member payroll by source of UAAL. The components of the UAAL contribution are shown below for the fiscal year beginning July 1, 2023.

UAAL % as of Fiscal Year Beginning July 1, 2023				
Source of UAAL	**Rem. Amort. Period**	**Outstanding Balance**	**Amortization Payment**	**UAAL Pmt %**
2019 Early Retirements	2	$ 34,794	$ 18,335	
2020 Legacy UAAL	5	$ 19,688,235	$ 4,388,425	
2020 Asm Change	13	$ 3,855,757	$ 381,637	
2021 Early Retirements	4	$ 419,695	$ 114,791	
2021 Experience	14	$ 322,535	$ 30,165	
2022 Benefit Change	15	$ 2,336,667	$ 207,526	
2022 Experience	15	$ (120,652)	$ (10,715)	
Total		$ 26,537,032	$ 5,130,164	104.60%

Determination of Unfunded Actuarial Accrued Liability

	June 30, 2022	June 30, 2021
A. Accrued Liability		
1. For retirees and beneficiaries	$62,330,532	$64,183,868
2. For vested terminated members	270,150	252,338
3. For present active members		
a. Value of expected future benefit payments	30,438,444	27,595,507
b. Value of future normal costs	10,089,352	10,322,447
c. Active member accrued liability: (a) - (b)	20,349,092	17,273,060
4. Total accrued liability	82,949,774	81,709,266
B. Present Assets (Funding Value)*	54,062,028	51,814,168
C. Unfunded Actuarial Accrued Liability: (A.4) - (B)	28,887,746	29,895,098
D. Funding Ratio: (B) / (A.4)	65.2%	63.4%
E. Funding Ratio: Market Value Basis	61.6%	69.5%

* *Net of Excess Earnings Reserve of $180,109 for June 30, 2022, and $212,884 for June 30, 2021.*

Development of Funding Value of Assets

Year Ended June 30:	2019	2020	2021	2022	2023	2024	2025
A. Funding Value Beginning of Year	$46,148,162	$47,566,458	$49,466,718	$52,027,052			
B. Market Value End of Year	46,799,259	44,862,168	56,996,971	51,247,293			
C. Market Value Beginning of Year	46,782,048	46,799,259	44,862,168	56,996,971			
D. Non-Investment Net Cash Flow	(951,352)	(481,403)	(1,925,792)	80,034			
E. Investment Income							
E1. Market Total: B - C - D	968,563	(1,455,688)	14,060,595	(5,829,712)			
E2. Assumed Rate of Investment Return	7.25%	7.25%	7.00%	7.00%			
E3. Amount for Immediate Recognition	3,311,255	3,431,117	3,395,268	3,644,695			
E4. Amount for Phased-In Recognition: E1-E3	(2,342,692)	(4,886,805)	10,665,327	(9,474,407)			
F. Phased-In Recognition of Investment Income							
F1. Current Year: 0.25 x E4	(585,673)	(1,221,701)	$2,666,332	(2,368,602)			
F2. First Prior Year	231,901	(585,673)	(1,221,701)	2,666,332	$ (2,368,602)		
F3. Second Prior Year	526,018	231,901	(585,673)	(1,221,701)	2,666,332	$ (2,368,602)	
F4. Third Prior Year	(1,113,853)	526,019	231,900	(585,673)	(1,221,702)	2,666,331	$(2,368,601)
F5. Total Recognized Investment Gain	(941,607)	(1,049,454)	1,090,858	(1,509,644)	(923,972)	297,729	(2,368,601)
G. Funding Value End of Year							
G1. Preliminary Funding Value End of Year: (A+D+E3+F5)	47,566,458	49,466,718	52,027,052	54,242,137			
G2. Upper Corridor Limit: 120% x B	56,159,111	53,834,602	68,396,365	61,496,752			
G3. Lower Corridor Limit: 80% x B	37,439,407	35,889,734	45,597,577	40,997,834			
G4. Adjustment to Funding Value	0	0	0	0			
G5. Funding Value End of Year	47,566,458	49,466,718	52,027,052	54,242,137			
H. Difference between Market & Funding Value: B-G5	(767,199)	(4,604,550)	4,969,919	(2,994,844)			
I. Recognized Rate of Return	5.2 %	5.0 %	9.3%	4.1%			
J. Market Rate of Return	2.1%	(3.1)%	32.0 %	(10.2)%			
K. Ratio of Funding Value to Market Value	101.6 %	110.3 %	91.3 %	105.8 %			

The Funding Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed four-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If actual and assumed rates of retirement income are exactly equal for three consecutive years, the Funding Value will become equal to Market Value.

Derivation of Experience Gain/(Loss)
Years Ended June 30, 2022 and 2021

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain/(loss) is shown below:

	2021-2022	**2020-2021**
(1) UAAL* at start of year	$ 29,895,098	$ 31,075,944
(2) Employer normal cost from last valuation	593,034	664,815
(3) Actual employer contributions	5,801,664	4,639,422
(4) Interest accrual: [((1) + 1/2[(2) - (3)]) * 7.00%]	1,910,355	2,036,205
(5) Expected UAAL before changes: (1)+(2)-(3)+(4)	26,596,823	29,137,542
(6) Effect of Benefit Changes	2,336,667	500,000
(7) Effect of Assumption Changes	0	0
(8) Excess Earnings transferred to Excess Earnings Reserve Fund	0	0
(9) Expected UAAL after changes: (5)+(6)+(7)+(8)	28,933,490	29,637,542
(10) Actual UAAL at end of year	28,887,746	29,895,098
(11) Gain/(loss): (9)-(10)	45,744	(257,556)
(12) Gain/(loss) as percent of actuarial accrued liabilities at start of year ($81,709,266)	0.1 %	(0.3)%

* *Unfunded Actuarial Accrued Liabilities.*

Summary Statement of System Resources and Obligations for the Years Ending June 30, 2022 and 2021

Present Resources and Expected Future Resources

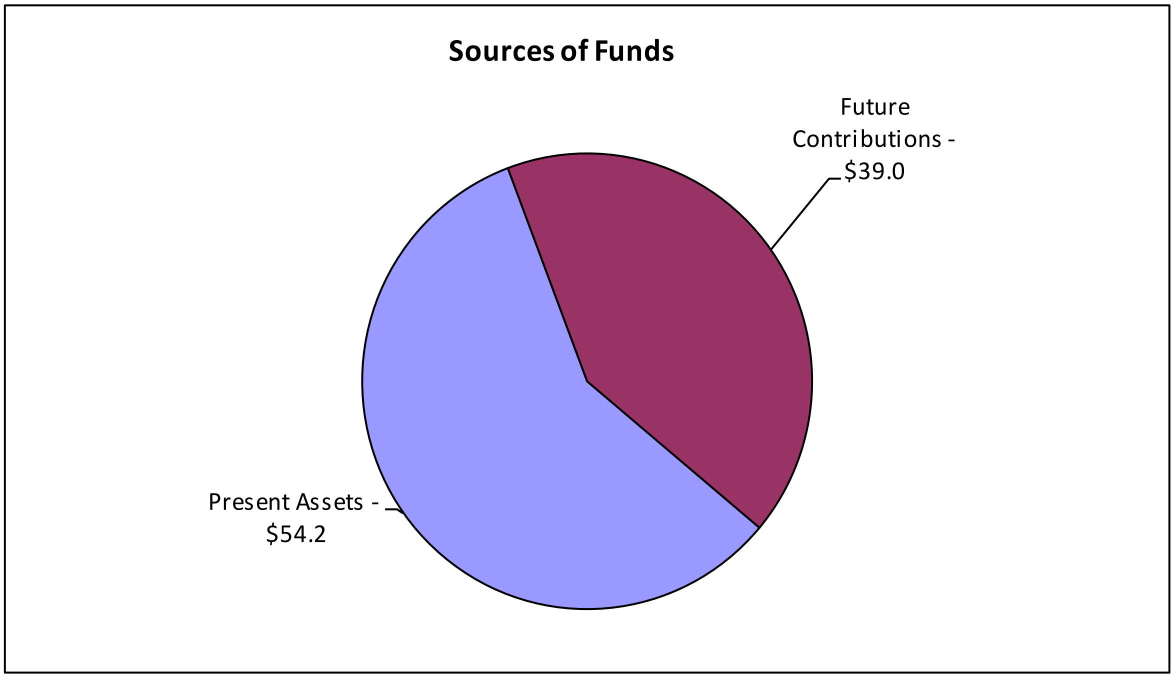
		2022	2021
A.	Present valuation assets		
	1. Net assets from System financial statements	$51,247,293	$56,996,971
	2. Market value adjustment	2,994,844	(4,969,919)
	3. Valuation assets	54,242,137	52,027,052
B.	Actuarial present value of expected future employer contributions		
	1. For normal costs	6,440,198	5,657,900
	2. For unfunded actuarial accrued liability	28,887,746	29,895,098
	3. Total	35,327,944	35,552,998
C.	Actuarial present value of expected future member contributions	3,649,154	4,664,547
D.	Total present and expected future resources	$93,219,235	$92,244,597

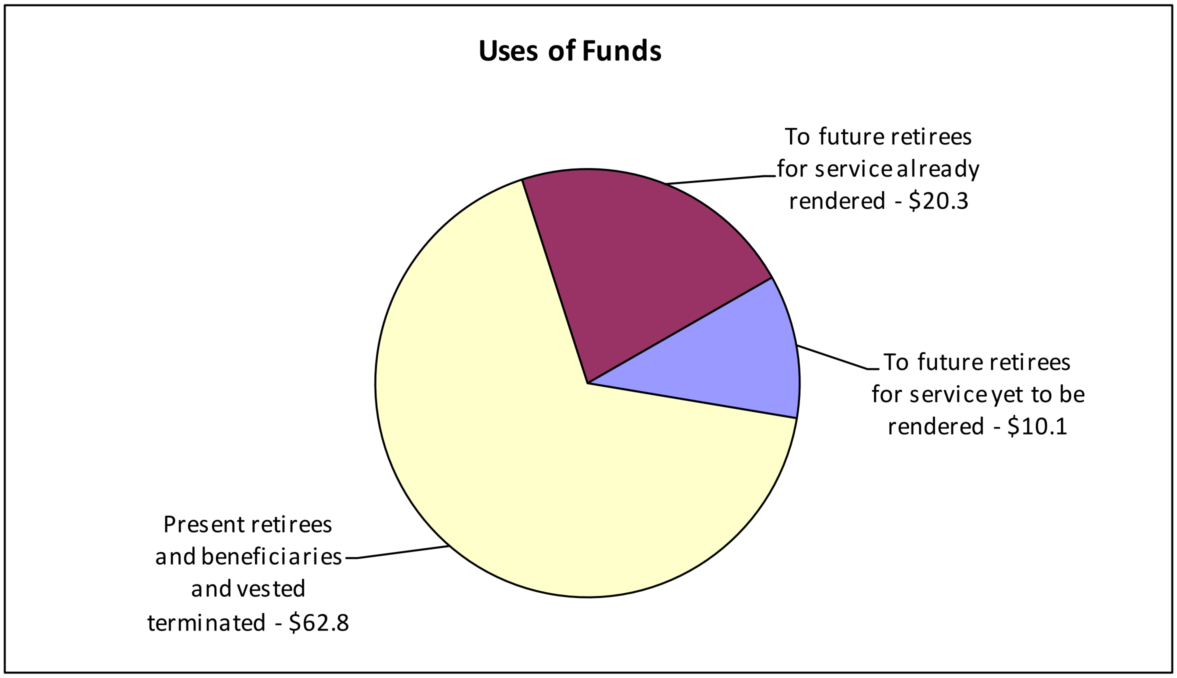
Actuarial Present Value of Expected Future Benefit Payments

		2022	2021
A.	To retirees and beneficiaries #	$62,510,641	$64,396,752
B.	To vested terminated members	270,150	252,338
C.	To present active members		
	1. Allocated to service rendered prior to valuation date - actuarial accrued liability	20,349,092	17,273,060
	2. Allocated to service likely to be rendered after valuation date	10,089,352	10,322,447
	3. Total	30,438,444	27,595,507
D.	Total actuarial present value of expected future pension payments	$93,219,235	$92,244,597

 # Includes excess earnings reserve fund.

Financing $93.2 Million of Benefit Promises
June 30, 2022





Actuarial Accrued Liabilities & Assets
Comparative Statement

Valuation Date!	Valuation Assets	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liabilities (UAAL)	Valuation Payroll	Ratio of Valuation Assets to AAL	Amortization Period(s)	Ratio of Valuation Assets to Valuation Payroll	Ratio of AAL to Valuation Payroll	Ratio of UAAL to Valuation Payroll
06-30-03#	$ 50,720,650	$ 50,848,534	$ 127,884	$ 4,490,451	99.7 %		1,129.5 %	1,132.4 %	2.8 %
06-30-04*	47,582,175	52,671,475	5,089,300	5,065,923	90.3 %		939.3 %	1,039.7 %	100.5 %
06-30-05	45,763,955	53,877,816	8,113,861	5,239,288	84.9 %		873.5 %	1,028.3 %	154.9 %
06-30-06	46,566,532	56,806,766	10,240,234	5,281,801	82.0 %	20	881.6 %	1,075.5 %	193.9 %
06-30-07	49,164,698	59,119,680	9,954,982	5,438,968	83.2 %	19	903.9 %	1,087.0 %	183.0 %
06-30-08#	50,436,365	57,187,103	6,750,738	5,759,174	88.2 %	18	875.8 %	993.0 %	117.2 %
06-30-09#	45,271,102	58,953,581	13,682,479	5,847,595	76.8 %	17	774.2 %	1,008.2 %	234.0 %
06-30-10	43,827,980	61,186,413	17,358,433	5,532,619	71.6 %	16	792.2 %	1,105.9 %	313.7 %
06-30-11	42,616,916	63,999,867	21,382,951	4,922,456	66.6 %	15	865.8 %	1,300.2 %	434.4 %
06-30-12	40,675,521	64,233,512	23,557,991	4,889,791	63.3 %	14	831.9 %	1,313.6 %	481.8 %
06-30-13	41,888,768	65,718,329	23,829,561	4,966,288	63.7 %	13	843.5 %	1,323.3 %	479.8 %
06-30-14	44,251,466	66,847,581	22,596,115	5,047,949	66.2 %	12	876.6 %	1,324.3 %	447.6 %
06-30-15#	44,321,849	67,893,830	23,571,981	4,633,108	65.3 %	11 5	956.6 %	1,465.4 %	508.8 %
06-30-16*	43,967,577	71,668,730	27,701,153	4,745,297	61.3 %	10 4	926.6 %	1,510.3 %	583.8 %
06-30-17	44,843,750	72,751,896	27,908,146	4,841,046	61.6 %	9 3	926.3 %	1,502.8 %	576.5 %
06-30-18	46,148,162	73,974,981	27,826,819	5,105,443	62.4 %	8 2	903.9 %	1,448.9 %	545.0 %
06-30-19#	47,566,458	75,718,230	28,151,772	5,266,008	62.8 %	7 1 5	903.3 %	1,437.9 %	534.6 %
06-30-20#*	49,466,718	80,542,662	31,075,944	4,984,183	61.4 %	7 4 15	992.5 %	1,616.0 %	623.5 %
06-30-21#	52,027,052	81,922,150	29,895,098	5,086,232	63.5 %	6 3 14 5 15	1,022.9 %	1,610.7 %	587.8 %
06-30-22#	54,242,137	83,129,883	28,887,746	4,623,128	65.2 %	5 2 13 4 14 15 15	1,173.3 %	1,798.1 %	624.9 %

* *Actuarial assumptions revised.*
\# *Retirement System amended.*
! *Includes excess earnings reserve.*

The Ratio of Valuation Assets to AAL is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

Amortization years indicate the years remaining for financing the UAAL. Historical information is not available for years prior to June 30, 2006.

The ratios of assets and AAL to valuation payroll gives an indication of both maturity and volatility. Many systems have ratios between 5 and 7. When ratios are above this range, there may be more volatility in the year-to-year contribution level as a % of pay. For systems that are closed to new hires, it is expected that these ratios will grow as payroll declines.

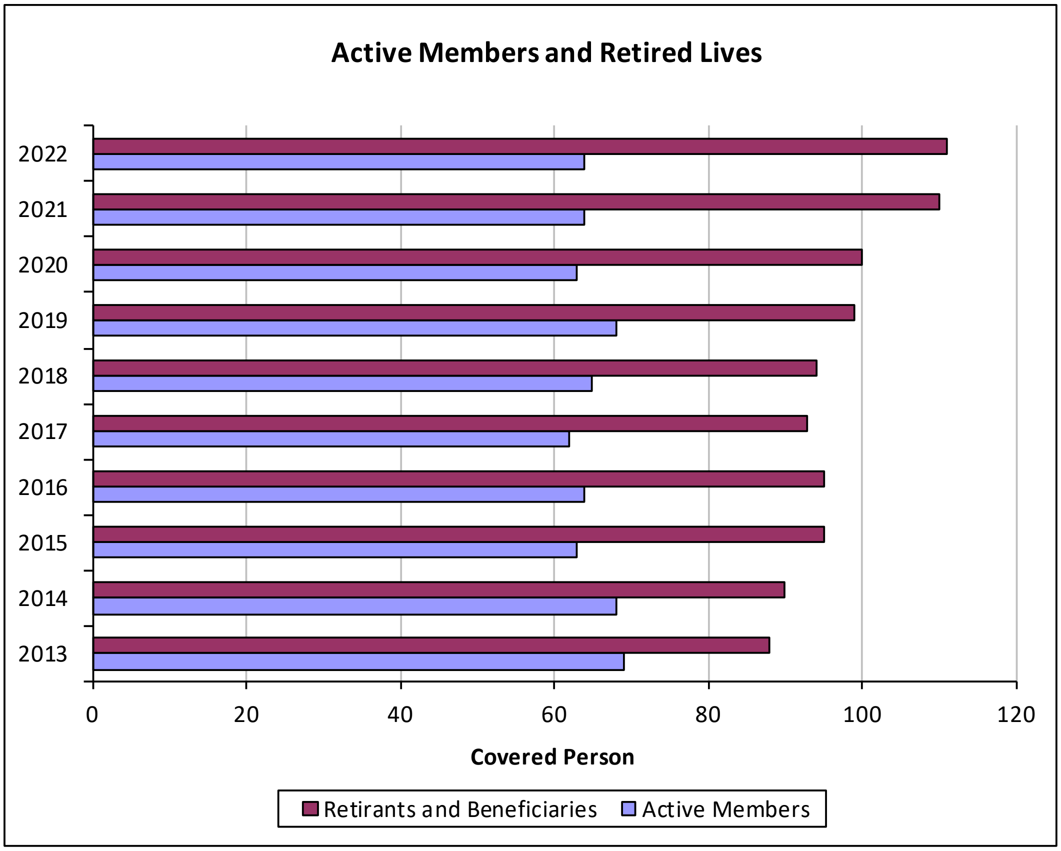
The ratio of UAAL to valuation payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 3 or 4 may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

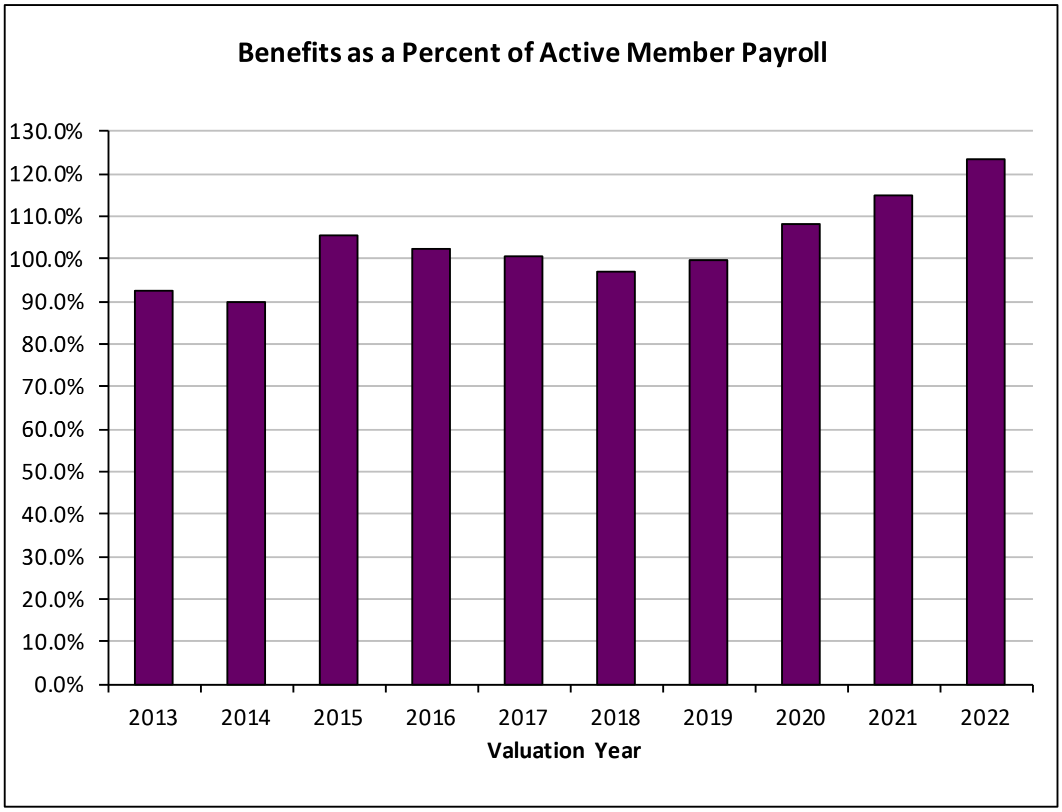
Computed Employer Contributions
Comparative Statement

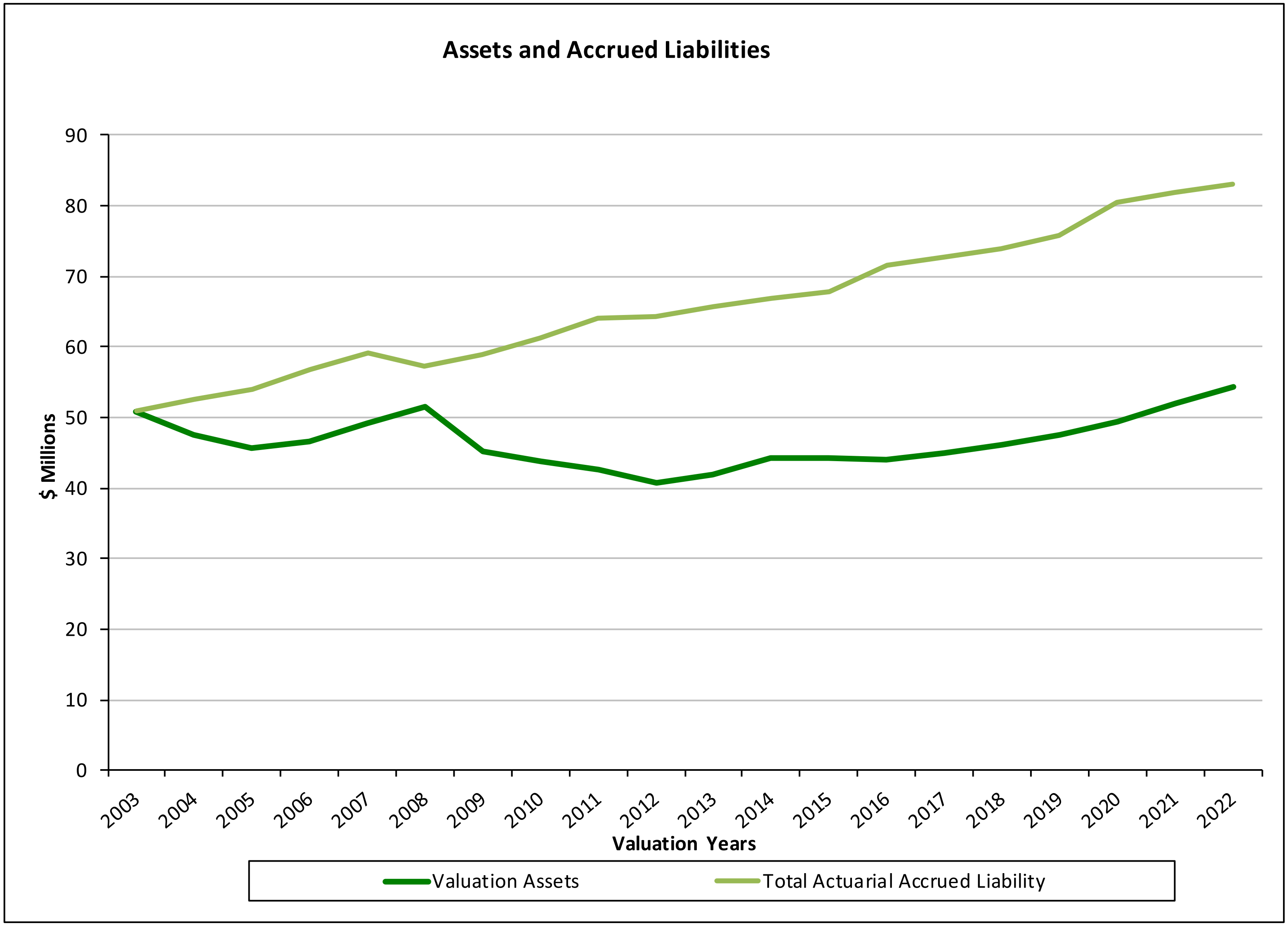
	Active Members				Retirees & Beneficiaries				Employer Contributions as Payroll Percents		
		Valuation Payroll					Annual Pensions				
Valuation Date	No.	Total	Average	% Incr.	No.	Active Per Retired	$	% of Payroll	Employer Normal Cost	UAAL	Total
06-30-03#	64	$4,490,451	$70,163	1.7 %	73	0.9	$3,164,793	70.5 %	21.7 %	0.3 %	22.0 %
06-30-04*	67	5,065,923	75,611	7.8 %	75	0.9	3,170,325	62.6 %	19.1 %	10.1 %	29.2 %
06-30-05	67	5,239,288	78,198	3.4 %	73	0.9	3,134,950	59.8 %	19.1 %	14.3 %	33.4 %
06-30-06	64	5,281,801	82,528	5.5 %	75	0.9	3,337,483	63.2 %	19.4 %	11.8 %	31.2 %
06-30-07	63	5,438,968	86,333	4.6 %	76	0.8	3,433,920	63.1 %	19.4 %	11.7 %	31.1 %
06-30-08#	63	5,759,174	91,415	5.9 %	77	0.8	3,471,224	60.3 %	12.8 %	7.1 %	19.9 %
06-30-09#	66	5,847,595	88,600	(3.1)%	76	0.9	3,521,322	60.2 %	13.2 %	16.9 %	30.1 %
06-30-10	64	5,532,619	86,447	(2.4)%	78	0.8	3,844,141	69.5 %	13.2 %	23.2 %	36.4 %
06-30-11	64	4,922,456	76,913	(11.0)%	86	0.7	4,445,242	90.3 %	13.0 %	33.8 %	46.8 %
06-30-12	67	4,889,791	72,982	(5.1)%	87	0.8	4,503,892	92.1 %	13.6 %	39.0 %	52.6 %
06-30-13	69	4,966,288	71,975	(1.4)%	88	0.8	4,594,702	92.5 %	13.7 %	40.8 %	54.5 %
06-30-14	68	5,047,949	74,235	3.1 %	90	0.8	4,539,096	89.9 %	14.2 %	40.3 %	54.5 %
06-30-15#	63	4,633,108	73,541	(0.9)%	95	0.7	4,878,836	105.3 %	12.4 %	50.0 %	62.4 %
06-30-16*	64	4,745,297	74,145	0.8 %	95	0.7	4,861,054	102.4 %	13.2 %	65.1 %	78.3 %
06-30-17	62	4,841,046	78,081	5.3 %	93	0.7	4,862,301	100.4 %	13.0 %	68.1 %	81.1 %
06-30-18	65	5,105,443	78,545	0.6 %	94	0.7	4,950,768	97.0 %	12.6 %	70.3 %	82.9 %
06-30-19#	68	5,266,008	77,441	(1.4)%	99	0.7	5,249,475	99.7 %	12.0 %	77.0 %	89.0 %
06-30-20#*	63	4,984,183	79,114	2.2 %	100	0.6	5,390,425	108.2 %	13.0 %	85.4 %	98.4 %
06-30-21#	64	5,086,232	79,472	0.5 %	110	0.6	5,850,096	115.0 %	11.3 %	88.8 %	100.1 %
06-30-22#	64	4,623,128	72,236	(9.1)%	111	0.6	5,703,159	123.4 %	15.6 %	104.6 %	120.2 %

* *Actuarial assumptions revised.*

\# *Retirement System amended.*


Active Members and Retired Lives
2022
2021
2020
2019
2018
2017
2016
2015
2014
2013
0
20
40
60
80
100
120
Covered Person
Retirants and Beneficiaries
Active Members


Benefits as a Percent of Active Member Payroll
130.0%
120.0%
110.0%
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Valuation Year


Assets and Accrued Liabilities
$ Millions
0
10
20
30
40
50
60
70
80
90
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Valuation Years
Valuation Assets
Total Actuarial Accrued Liability

Comments, Certification and Other Observations

Comment A: The contribution increased from $5,400,300 last year to $5,893,459 this year.

Comment B: There were changes to plan provisions since the last valuation as listed below:

- Service retirement eligibility for all but Police (COA), changed to 25 or more years of service regardless of age or age 60 with 10 or more years of service.
- New Police Patrol hired 7/1/2022 and after have a 2.50% pension multiplier.
- Fire member contributions increase to 8.50% of covered compensation effective 7/1/2025.
- Police Patrol member contributions increase to 8.50% of covered compensation effective 7/1/2024.

Comment C: System experience for the year ended June 30, 2022 was slightly less favorable than assumed, resulting in an overall loss of $235,200. The experience loss was primarily due to unfavorable investment experience which was partially offset by lower pay increases than assumed.

Comment D: An excess earnings reserve fund was established in 1996. The reserve balance as of June 30, 2022 is $180,109. See Appendix I page 3 for the development of the reserve balance.

A portion of the excess earnings reserve has been used in prior years to provide ad-hoc post-retirement increases. The ad-hoc increases have not been explicitly included when calculating contribution requirements to the Retirement System.

Comment E: As of the valuation date, the Unfunded Actuarial Accrued Liability (UAAL) is $28.9 million, and the funded ratio is 65.2% (61.6% on a market value basis). At the time of the last valuation, the funded ratio was 63.4%.

The retired lives are less than fully funded on a market value basis. It is most important that the Plan receive contributions at least equal to the rates shown in this report.

Comment F: The June 30, 2022 actuarial present value of retirement allowances (including the excess earnings reserve) is greater than the balance in the Reserve for Retired Benefit Payments. Past practice has been to maintain an exact balance between assets and liabilities for current retired lives. ***Therefore, to the extent possible, we recommend a transfer in the amount of $15,313,410 from the Reserve for Employer's Contributions to the Reserve for Retired Benefit Payments.*** The transfer was assumed to have been made as of June 30, 2022 for purposes of this valuation.

Comment G: This report reflects the impact of COVID-19 experience through June 30, 2022. It does not reflect the ongoing impact of COVID-19, which is likely to influence demographic and economic experience, at least in the short term. We will continue to monitor these developments and their impact on the Retirement System. Actual experience will be reflected in each subsequent annual valuation, as experience emerges.

Comments, Certification and Other Observations

Michigan Public Act 202: Under Public Act 202 of the State of Michigan, Michigan municipalities are required to report liabilities under uniform assumption guidelines. While the current guidelines are currently only for reporting purposes (and not funding), City governments may be encouraged to use these new assumptions for funding.

The uniform assumptions for 2022 and 2023 reporting include the following:

- Investment return no higher than 6.85%;
- Assumed wage inflation no lower than 3.0%*;
- Mortality assumption that uses a version of Pub-2010 with generational mortality improvement using scale MP-2020*; and
- Amortization period no longer than 17 years (16 years for 2023) for Pension Plans.

**Or based on an experience study within the last five years.*

The information needed to assist with PA 202 reporting requirements is supplied in the GASB report.

Looking Ahead: Due to the asset smoothing method only a portion of the current year asset loss was recognized, and portions of prior year's gains and losses remain to be recognized. If the Market Value of Assets were used (instead of smoothed value), the employer contribution would have been approximately $6,200,000 (instead of $5,893,459), and the funded status would have been about 61.6% (instead of 65.2%).

Certification: We certify that the valuation is complete and accurate and was made in accordance with generally recognized actuarial methods. The actuarial assumptions summarized in Section C are in aggregate a reasonable representation of the past and anticipated future experience of the System.

Comments, Certification and Other Observations (Concluded)

OTHER OBSERVATIONS:

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial value of assets), it is expected that:

1) Employer normal cost amounts as a percentage of payroll will remain approximately level year to year;
2) The unfunded actuarial accrued liability will be fully amortized after 15 years; and
3) The funded status of the plan will increase gradually towards a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regards to any funded status measurements presented in this report:

1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
2) The measurement is inappropriate for assessing the need for or the amount of future employer contributions.
3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.
4) The funding level of the plan on a Market Value basis as of June 30, 2022 is shown on page A-3.

SECTION B

VALUATION DATA

Brief Summary of Act 345 Benefit Provisions as of June 30, 2022

Service Retirement

Eligibility: Police (COA): Age 50 with 25 or more years of service or age 60 regardless of service.
All Others: Any age with 25 or more years of service or age 60 with 10 or more years of service.

Amount: The benefit amounts attributable to service retirements and the conditions under which such benefits may be paid are described in tabular form on page B-3.

Eligibility	Amount
Deferred Retirement	
10 or more years of service.	Computed as service retirement but based upon service, FAC and benefit in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.
Death After Retirement Survivor's Pension	
Payable to a surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later.	Spouse's pension equals 60% of the pension retiree was receiving.
Non-Duty Death-In-Service Survivor's Pension	
Payable to a surviving spouse, if any, upon the death of a member with 10 or more years of service.	Accrued straight life pension actuarially reduced in accordance with an Option I election.
Duty Death-In-Service Survivor's Pension	
Payable upon the expiration of worker's compensation to the survivors of a member who died in the line of duty.	Same amount that was paid by worker's compensation.
Non-Duty Disability	
Payable upon the total and permanent disability of a member with 5 or more years of service.	To Age 55: 1.5% of FAC times years of service. At Age 55: Same as service retirement pension.
Duty Disability	
Payable upon the total and permanent disability of a member in the line of duty.	To Age 55: 50% of FAC. At Age 55: Same as service retirement pension with service credit from date of disability to age 55.
Member Contributions	
Police Chief, Fire Chief, and Public Safety Director	10.0% of covered compensation.
All Others	8.0% of covered compensation.
	8.5% of covered compensation. (Effective 7/1/24 for Police Patrol and 7/1/25 for Fire.)

Brief Summary of Act 345 Benefit Provisions as of June 30, 2022

FAC Period

All	Average of the highest 3 years of annual compensation during the 10 years immediately preceding retirement.

Includable Compensation

IAFF Local 1307

- For employees promoted to command after 7/1/2006, but hired before 1/1/2008, FAC shall include and be based upon base wage which shall include out of class pay and shift differential, OT, Longevity pay, holiday pay, accumulated and unused vacation days at the time of retirement, food allowance and cleaning and clothing allowance and one half of accumulated sick leave, to a max. of 45 days.
- For employees hired after 1/1/2008 only base wage, longevity pay, and unused vacation (capped at 5 days) shall be factored into FAC.

Police (COA)

- FAC for all employees hired prior to 7/1/2008 shall only include base wage (which shall include out of class pay, and shift diff.), overtime pay, longevity pay, holiday pay, and accumulated and accrued unused vacation days at the time of retirement, officer training bonus, gun allowance, a cleaning and clothing allowance and one half of accumulated sick leave to a max of 800 hours.
- For employees hired after 7/1/2008, FAC will only include base wage, longevity pay, and unused vacation time (capped at 120 hours).

Police Patrol

- For employees hired after 1/1/1981, but before 7/1/2008, FAC shall be based upon base wage, overtime pay, longevity pay, holiday pay, accumulated and accrued unused vacation days at the time of retirement, officer training bonus, gun allowance and cleaning and clothing allowance, and one half of accumulated sick leave, to a maximum of 100 days.
- For employees hired after 7/1/2008, FAC will only include base wage, longevity pay, and unused vacation time (capped at 120 hours).

Brief Summary of Act 345 Benefit Provisions as of June 30, 2022

Group	Benefit Formula					Maximum Annual Benefit after Annuity Withdrawal[3,4]	Comment
	Multiplier x Service			Multiplier x Service			
IAFF Local 1307							
Tier 1: Hired before 7/1/08, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$80,000	1
Tier 2: Hired on 7/1/08 and before 7/2/18, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$70,000	1
Tier 3: Hired after 7/1/18	2.69%	first 25	+	1.00%	over 25	$70,000	1
Police (COA)							
Tier 1: Hired before 7/1/08, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$80,000	2
Tier 2: Hired on 7/1/08 and before 7/2/18, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$70,000	2
Tier 3: Hired after 7/1/18	2.69%	first 25	+	1.00%	over 25	$70,000	2
Police Patrol							
Tier 1: Hired before 7/1/08, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$80,000	-
Tier 2: Hired on 7/1/08 and before 7/2/18, retired after 7/1/15	2.69%	first 25	+	1.00%	over 25	$70,000	-
Tier 3: Hired after 7/1/18	2.69%	first 25	+	1.00%	over 25	$70,000	-
Tier 4: Hired on or after 7/1/22	2.50%	first 25	+	1.00%	over 25	$70,000	-
Current Public Safety Director	2.69%	first 25	+	1.00%	over 25	$80,000	-

[1] *Members promoted to command positions on or after 7/1/06 will be provided the same pension calculations and payout at retirement as they were provided as non-command officers.*

[2] *Members promoted to COA on or after 7/1/06 will maintain their current benefits unless the COA agreement provides less.*

[3] *Payable as straight life annuity.*

[4] *Annuity withdrawal is not offered to members hired after 7/1/18.*

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Statement

Year Ended	Added to Rolls		Removed from Rolls		Rolls End of Year		Pensions as a % of Member Payroll	Average Pension	Present Value of Pensions[+]
	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions			
06-30-03	15	$ 1,022,154	2	$ 68,029	73	$ 3,164,793	70.5%	$43,353	$ 34,597,105
06-30-04@	1	5,531			74	3,170,325	62.6%	42,842	34,497,627
06-30-05	2	34,630	3	70,005	73	3,134,950	59.8%	42,945	33,702,098
06-30-06	5	257,163	3	54,630	75	3,337,483	63.2%	44,500	35,632,439
06-30-07	3	158,889	2	62,452	76	3,433,920	63.1%	45,183	36,359,122
06-30-08@	1	42,164		4,860	77	3,471,224	60.3%	45,081	36,296,873
06-30-09@	2	104,196	3	54,098	76	3,521,322	60.2%	46,333	36,639,620
06-30-10	6	423,407	4	100,588	78	3,844,141	69.5%	49,284	40,118,035
06-30-11^	10	662,697	2	61,596	86	4,445,242	90.3%	51,689	47,597,576
06-30-12	2	123,636	1	64,986	87	4,503,892	92.1%	51,769	47,475,689
06-30-13	2	112,805	1	21,995	88	4,594,702	92.5%	52,213	47,905,503
06-30-14	5	125,168	4	180,774	89	4,539,096	89.9%	51,001	46,866,286
06-30-15@	9	480,526	3	140,786	95	4,878,836	105.3%	51,356	51,295,005
06-30-16@	2	101,081	2	118,863	95	4,861,054	102.4%	51,169	52,406,109
06-30-17@	1	102,311	3	101,064	93	4,862,301	100.4%	52,283	52,144,215
06-30-18	2	134,033	1	45,566	94	4,950,768	97.0%	52,668	52,768,325
06-30-19@	5	298,707			99	5,249,475	99.7%	53,025	55,604,425
06-30-20@	3	191,753	2	50,803	100	5,390,425	108.2%	53,904	58,680,275
06-30-21@	12	531,171	2	71,500	110	5,850,096	115.0%	53,183	64,183,868
06-30-22@	9	329,104	8	476,041	111	5,703,159	123.4%	51,380	62,330,532

@ Revised actuarial assumptions and/or benefit provisions.

+ Excludes excess earnings reserves.

^ Includes members electing to enter one year Trust.

Retirees and Beneficiaries June 30, 2022
Tabulated by Attained Age

Attained Age	No.	Annual Pensions
40-44	1	$ 7,743
45-49	3	183,993
50-54	14	672,881
55-59	14	917,155
60-64	18	1,105,498
65-69	11	710,364
70-74	20	1,014,499
75-79	17	661,334
80-84	10	330,666
85-89	1	56,495
90-94	2	42,531
Totals	**111**	**$5,703,159**

Average Age at Retirement:	50.6 years
Average Age Now:	67.0 years

On the valuation date, there is one vested former member, age 45 with total estimated annual benefits of $38,798.

Active Members - Comparative Statement

Valuation Date	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Inc.
06-30-03	64	$4,490,451	37.3	10.2	$70,163	1.7 %
06-30-04	67	5,065,923	37.9	10.8	75,611	7.8 %
06-30-05	67	5,239,288	38.9	11.8	78,198	3.4 %
06-30-06	64	5,281,801	39.3	12.4	82,528	5.5 %
06-30-07	63	5,438,968	40.0	13.1	86,333	4.6 %
06-30-08	63	5,759,174	40.7	13.7	91,415	5.9 %
06-30-09	66	5,847,595	40.4	13.6	88,600	(3.1)%
06-30-10	64	5,532,619	40.3	13.5	86,447	(2.4)%
06-30-11	64	4,922,456	37.7	11.2	76,913	(11.0)%
06-30-12	67	4,889,791	37.9	11.0	72,982	(5.1)%
06-30-13	69	4,966,288	38.0	11.1	71,975	(1.4)%
06-30-14	68	5,047,949	39.1	12.4	74,235	3.1 %
06-30-15	63	4,633,108	38.4	12.2	73,541	(0.9)%
06-30-16	64	4,745,297	38.6	12.4	74,145	0.8 %
06-30-17	62	4,841,046	39.0	13.3	78,081	5.3 %
06-30-18	65	5,105,443	38.6	12.8	78,545	0.6 %
06-30-19	68	5,266,008	37.8	11.5	77,441	(1.4)%
06-30-20	63	4,984,183	38.1	12.4	79,114	2.2 %
06-30-21	64	5,086,232	36.9	10.7	79,472	0.5 %
06-30-22	64	4,623,128	37.3	11.3	72,236	(9.1)%

Active Members Added to and Removed from Rolls

	Number Added During Year		Terminations During Year										Active Members End of Year
			Normal Retirement		Disability Retirement		Died-In-Service		Withdrawals				
									Vested	Other	Total		
Valuation Date	A	E	A	E	A	E	A	E	A	A	A	E	
6-30-18	6	3	1	0.5	0	0.1	1	0.1	0	1	1	0.7	65
6-30-19	8	5	4	0.3	1	0.1	0	0.1	0	0	0	1.2	68
6-30-20	2	7	2	0.3	0	0.1	0	0.0	1	4	5	1.8	63
6-30-21	9	8	6	1.3	0	0.1	0	0.0	0	2	2	1.1	64
6-30-22	2	2	1	0.5	0	0.1	0	0.0	0	1	1	1.7	64
5-Year Totals	27	25	14	2.9	1	0.5	1	0.2	1	8	9	6.5	

A = Actual
E = Expected

Active Members as of June 30, 2022
by Attained Age and Years of Service

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	2							2	$ 93,786
25-29	9	1						10	512,069
30-34	8	4						12	647,390
35-39	1	1	13	1				16	1,156,070
40-44	1	1	3	1	2			8	604,983
45-49				1	9	1		11	1,122,630
50-54				2	2	1		5	486,200
Total	**21**	**7**	**16**	**5**	**13**	**2**		**64**	**$ 4,623,128**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	37.3	years
Service:	11.3	years
Annual Pay:	$72,236	

Summary of Current Asset Information

Balance Sheet

Current Assets		Reserve for	
Cash & Equivalents	$ 1,908,834	Employees' Contributions	$ 4,050,062
Receivables & Accruals	41,988	Employer Contributions	0
Investments	49,296,471	Retired Benefit Payments	47,017,122
Miscellaneous Assets	0	Excess Earnings	180,109
Total Current Assets	$51,247,293	Total Reported Reserves	$51,247,293
Market Adjustment	2,994,844	Market Adjustment	2,994,844
Total Valuation Assets	$54,242,137	Total Valuation Reserves	$54,242,137

Revenues and Expenditures

	2021-2022	2020-2021
Valuation Assets - July 1	$52,027,052	$49,466,718
Revenues		
Employees' Contributions	380,585	382,803
Employer Contributions	5,801,664	4,639,422
Recognized Investment Income	2,426,900	4,722,458
Expenditures		
Benefit Payments and Refund of Member Contributions	6,102,215	6,948,017
Investment Expense	291,849	236,332
Valuation Assets - June 30	$54,242,137	$52,027,052

Valuation assets are equal to a smoothed asset value. The derivation of valuation assets is shown on page A-4.

SECTION C

ACTUARIAL COST METHOD AND ASSUMPTIONS

Basic Financial Objective and Operation of the Retirement System

Benefit Promises Made Which Must Be Paid For. A retirement program is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an "IOU" which reads: "The Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The Constitution of the State of Michigan is directed to the question:

> "Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."

This Retirement System meets this constitutional requirement by having the following ***Financial Objective: To establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year-to-year*** and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

> *Normal Cost* (the current value of benefits likely to be paid on account of members' service being rendered in the current year)
>
> ... plus ...
>
> *Interest on the Unfunded Actuarial Accrued Liability* (the difference between the actuarial accrued liability and current system assets).

If contributions to the retirement program are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

$$B = C + I - E$$

Benefit payments to any group of members and their beneficiaries cannot exceed the sum of:

Contributions received on behalf of the group

... plus ...

Investment earnings on contributions received and not required for immediate payment of benefits

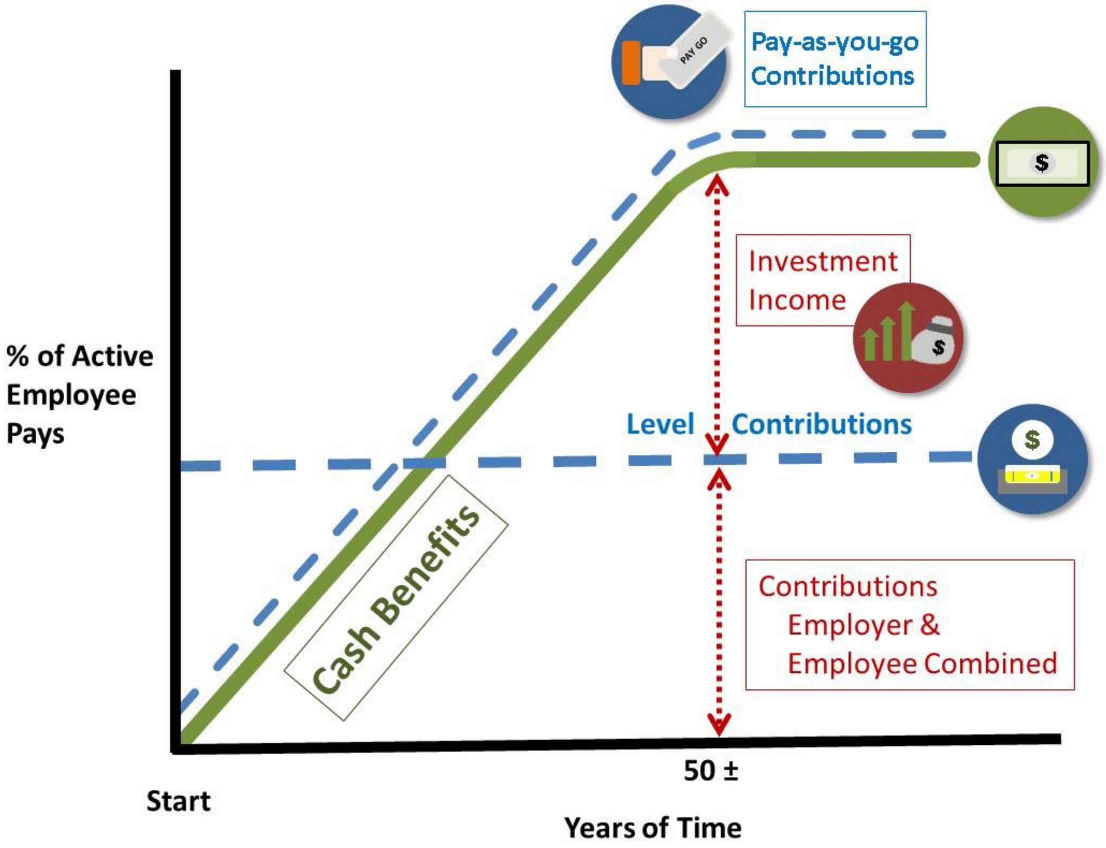
... minus ...

Expenses incurred in operating the program.

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Investment income becomes the third and largest contributor to the retirement program, and the amount is directly related to the amount of contributions and investment performance.

There are retirement programs designed to defer the bulk of contributions far into the future. Lured by artificially low present contributions, such programs ignore the inevitable consequence of a relentlessly increasing contribution rate -- to a level greatly in excess of the level percent-of-payroll rate. ***This method of financing is prohibited in Michigan by the state constitution***.

Computed Contribution Rate Needed to Finance Benefits. From a given schedule of benefits and from the data furnished, the actuary calculates the contribution rate *by means of an actuarial valuation* - the technique of assigning monetary values to the risks assumed in operating a retirement program.

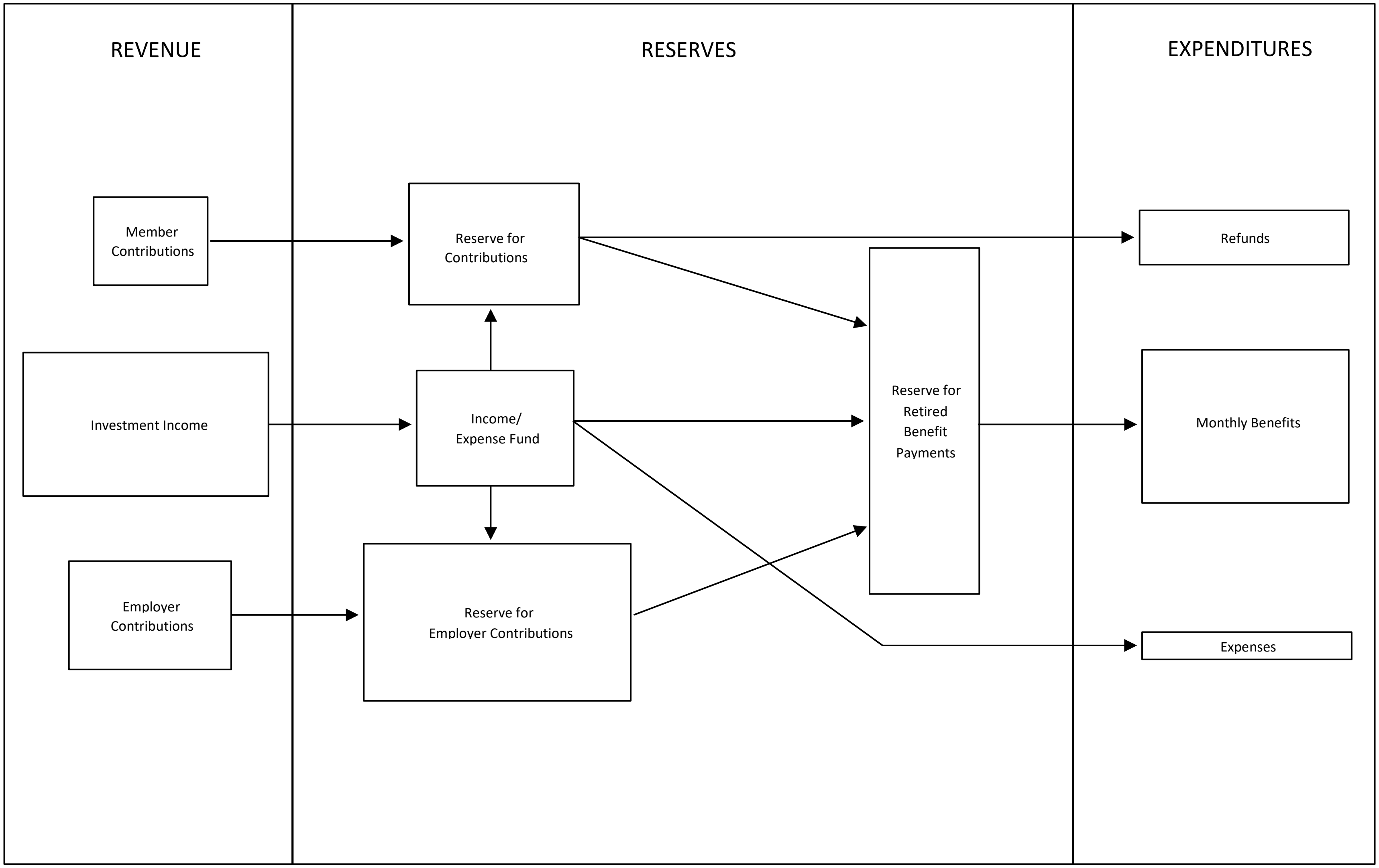


CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- **Economic Risk Areas**
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- **Non-Economic Risk Areas**
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

Flow of Money Through the Retirement System



Valuation Methods

The assumptions and methods are based on an experience study dated February 11, 2021 adopted by the Board on February 18, 2021.

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual ***entry-age normal cost valuation method*** having the following characteristics:

- The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and
- Each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. The Unfunded Actuarial Accrued Liability (UAAL) was determined using the funding value of assets and actuarial accrued liability calculated as of the valuation date. The UAAL amortization payment (one component of the contribution requirement), is the level percent of pay required to fully amortize the UAAL beginning on the date contributions determined by this report are scheduled to begin. In accordance with the Actuarial Funding Policy, Sections III. C., the UAAL is financed over a period of years. This UAAL payment reflects payments expected to be made between the valuation date and the date contributions determined by this report are scheduled to begin. Unfunded actuarial accrued liabilities were amortized by level (principal & interest combined) percent-of-payroll contributions.

The ***valuation assets*** used for funding purposes is derived as follows: Prior year valuation assets are increased by contribution and expected investment income and reduced by refunds, benefit payments and expenses. To this amount is added 25% of the difference between expected and actual investment income for each of the previous four years. The total funding value of assets is limited to 80%/120% of the market value on the valuation date. Finally the total funding value is reduced by the Excess Earnings Reserve Fund Balance, Appendix 1-3; 5), in order to determine the net valuation assets for funding purposes. During periods when investment performance exceeds the assumed rate, actuarial value of assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, actuarial value of assets will tend to be greater than market value.

Valuation Assumptions

The actuary calculates the contribution requirements and benefit values of the System by applying actuarial assumptions to the benefit provisions and census data furnished, using the valuation methods described on page C-5.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment income likely to be generated by the assets of the Retirement System;
- Patterns of salary increases to members;
- Rates of mortality among members, retirants and beneficiaries;
- Rates of withdrawal of active members;
- Rates of disability among members and their subsequent rates of recovery; and
- Probabilities of retirement at various ages after benefit eligibility.

In a valuation the actuary projects the monetary effect of each assumption, for each distinct experience group, for the next year and for each year over the next half-century or longer.

Actual experience will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions. Each valuation provides a complete recalculation of System costs based upon assumptions regarding future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of small adjustments to the computed contribution rate.

From time-to-time it is appropriate to modify one or more of the assumptions, to reflect basic experience trends (but not random year-to-year fluctuations).

Valuation Assumptions (Continued)

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

Sample Ages	Salary Increase Assumptions for an Individual Member		
	Merit & Seniority	**Base (Economy)**	**Increase Next Year**
20	2.9%	3.0%	5.9%
25	2.3%	3.0%	5.3%
30	2.0%	3.0%	5.0%
35	1.8%	3.0%	4.8%
40	1.6%	3.0%	4.6%
45	1.3%	3.0%	4.3%
50	0.9%	3.0%	3.9%
55	0.5%	3.0%	3.5%
60	0.1%	3.0%	3.1%
Ref:	458		

If the number of active members remains constant, then the total active member payroll will increase 3.0% annually, the base portion of the individual salary increase assumptions.

The rate of investment is compounded annually net of expenses.

Investment Return	7.00%
Wage Inflation	3.00%
Price Inflation	2.25%
Spread Between Investment Return and Wage Inflation	4.00%
Spread Between Investment Return and Price Inflation	4.75%

These assumptions are used to equate the value of payments due at different points in time.

Economic experience during the last five years has been as follows:

	Year Ended June 30					**5-Year**
	2022	**2021**	**2020**	**2019**	**2018**	**Average**
1) Nominal rate of return*	4.1 %	9.3 %	5.0 %	5.2 %	4.3 %	5.6 %
2) Increase in CPI (6/30)	9.1 %	5.4 %	0.6 %	1.6 %	2.9 %	3.9 %
3) Average salary increase	(9.1)%	0.5 %	2.2 %	(1.4)%	0.6 %	(1.5)%
4) Spread between recognized investment return and:						
CPI						1.7 %
Average salary increase						7.1 %

* *The nominal rate of return was computed using the approximate formula: i = I divided by 1/2 (A+B-I), where I is realized investment income net of expenses, A is the beginning of year asset value and B is the end of year asset value.*

Valuation Assumptions (Continued)

The mortality rates utilized are based upon the Pub-2010 Amount-Weighted Safety tables, in conjunction with the MP-2020 Projection Scale on a fully generational basis. The tables used were as follows:

- **Pre-Retirement**: The Pub-2010 Amount-Weighted, Safety, Employee, Male and Female tables, with a base year of 2010 and future mortality improvements projected using scale MP-2020.
- **Healthy Post-Retirement**: The Pub-2010 Amount-Weighted, Safety, Healthy Retiree, Male and Female tables, with a base year of 2010 and future mortality improvements projected using scale MP-2020.
- **Disability Retirement**: The Pub-2010 Amount-Weighted, Safety, Disabled Retiree, Male and Female, with a base year of 2010 and future mortality improvements projected using scale MP-2020.

These tables were first used for the June 30, 2020 valuation.

Future Life Expectancy (Years)* at Sample Ages						
Sample	Healthy Pre-Retirement^		Healthy Post-Retirement		Disabled Retirement	
Age	Men	Women	Men	Women	Men	Women
45	43.53	45.95	40.58	42.62	38.97	41.12
50	38.41	40.82	35.43	37.41	34.03	36.12
55	33.32	35.72	30.38	32.30	29.16	31.24
60	28.33	30.69	25.49	27.41	24.48	26.64
65	23.46	25.71	20.89	22.77	20.13	22.31
70	18.76	20.79	16.62	18.39	16.10	18.19
75	14.29	16.07	12.72	14.33	12.39	14.30
80	10.12	11.62	9.31	10.75	9.19	10.75
Ref:	2721	2722	2703	2704	2709	2710
Multiplier:	1.00	1.00	1.00	1.00	1.00	1.00
Setback:	0	0	0	0	0	0
Base Year:	2010	2010	2010	2010	2010	2010
MP Scale:	964	965	964	965	964	965

** Based on retirements in 2022. Retirements in future years will reflect improvements in life expectancy.*
^ 95% of Pre-Retirement Deaths are assumed to be non-duty related and 5% are assumed to be duty related.

Valuation Assumptions (Continued)

For Police (COA) the rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Retirement Ages	Percent*
50	70%
51	20%
52	20%
53	20%
54	20%
55	10%
56	10%
57	10%
58	10%
59	10%
60	100%
Ref.	3180

** A 30% rate is assumed for retirements occurring one year earlier than the stated age 50 with 25 years of service requirement.*

A member is eligible for retirement at age 50 with 25 years of service or after attaining age 60.

For all other members the rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Years of Service	Percent*
25	70%
26	50%
27	50%
28	50%
29	50%
30	100%

** A 30% rate is assumed for retirements occurring one year earlier than the stated 25 years of service requirement. In addition, 100% retirement is assumed for members age 60 with 10 or more years of service.*

A member is eligible for retirement at age 60 with 10 years of service or at any age with 25 years of service.

Valuation Assumptions (Concluded)

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year
All	0	12.50%
	1	8.50%
	2	5.00%
	3	3.00%
	4	2.50%
25	5 & Over	1.62%
30		1.40%
35		0.83%
40		0.32%
45		0.18%
50		0.18%
55		0.18%
60		0.18%
Ref.		146 237

Rates of disability were as follows. This assumption measures the probability of members retiring with a disability benefit. 10% of disabilities are assumed to be non-duty related and 90% are assumed to be duty related.

Sample Ages	% of Active Members Becoming Disabled within Next Year
20	0.06%
25	0.07%
30	0.10%
35	0.13%
40	0.19%
45	0.29%
50	0.48%
55	0.82%
Ref	256
Multiplier	125%

Miscellaneous and Technical Assumptions
June 30, 2022

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. 90% of active members are assumed to be married at time of retirement. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined using the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and death decrements do not operate during the first five years of service. Disability also does not operate during retirement eligibility.
Loads:	Retirement Present Values, for benefits commencing immediately, were loaded by 17% for all Fire and Police Patrol/Command hired on or before 7/1/2008 (2% for those Police Patrol/Command hired after 7/1/2008) of active member liabilities to account for the additional amount included in the FAC due to unused sick time and unused vacation time.
Option Factors:	Option factors are based upon a 7.00% interest rate assumption and a 100%/0% unisex blend of the Pub-2010S Amount-Weighted, Healthy Retiree, Male and Female tables, with future mortality improvements projected to 2024 using scale MP-2020, effective for retirements on or after June 30, 2021.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
Normal Form of Benefit:	A 60% automatic joint and survivor payment is the assumed form of benefit.
Benefit Service:	Exact Fractional service is used to determine the amount of benefit payable.
Annuity Withdrawal:	The interest rate for annuity withdrawal conversions was assumed to be 0.0% per year.

Glossary

Accrued Service: The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability: The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

Actuarial Assumptions: Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turn-over and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method: A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent: A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

Actuarial Present Value: The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Amortization: Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain (Loss): A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Normal Cost: The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Reserve Account: An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability: The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

Valuation Assets: The value of current plan assets recognized for valuation purposes.

APPENDIX I

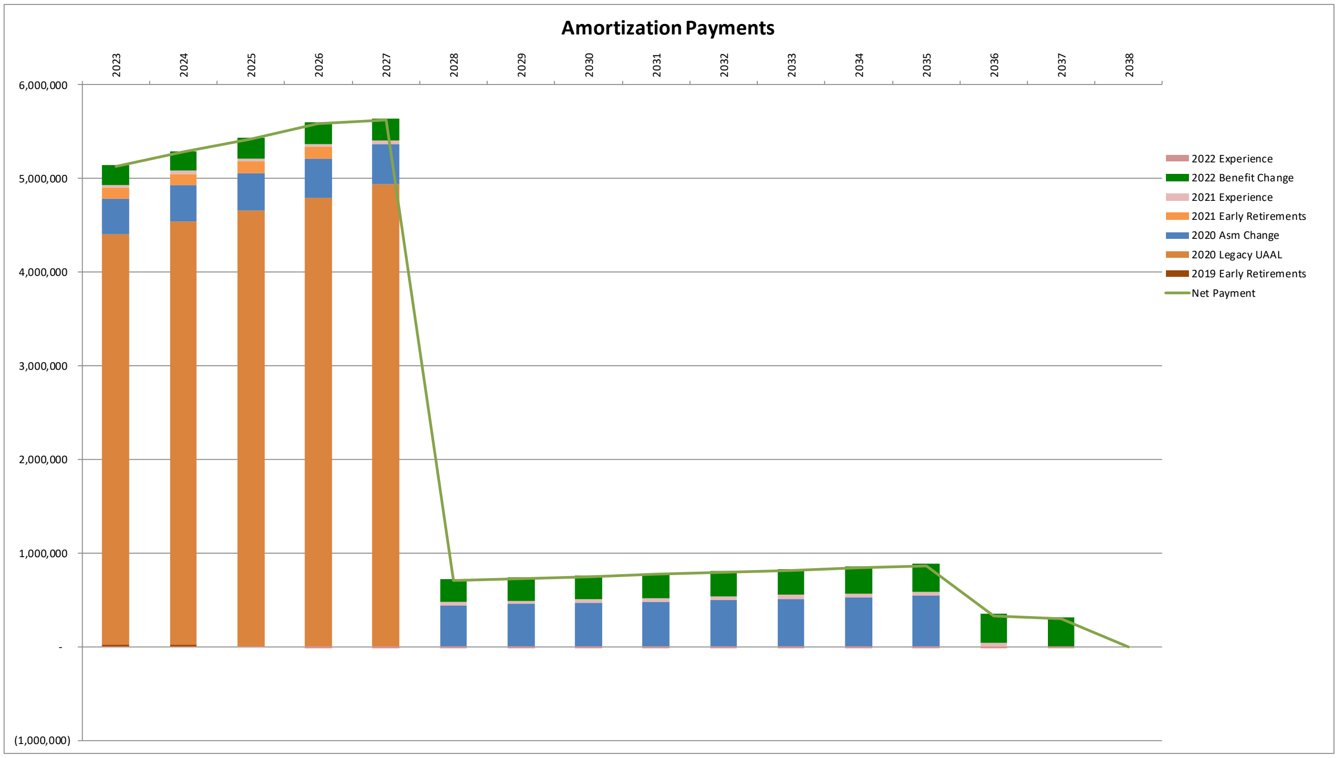
AMORTIZATION PAYOFF SCHEDULE

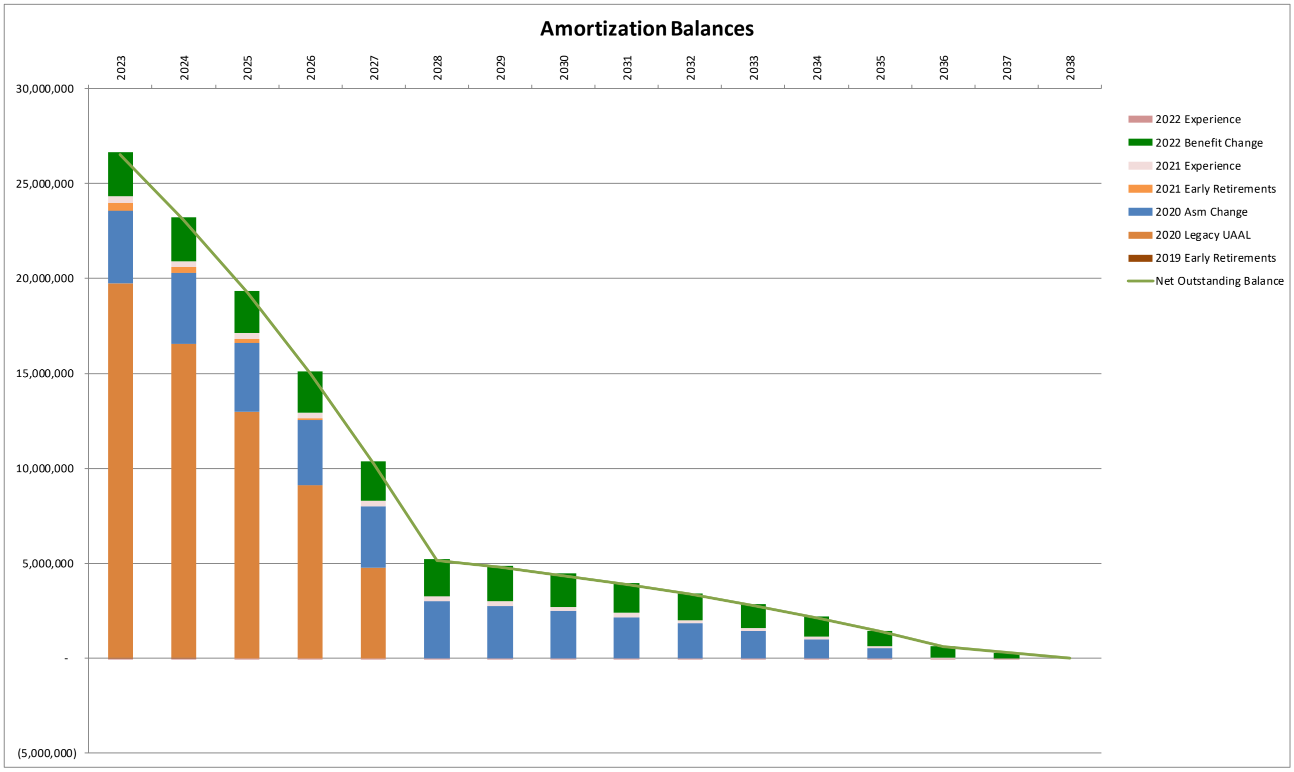
Amortization Payoff Schedule

Date	Unfunded Actuarial Accrued Liability (UAAL) (Beg. of Year)	Funded Ratio (Beg. of Year)	UAAL Payment %	UAAL Payment $	Interest	UAAL (End of Year)
June 30, 2022	$ 28,887,746	65.2%				
July 1, 2023	26,537,032	68.3%	104.60%	$ 5,130,164	$ 1,680,061	$ 23,086,929
July 1, 2024	23,086,929	72.7%	104.60%	5,284,069	1,433,228	19,236,088
July 1, 2025	19,236,088	77.4%	104.22%	5,423,141	1,158,856	14,971,804
July 1, 2026	14,971,804	82.5%	104.22%	5,585,835	854,726	10,240,695
July 1, 2027	10,240,695	88.1%	101.88%	5,624,209	522,221	5,138,707
July 1, 2028	5,138,707	94.1%	12.41%	705,549	335,294	4,768,452
July 1, 2029	4,768,451	94.5%	12.41%	726,715	308,643	4,350,379
July 1, 2030	4,350,379	95.0%	12.41%	748,517	278,624	3,880,486
July 1, 2031	3,880,486	95.6%	12.41%	770,972	244,954	3,354,468
July 1, 2032	3,354,468	96.2%	12.41%	794,101	207,333	2,767,700
July 1, 2033	2,767,700	96.9%	12.41%	817,925	165,434	2,115,210
July 1, 2034	2,115,210	97.7%	12.41%	842,462	118,911	1,391,658
July 1, 2035	1,391,658	98.5%	12.41%	867,736	67,388	591,310
July 1, 2036	591,310	99.4%	4.63%	333,321	29,857	287,846
July 1, 2037	287,846	99.7%	4.01%	297,693	9,847	0
July 1, 2038	0	100.0%	0.00%	0	0	(0)

UAAL at the valuation date is adjusted to July 1st of the following year with payments expected to be made between the valuation date and July 1st of the following year.

Amortization Payoff Schedule (Concluded)





Calculation of
Excess Earnings Reserve Fund Balance

The schedule below shows the development of the current balance in the Excess Earnings Reserve Fund.

Transaction	Amount
1) Balance as of 7/1/2021	$212,884
2) 2021 Transfer Amount	0
3) 2021/2022 Scheduled Distribution	35,100
4) 2021/2022 Distribution not made as a result of death	2,325
5) Balance as of 7/1/2022: (1)+(2)-(3)+(4)	**180,109**
6) 2022 Maximum Transfer Amount	0
7) 2022/2023 Scheduled Distribution	41,400
8) Balance Available for Distribution as of 7/1/2023: (5)+(6)-(7)	**$138,709**

The calculations are based on our understanding of the Excess Earnings Distribution Program as described during the Retirement Board meeting of February 21, 2008, and assume a tiered structure payout as of July 1, 2013. This includes a maximum annual transfer equal to 10% of the excess of the rate of return on the actuarial value of Retirement System assets over the assumed rate of return (7.00%) multiplied by the actuarial present value of pensions being paid to retired members and beneficiaries. The calculation of the 2022 maximum transfer amount is detailed below:

Development of Maximum Transfer Amount	
a) Rate of return on Actuarial Value of Assets	4.10%
b) Assumed rate of return on Actuarial Value of Assets	7.00%
c) Excess rate of return: maximum ((a)-(b), 0%)	0.00%
d) Present Value of pensions for retired members and beneficiaries	$62,330,532
e) 2022 maximum transfer: (c)*(d)*10%	**$ 0**

The calculation of the maximum annual amount available to be transferred to the Excess Earnings Reserve Fund is based upon the Retirement Board's direction and is consistent with the Retirement Board's interpretation of Chapter 297.33 of the Code of Ordinances of the City of Southgate.

The balance available for distribution as of 7/1/2023 includes both expected payouts and expected transfers for the 12-month period following June 30, 2022.

100-Year Closed Group Projection of Benefit Payments

The benefit projections shown below are based upon the existing plan population as of the valuation date, June 30, 2022, assuming no new entrants in the plan. The projections were prepared assuming all actuarial assumptions are met during the projection period.

Fiscal Year Ending June 30,	Projected Benefit Payment
2023	$5,961,109
2024	6,082,418
2025	6,331,239
2026	6,346,015
2027	6,605,170
2028	6,917,082
2029	6,753,334
2030	6,755,265
2031	6,652,171
2032	6,583,576
2033	6,651,701
2034	6,717,239
2035	6,842,701
2036	7,054,248
2037	7,544,409
2038	7,098,070
2039	7,035,117
2040	7,301,373
2041	7,086,874
2042	7,092,168
2043	7,205,312
2044	7,106,772
2045	6,902,298
2046	6,924,749
2047	6,897,349
2048	6,833,875
2049	6,693,944
2050	6,532,240
2051	6,365,484
2052	6,192,198
2053	6,015,255
2054	5,835,379
2055	5,655,107
2056	$5,475,040
2057	5,295,434
2058	5,116,663
2059	4,938,933
2060	4,762,417
2061	4,587,249
2062	4,413,612
2063	4,241,725
2064	4,071,810
2065	3,904,129
2066	3,738,928
2067	3,576,437
2068	3,416,837
2069	3,260,224
2070	3,106,613
2071	2,956,003
2072	2,808,334
2073	2,663,481
2074	2,521,259
2075	2,381,435
2076	2,243,778
2077	2,108,089
2078	1,974,253
2079	1,842,253
2080	1,712,177
2081	1,584,190
2082	1,458,553
2083	1,335,611
2084	1,215,801
2085	1,099,602
2086	987,543
2087	880,211
2088	778,174
2089	$681,974
2090	592,088
2091	508,917
2092	432,799
2093	363,924
2094	302,329
2095	247,942
2096	200,566
2097	159,885
2098	125,483
2099	96,861
2100	73,451
2101	54,652
2102	39,852
2103	28,446
2104	19,853
2105	13,529
2106	8,990
2107	5,821
2108	3,667
2109	2,247
2110	1,337
2111	771
2112	432
2113	235
2114	125
2115	65
2116	32
2117	17
2118	8
2119	4
2120	1
2121	0
2122	0

Actuarial Funding Policy

WHEREAS, the City of Southgate Police and Fire Retirement System ("Retirement System") is established and administered pursuant to the provisions of Public Act 345 of 1937, as amended (MCL 38. 551 *et seq*.), applicable collective bargaining agreements, and applicable state and federal laws including, but not limited to Public Act 314 of 1965, as amended ("Act 314") [MCL 38.1132 *et seq.*], and

WHEREAS, the Board of Trustees of the Retirement System ("Board") is vested with the authority and fiduciary responsibility for the administration, management and operation of the Retirement System, and

WHEREAS, the Board, in consultation with its Actuary, has an obligation to establish the economic and demographic assumptions to be utilized in performing the required actuarial valuation of the Retirement System and in determining the required annual employer contribution to the Retirement System, and

WHEREAS, the Board is aware of upcoming changes to the accounting and reporting standards approved by the Governmental Accounting Standards Board (GASB) for public pension plans, and

WHEREAS, the Board wishes to establish a formal Actuarial Funding Policy addressing the funding objectives and actuarial assumptions to be utilized in determining the funding status of the Retirement System, therefore be it

RESOLVED, that the Board hereby adopts the following Actuarial Funding Policy:

I. GENERAL

A. Purpose

(1) In light of upcoming changes to the GASB financial accounting and reporting standards for public pension plans, the Board of Trustees of the Retirement System desires to establish a formal Actuarial Funding Policy to ensure the systematic funding of future pension obligations of the Retirement System.

B. Policy Objectives

(1) Maintain adequate levels of assets sufficient to fund all benefits expected to be paid to members and beneficiaries when due.

(2) Maintain stability of employer contributions rates, consistent with other funding objectives.

(3) Support the public policy goals of accountability and transparency.

(4) Monitor material risks to assist in any risk management strategies the Board deems appropriate.

(5) Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring costs to future members and employers.

(6) Provide a reasonable margin for adverse experience to offset risk.

(7) Review the Plan's investment return assumption, potentially in conjunction with a periodic asset liability study and in consideration of the Board's risk profile.

(8) Continue the systematic reduction of the Plan's Unfunded Actuarial Accrued Liabilities (UAAL).

II. LEGAL

A. Annual Actuarial Valuation

(1) Section 20h(4) of Act 314 [MCL 38.1140h(4)], requires the Retirement System to have an actuarial valuation performed annually as follows:

> Except as otherwise provided in this subsection, a system shall have an annual actuarial valuation with assets valued on a market-related basis. The actuarial present value of total projected benefits shall include all pension benefits to be provided by the system to members or beneficiaries pursuant to the terms of the system and any additional statutory or contractual agreements to provide pension benefits through the system that are in force at the actuarial valuation date, including, but not limited to, service credits purchased by members, deferred retirement option plans, early retirement programs, and postretirement adjustment programs. A system that has less than $20,000,000.00 is only required to have an actuarial valuation as required under this subsection done every other year.

B. Annual Employer Contribution

(1) The Board is required, pursuant to Section 20m of Act 314 [MCL 38.1140m], to annually certify the annual required contribution to be made by the employer as follows:

> The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of any system shall confirm in the annual actuarial valuation required under section 20h and the summary annual report required under section 13 that each system under this act provides for the payment of the required employer contribution as provided in this section and shall confirm in the summary annual report that the system has received the required employer contribution for the year covered in the summary annual report. The required employer contribution is the actuarially determined contribution amount. An annual required employer contribution in a system under this act shall consist of a current service cost payment and a payment of at least the annual accrued amortized interest on any unfunded actuarial liability and the payment of the

> annual accrued amortized portion of the unfunded principal liability. For fiscal years that begin before January 1, 2006, the required employer contribution shall not be determined using an amortization period greater than 40 years. Except as otherwise provided in this section, for fiscal years that begin after December 31, 2005, the required employer contribution shall not be determined using an amortization period greater than 30 years. In a plan year, any current service cost payment may be offset by a credit for amortization of accrued assets, if any, in excess of actuarial accrued liability. A required employer contribution for a system administered under this act shall allocate the actuarial present value of future plan benefits between the current service costs to be paid in the future and the actuarial accrued liability. The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of a system shall act upon the recommendation of an actuary and the board and the actuary shall take into account the standards of practice of the Actuarial Standards Board of the American Academy of Actuaries in making the determination of the required employer contribution.

III. POLICY

A. Actuarial Cost Method

(1) The individual entry age normal actuarial cost method of valuation shall be utilized in determining actuarial accrued liability and normal cost with the following characteristics:

  (a) the annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member’s benefit at the time of retirement; and

  (b) each annual normal cost is a constant percentage of the member’s year by year projected covered pay.

(2) Differences in the past between assumed experience and actual experience (actuarial gains and losses) shall be factored into the actuarial accrued liability.

(3) The normal cost shall be determined on an individual basis for each active member.

B. Asset Smoothing Method

(1) The investment gains or losses of each valuation period, resulting from the difference between actual investment return and assumed investment return, shall be recognized annually in level amounts over a period not to exceed five (5) years in calculating the funding value of assets.

C. Amortization Method

(1) A level percent of payroll amortization method shall be used to systematically pay off the unfunded actuarial accrued liabilities over a closed amortization period not to exceed 30 years.

(2) Unfunded liabilities associated with benefit changes or assumption changes shall be funded over a period to be determined by the Board in consultation with its actuary.

(3) Unfunded liabilities arising from benefit changes provided to retirees or in conjunction with early retirement incentive programs offered by the employer shall be separately funded over a period to be determined by the Board in consultation with its actuary.

(4) In the event that the Retirement System's assets exceed its liabilities, all amortization schedules other than those related to benefit changes for retirees or early retirement incentive programs offered by the employer shall be considered completed, and employer contributions will be set based upon the normal cost and the completion of any remaining amortizations due to benefit changes for retirees or early retirement incentive programs offered by the employer, without regard to the overfunding status of the Retirement System.

D. Assumptions

(1) The economic and demographic actuarial assumptions utilized to determine the contribution requirements and benefit values of the Retirement System shall be determined by the Board in consultation with its actuary.

E. Funding Target

(1) The targeted funded ratio of the Retirement System shall be 100%.

(2) The employer contribution rate shall at least be equal to the normal cost unless the funded ratio of the Retirement System exceeds 120%.

(3) A funding plan shall be developed by the Board in consultation with its actuary if the funded ratio of the Retirement System falls below 50%, which may include additional funding requirements.

F. Risk Management

(1) Assumption Changes

  (a) The actuarial assumptions utilized to determine the annual contribution requirements and valuations shall be those last adopted by the Board based on the most recent experience study and upon the advice and recommendation of the Board's actuary. The Board's actuary shall conduct an experience study at least once every five years. The results of the experience study shall be the basis for the actuarial assumptions recommended to the Board.

(2) The actuarial assumptions that are in effect at the time of a Member's retirement shall be those used for the purpose of pension benefit calculations.

(b) The actuarial assumptions may be revised during the five-year period between experience studies if significant plan design changes or other significant economic events occur, as advised by the actuary.

(2) Risk Measures. The following risk measures will be annually determined to provide quantifiable measurements of risk as it applies to the Retirement System.

(a) Funded ratio;

(b) Unfunded actuarial accrued liabilities – the years required to pay down the unfunded liabilities of the Retirement System based upon the current funding schedule;

(c) Total unfunded actuarial accrued liabilities as a percentage of total payroll;

(d) Total assets as a percentage of total payroll; and

(e) Total actuarial accrued liabilities as a percentage of total payroll.

(3) Risk Control

(a) The Board shall carefully monitor the risk measures identified above and shall consider steps to mitigate risk, particularly as the funded ratio increases.

IV. REVIEW AND AMENDMENT

A. Periodic Review

(1) This Actuarial Funding Policy shall be reviewed no less frequently than once every five years in conjunction with the required experience study performed by the Board's actuary, and may be reviewed at any time at the Board's discretion.

B. Amendment

(1) The Board, in consultation with its Actuary and Legal Counsel, may amend this Actuarial Funding Policy at any time as deemed necessary to address changes in the makeup, benefit structure and/or funding status of the Retirement System.

APPENDIX II

RISK COMMENTARY

Risk Commentary

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

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 due to changing conditions; 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

- **Investment Risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
- **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution amount shown on page A-2 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined amounts do not necessarily guarantee benefit security.

Risk Commentary (Concluded)

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2022	2021	2020	2019	2018
Ratio of the market value of assets to payroll	11.08	11.21	9.00	8.89	9.16
Ratio of actuarial accrued liability[!] to payroll	17.98	16.11	16.16	14.38	14.49
Ratio of actives to retirees and beneficiaries	0.58	0.58	0.63	0.69	0.69
Ratio of net cash flow to market value of assets	0.2%	-3.4%	-1.1%	-2.0%	-1.3%

[!] *Includes excess earnings reserve* .

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 10.0 times the payroll, a return on assets 5% different than assumed would equal 50% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of actives to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means benefit and expenses exceed contributions and existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.