City of Southgate Policemen and Firemen Retirement System

66th Actuarial Valuation Report
as of June 30, 2020

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GRS

January 25, 2021

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, 2020**

Dear Board Members:

The results of the June 30, 2020 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, 2022, and to determine the excess earnings reserve balance as of June 30, 2020. 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, 2020. 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 reflects the impact of COIVD-19 experience through June 30, 2020. 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 Southgate Policemen and Firemen Retirement System. Actual future experience will be reflected in each subsequent annual valuation, as experience emerges.

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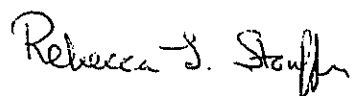
Rebecca L. Stouffer and James D. Anderson are Members of the American Academy of Actuaries (MAAA). These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

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, ASA, FCA, MAAA

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

LS/JDA:dj

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, 2021 are shown on page A-2.

City's Computed Contributions

Contributions for	% of Covered Payroll	
	For the Fiscal Year Beginning July 1,	
	2021	**2020**
Normal Cost of Benefits:		
Age and service	17.20 %	16.75 %
Death before retirement	0.43 %	0.44 %
Disability	1.12 %	1.13 %
Future refunds of member contributions	0.34 %	0.28 %
Total	19.09 %	18.60 %
Members' Contributions	8.01 %	6.57 %
City's Normal Cost	11.08 %	12.03 %
Unfunded Actuarial Accrued Liabilities (UAAL)	88.64 %	77.03 %
Total City Contribution# - %	**99.72 %**	**89.06 %**
- $	$5,324,232	$5,023,945

\#   *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.*

Actual employer contributions for the fiscal year ending June 30, 2020 were reported to be $4,998,995.

The unfunded actuarial accrued liabilities were amortized as a level percent of member payroll. For the fiscal year beginning July 1, 2021, a portion of the UAAL was amortized over a period of four years and the remaining UAAL was amortized over a period of six years.

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

Determination of Unfunded Actuarial Accrued Liability

	June 30,	
	2020	**2019**
A. Accrued Liability		
1. For retirees and beneficiaries	$56,940,385	$55,604,425
2. For vested terminated members	783,258	1,047,343
3. For present active members		
a. Value of expected future benefit payments	28,390,798	28,758,169
b. Value of future normal costs	9,638,278	9,971,479
c. Active member accrued liability: (a) - (b)	18,752,520	18,786,690
4. Total accrued liability	76,476,163	75,438,458
B. Present Assets (Funding Value)*	49,226,234	47,286,686
C. Unfunded Actuarial Accrued Liability: (A.4) - (B)	27,249,929	28,151,772
D. Funding Ratio: (B) / (A.4)	64.4%	62.7%
E. Funding Ratio: Market Value Basis	58.3%	61.7%

* Net of Excess Earnings Reserve of $240,484 for June 30, 2020, and $279,772 for June 30, 2019.

Development of Funding Value of Assets

Year Ended June 30:	2017	2018	2019	2020	2021	2022	2023
Funding Value Beginning of Year	$43,967,577	$44,843,750	$46,148,162	$47,566,458			
Market Value End of Year	43,250,895	46,782,048	46,799,259	44,862,168			
Market Value Beginning of Year	39,572,048	43,250,895	46,782,048	46,799,259			
Non-Investment Net Cash Flow	(1,556,454)	(624,967)	(951,352)	(481,403)			
Investment Income							
E1. Market Total: B - C - D	5,235,301	4,156,120	968,563	(1,455,688)			
E2. Assumed Rate of Investment Return	7.25%	7.25%	7.25%	7.25%			
E3. Amount for Immediate Recognition	3,131,228	3,228,517	3,311,255	3,431,117			
E4. Amount for Phased-In Recognition: E1-E3	2,104,073	927,603	(2,342,692)	(4,886,805)			
Phased-In Recognition of Investment Income							
F1. Current Year: 0.25 x E4	$526,018	$231,901	(585,673)	(1,221,701)	$ (1,221,701)		
F2. First Prior Year	(1,113,854)	526,018	231,901	(585,673)	(585,673)	$ (1,221,701)	
F3. Second Prior Year	(943,203)	(1,113,854)	526,018	231,901	231,900	(585,673)	$(1,221,702)
F4. Third Prior Year	832,438	(943,203)	(1,113,853)	526,019	(1,575,474)	(1,807,374)	(1,221,702)
F5. Total Recognized Investment Gain	(698,601)	(1,299,138)	(941,607)	(1,049,454)			
Funding Value End of Year							
G1. Preliminary Funding Value End of Year: (A+D+E3+F5)	44,843,750	46,148,162	47,566,458	49,466,718			
G2. Upper Corridor Limit: 120% x B	51,901,074	56,138,458	56,159,111	53,834,602			
G3. Lower Corridor Limit: 80% x B	34,600,716	37,425,638	37,439,407	35,889,734			
G4. Adjustment to Funding Value	0	0	0	0			
G5. Funding Value End of Year	44,843,750	46,148,162	47,566,458	49,466,718			
Difference between Market & Funding Value: B-G5	(1,592,855)	633,886	(767,199)	(4,604,550)			
Recognized Rate of Return	5.6 %	4.3 %	5.2 %	5.0%			
Market Rate of Return	13.5%	9.7%	2.1 %	(3.1)%			
Ratio of Funding Value to Market Value	103.7 %	98.6 %	101.6 %	110.3 %			

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.

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Derivation of Experience Gain/(Loss)
Years Ended June 30, 2020 and 2019

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:

	2019-2020	2018-2019
(1) UAAL* at start of year	$ 28,151,772	$ 27,826,819
(2) Employer normal cost from last valuation	655,673	663,159
(3) Actual employer contributions	4,998,995	4,328,200
(4) Interest accrual: [((1) + 1/2[(2) - (3)]) * 7.25%]	1,883,558	1,884,587
(5) Expected UAAL before changes: (1)+(2)-(3)+(4)	25,692,008	26,046,365
(6) Effect of Benefit Changes	101,033	75,000
(7) Excess Earnings transferred to Excess Earnings Reserve Fund	0	0
(8) Expected UAAL after changes: (5)+(6)+(7)	25,793,041	26,121,365
(9) Actual UAAL at end of year	27,249,929	28,151,772
(10) Gain/(loss): (8)-(9)	(1,456,888)	(2,030,407)
(11) Gain/(loss) as percent of actuarial accrued liabilities at start of year ($75,438,458)	(1.9)%	(2.8)%

* Unfunded Actuarial Accrued Liabilities.

Summary Statement of System Resources and Obligations for the Years Ending June 30, 2020 and 2019

Present Resources and Expected Future Resources

		2020	2019
A.	Present valuation assets		
	1. Net assets from System financial statements	$44,862,168	$46,799,259
	2. Market value adjustment	4,604,550	767,199
	3. Valuation assets	49,466,718	47,566,458
B.	Actuarial present value of expected future employer contributions		
	1. For normal costs	5,206,249	6,133,551
	2. For unfunded actuarial accrued liability	27,249,929	28,151,772
	3. Total	32,456,178	34,285,323
C.	Actuarial present value of expected future member contributions	4,432,029	3,837,928
D.	Total present and expected future resources	$86,354,925	$85,689,709

Actuarial Present Value of Expected Future Benefit Payments

		2020	2019
A.	To retirees and beneficiaries #	$57,180,869	$55,884,197
B.	To vested terminated members	783,258	1,047,343
C.	To present active members		
	1. Allocated to service rendered prior to valuation date - actuarial accrued liability	18,752,520	18,786,690
	2. Allocated to service likely to be rendered after valuation date	9,638,278	9,971,479
	3. Total	28,390,798	28,758,169
D.	Total actuarial present value of expected future pension payments	$86,354,925	$85,689,709

Includes excess earnings reserve fund.

Financing $86.4 Million of Benefit Promises
June 30, 2020

Sources of Funds

Future Contributions - $36.9

Present Assets - $49.5

Uses of Funds

To future retirees for service already rendered - $18.8

To future retirees for service yet to be rendered - $9.6

Present retirees and beneficiaries and vested terminated - $58.0
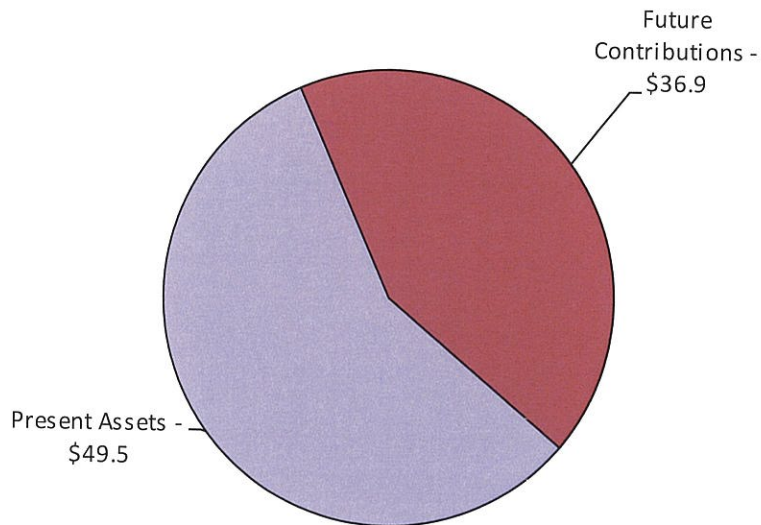
Actuarial Accrued Liabilities & Assets
Comparative Statement

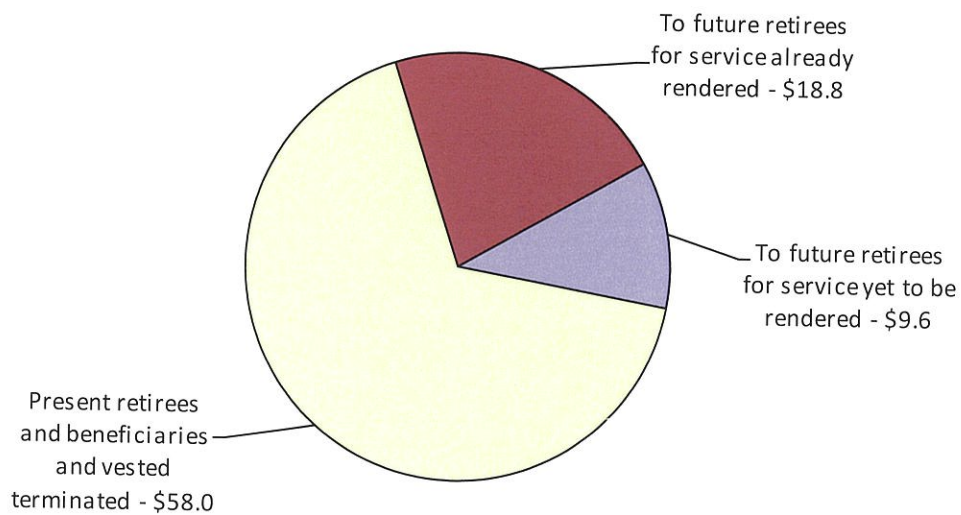| Valuation Date!	Valuation Assets	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liabilities (UAAL)	Valuation Payroll	Ratio of Valuation Assets To AAL	Amortization Years	Ratio of Valuation Assets To Valuation Payroll	Ratio of AAL To Valuation Payroll	Ratio of UAAL To Valuation Payroll
06-30-01	$ 56,377,876	$ 43,502,852	$ (12,875,024)	$ 4,692,492	129.6 %		1,201.5 %	927.1 %	-
06-30-02	55,156,131	47,533,958	(7,622,173)	4,898,127	116.0 %		1,126.1 %	970.5 %	-
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	76,716,647	27,249,929	4,984,183	64.5 %	6, 4	992.5 %	1,539.2 %	546.7 %

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

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 ~~imp~~ortant 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.

~~Am~~ortization 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 ~~rise~~ 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 ~~0~~ may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

Comparative Statement

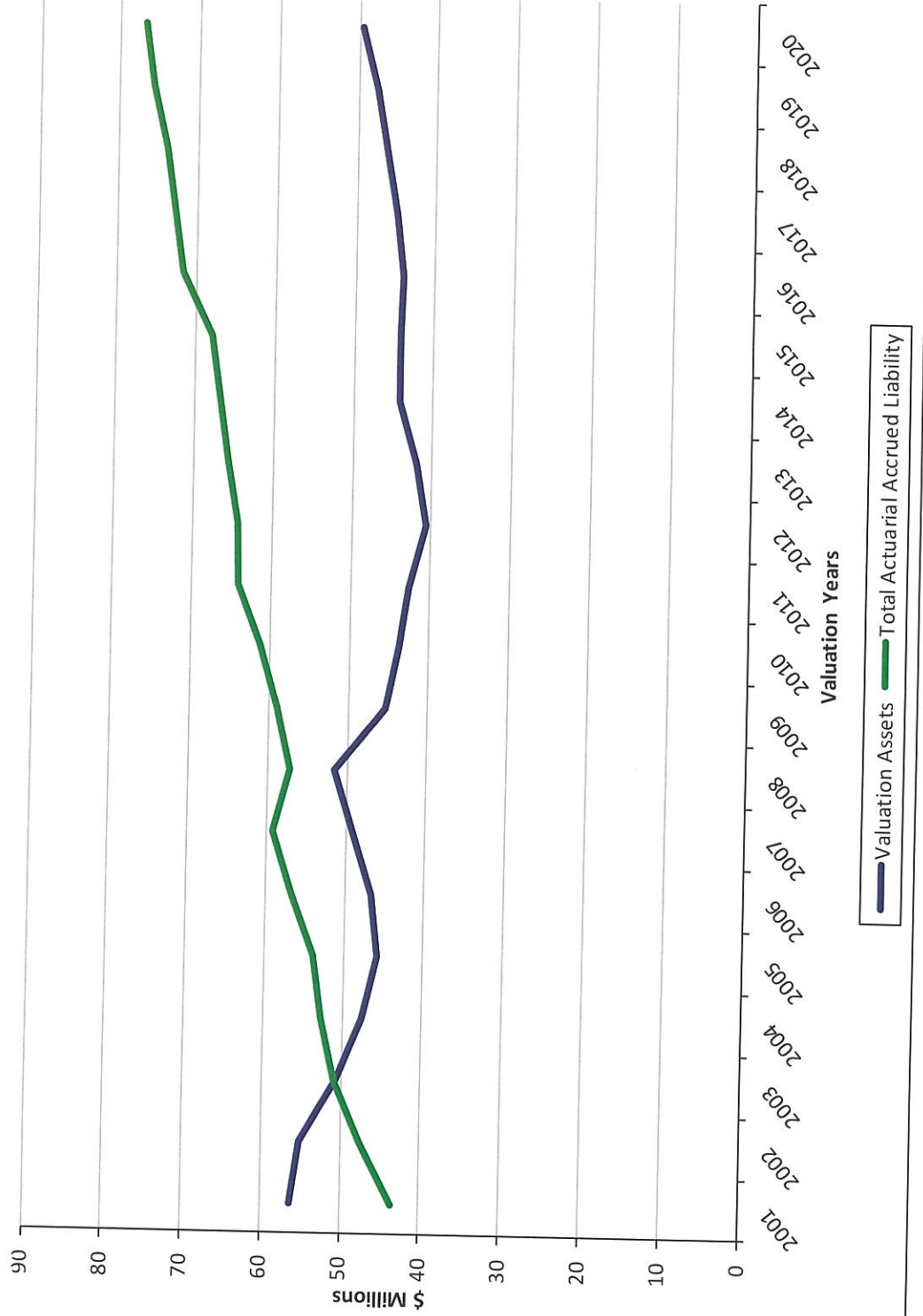| Valuation date | Active Members | | | | Retirees & Beneficiaries | | | | Employer Contributions as Payroll Percents | | |
| | No. | Valuation Payroll | | | No | Active Per Retired | Annual Pensions | | Employer Normal Cost | UAAL | Total |
		Total	Average	% Incr.			$	% of Payroll			
-01	71	$4,692,492	$66,091	(5.9)%	58	1.2	$2,090,714	44.6 %	22.3 %	(22.3)%	(0.0)%
-02	71	4,898,127	68,988	4.4 %	60	1.2	2,210,668	45.1 %	22.0 %	(14.5)%	7.5 %
-03#	64	4,490,451	70,163	1.7 %	73	0.9	3,164,793	70.5 %	21.7 %	0.3 %	22.0 %
-04*	67	5,065,923	75,611	7.8 %	75	0.9	3,170,325	62.6 %	19.1 %	10.1 %	29.2 %
-05	67	5,239,288	78,198	3.4 %	73	0.9	3,134,950	59.8 %	19.1 %	14.3 %	33.4 %
-06	64	5,281,801	82,528	5.5 %	75	0.9	3,337,483	63.2 %	19.4 %	11.8 %	31.2 %
-07	63	5,438,968	86,333	4.6 %	76	0.8	3,433,920	63.1 %	19.4 %	11.7 %	31.1 %
-08#	63	5,759,174	91,415	5.9 %	77	0.8	3,471,224	60.3 %	12.8 %	7.1 %	19.9 %
-09#	66	5,847,595	88,600	(3.1)%	76	0.9	3,521,322	60.2 %	13.2 %	16.9 %	30.1 %
-10	64	5,532,619	86,447	(2.4)%	78	0.8	3,844,141	69.5 %	13.2 %	23.2 %	36.4 %
-11	64	4,922,456	76,913	(11.0)%	86	0.7	4,445,242	90.3 %	13.0 %	33.8 %	46.8 %
-12	67	4,889,791	72,982	(5.1)%	87	0.8	4,503,892	92.1 %	13.6 %	39.0 %	52.6 %
-13	69	4,966,288	71,975	(1.4)%	88	0.8	4,594,702	92.5 %	13.7 %	40.8 %	54.5 %
-14	68	5,047,949	74,235	3.1 %	90	0.8	4,539,096	89.9 %	14.2 %	40.3 %	54.5 %
-15#	63	4,633,108	73,541	(0.9)%	95	0.7	4,878,836	105.3 %	12.4 %	50.0 %	62.4 %
-16*	64	4,745,297	74,145	0.8 %	95	0.7	4,861,054	102.4 %	13.2 %	65.1 %	78.3 %
-17	62	4,841,046	78,081	5.3 %	93	0.7	4,862,301	100.4 %	13.0 %	68.1 %	81.1 %
-18	65	5,105,443	78,545	0.6 %	94	0.7	4,950,768	97.0 %	12.6 %	70.3 %	82.9 %
-19#	68	5,266,008	77,441	(1.4)%	99	0.7	5,249,475	99.7 %	12.0 %	77.0 %	89.0 %
-20#	63	4,984,183	79,114	2.2 %	100	0.6	5,390,425	108.2 %	11.1 %	88.6 %	99.7 %

ial assumptions revised.
nent System amended.

Active Members and Retired Lives

Bar chart titled "Active Members and Retired Lives" showing Covered Person (x-axis, 0 to 120) by year (2011–2020). Series: Retirants and Beneficiaries, Active Members.

Benefits as a Percent of Active Member Payroll

Bar chart titled "Benefits as a Percent of Active Member Payroll" showing percentages by Valuation Year (2011–2020), ranging from 0.0% to 120.0%.

Assets and Accrued Liabilities

Legend: Valuation Assets — Total Actuarial Accrued Liability

X-axis: Valuation Years (2001–2020)
Y-axis: $ Millions (0–90)

Comments, Certification, and Other Observations

Comment A: The contribution increased from $5,023,945 last year to $5,324,232 this year.

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

- Member Contributions for all members (excluding Police Chief, Fire Chief, and Public Safety Director) were increased from 6.5% of covered compensation to 8.0% of covered compensation.

Comment C: System experience for the year ended June 30, 2020 was less favorable than assumed, resulting in an overall loss of $1,456,888. The experience loss was primarily due to unfavorable investment performance.

Comment D: An excess earnings reserve fund was established in 1996. The reserve balance as of June 30, 2020 is $240,484. See Appendix I page 2 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 $27.2 million, and the funded ratio is 64.4% (58.3% on a market value basis). At the time of the last valuation, the funded ratio was 62.7%.

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, 2020 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 $18,941,437 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, 2020 for purposes of this valuation.

Comments, Certification, and Other Observations

Michigan Public Act 202: Under Public Act 202 of the State of Michigan, Michigan municipalities are be 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 fiscal year 2021, include the following:

- Investment return no higher than 7.0%;
- Assumed wage inflation no lower than 3.0%*;
- Mortality assumption that uses a version of Pub-2010 with generational mortality improvement using scale MP-2019*; and
- Amortization period no longer than 18 years 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 separately.

Per Section III. F.(1)(a) of the Actuarial Funding Policy (a copy is attached in Appendix I), and in accordance with Public Act 202, a review of Plan experience should be performed at least once every five years. The most recent review of system experience covered the period of July 1, 2009 through June 30, 2014. A review of Plan experience covering the period July 1, 2014 through June 30, 2019 is presently underway.

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 $6,300,000 (instead of $5,324,232), and the funded status would have been about 58.3% (instead of 64.4%).

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 7.25% 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 6 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, 2020 is shown on page A-3.

SECTION B

VALUATION DATA

Brief Summary of Act 345 Benefit Provisions as of June 30, 2020

Service Retirement

Eligibility: All groups: Age 50 with 25 or more years of service or age 60 regardless 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 All Others	10.0% of covered compensation. 8.0% of covered compensation.
FAC Period	
All	Average of the highest 3 years of annual compensation during the 10 years immediately preceding retirement.

Brief Summary of Act 345 Benefit Provisions as of June 30, 2020

Includable Compensation

IAFF Local 1307

- FAC for Command Officers promoted to command on or before 7/1/2006 shall be based upon all compensation received during the employees FAC period, to include any payment received for sick, vacation, or bonus vacation days.
- For employees promoted to command after 7/1/2006, ½ sick with a maximum cap 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 shall be based upon all compensation received during the employees FAC period, to include any payment received for sick, vacation, or bonus vacation days. In addition, the dollar value of any compensatory time earned during the officer's FAC period shall be factored in.
- For employees promoted prior to 7/1/2006 the FAC shall include all of the items above up to a maximum of 1600 sick hours.
- For employees hired after 7/1/2007 FAC will not include any sick time payout.

Police Patrol

- For employees hired after 1/1/1981, 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 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).

Group	Benefit Formula				Maximum Annual Benefit After Annuity Withdrawal[3,4]	Comment
	Multiplier x Service			Multiplier x Service		
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	-
Current Public Safety Director	2.69%	first 25	+	1.00% over 25	$89,447	-

...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.

...members promoted to COA on or after 7/1/06 will maintain their current benefits unless the COA agreement provides less.

...able as straight life annuity.

...nuity withdrawal is not offered to members hired after 7/1/18.

GRS

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			
06-30-01	2	$ 75,688	1	$ 17,838	58	$ 2,090,714	44.6%	$36,047	$ 22,451,152
06-30-02#	2	119,954			60	2,210,668	45.1%	36,844	23,501,605
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	56,940,385

@ Revised actuarial assumptions and/or benefit provisions.

+ Excludes excess earnings reserves.

Does not include window retirees.

^ Includes members electing to enter one year Trust.

Retirees and Beneficiaries as of June 30, 2020
Tabulated by Type of Pension Being Paid

Type of Pension Being Paid	No.	Annual Pensions
Age and Service Pensions		
Regular Pension - terminating at death of retirant*	21	$ 865,791
Regular Pension - automatic 60% spouse benefit	58	3,969,083
Survivor Benefit	7	180,358
Total Age and Service Pensions	86	5,015,232
Casualty Pensions		
Duty Disability Pensions	11	293,444
Duty Death	1	22,932
Non-Duty Death	2	58,817
Total Casualty Pensions	14	375,193
Total Pensions Being Paid	100	$5,390,425

* *Includes EDRO Alternate Payees.*

On the valuation date, there are three vested former members, ages 43, 51, and 51, with total estimated annual benefits of $102,614.

Retirees and Beneficiaries June 30, 2020
Tabulated by Attained Age

Attained Age	No.	Annual Pensions
40-44	1	$ 7,743
45-49	1	51,074
50-54	11	638,038
55-59	13	827,076
60-64	16	1,143,292
65-69	14	837,170
70-74	15	762,926
75-79	17	671,185
80-84	8	325,584
85-89	1	36,194
90-94	3	90,143
Totals	100	$5,390,425

Average Age at Retirement: 51.3 years
Average Age Now: 67.9 years

Active Members - Comparative Statement

Valuation Date	Active Members	Valuation Payroll	Average Age	Average Service	Average Pay	% Inc.
06-30-01	71	$4,692,492	39.4	12.7	$66,091	(5.9)%
06-30-02	71	4,898,127	39.8	12.9	68,988	4.4 %
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 %

Active Members Added to and Removed from Rolls

Valuation Date	Number Added During Year A	Number Added During Year E	Normal Retirement A	Normal Retirement E	Disability Retirement A	Disability Retirement E	Died-In-Service A	Died-In-Service E	Withdrawals Vested A	Withdrawals Other A	Withdrawals Total A	Withdrawals Total E	Active Members End of Year
6-30-16	3	2	1	0.8	0	0.1	1	0.1	0	0	0	0.8	64
6-30-17	1	3	1	0.4	0	0.1	0	0.0	0	2	2	0.9	62
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
5-Year Totals	20	20	9	2.3	1	0.5	2	0.3	1	7	8	5.4	

A = Actual
E = Expected

Active Members as of June 30, 2020
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	1							1	$ 53,663
25-29	7	2						9	540,945
30-34	5	7	3					15	1,018,374
35-39		7	1	2				10	779,294
40-44	2		1	2	3			8	673,319
45-49			1	4	9	2		16	1,545,437
50-54				2	1	1		4	373,151
Total	15	16	6	10	13	3		63	$ 4,984,183

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

Age:	38.1	years
Service:	12.4	years
Annual Pay:	$79,114	

Summary of Current Asset Information

Balance Sheet

Current Assets		Reserve for	
Cash & Equivalents	$ 1,930,723	Employees' Contributions	$ 6,622,736
Receivables & Accruals	728,948	Employer Contributions	0
Investments	41,746,598	Retired Benefit Payments	37,998,948
Miscellaneous Assets	455,899	Excess Earnings	240,484
Total Current Assets	$44,862,168	Total Reported Reserves	$44,862,168
Market Adjustment	4,604,550	Market Adjustment	4,604,550
Total Valuation Assets	$49,466,718	Total Valuation Reserves	$49,466,718

Revenues and Expenditures

	2019-2020	2018-2019
Valuation Assets - July 1	$47,566,458	$46,148,162
Revenues		
Employees' Contributions	368,454	369,558
Employer Contributions	4,998,995	4,328,200
Recognized Investment Income	2,635,475	2,699,799
Expenditures		
Benefit Payments and Refund of Member Contributions	5,848,852	5,649,110
Investment Expense	253,812	330,151
Valuation Assets - June 30	$49,466,718	$47,566,458

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.
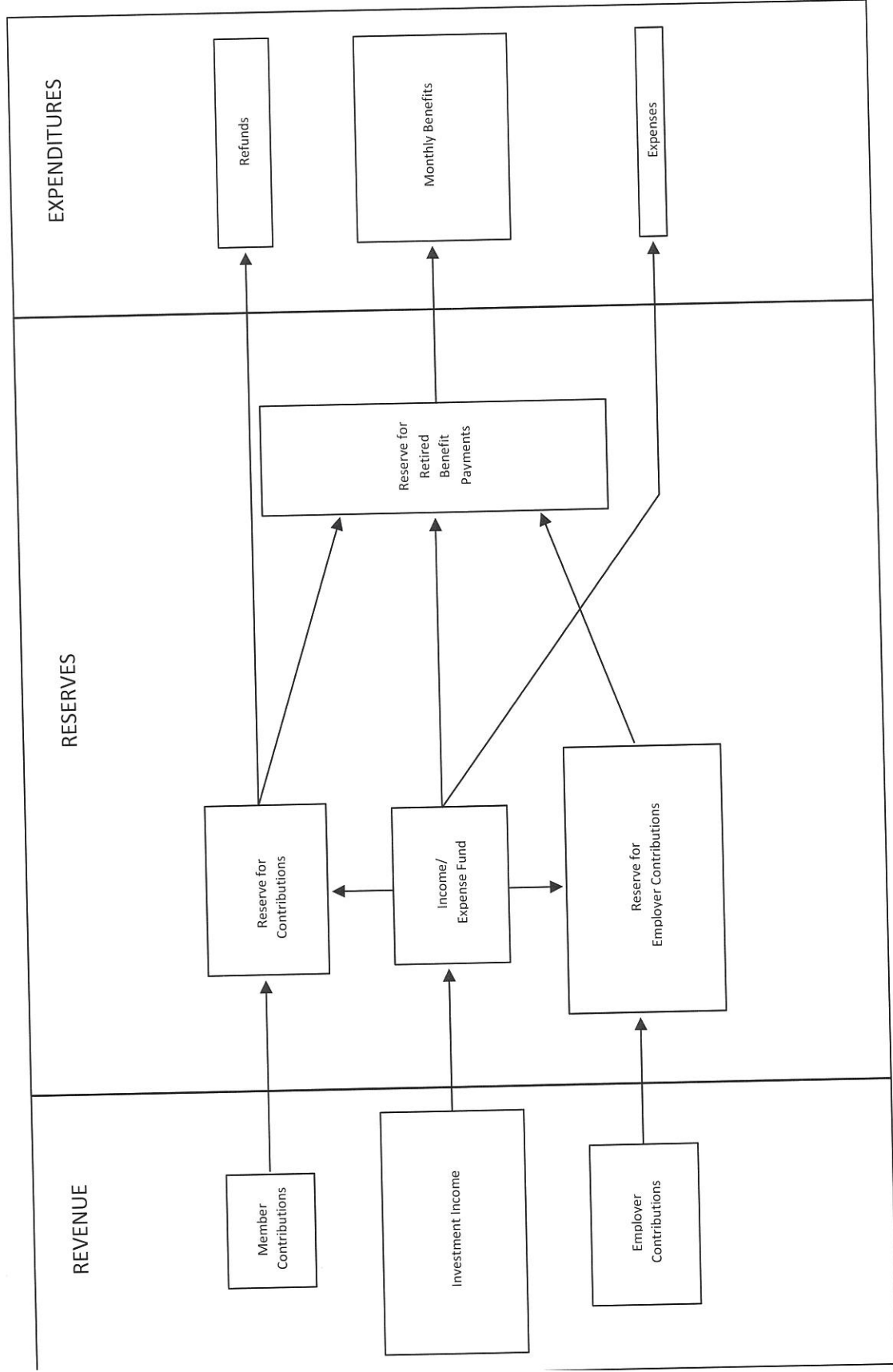
The chart contains the following labels:

- **% of Active Employee Pays** (y-axis)
- **Pay-as-you-go Contributions**
- **Investment Income**
- **Level Contributions**
- **Cash Benefits**
- **Contributions Employer & Employee Combined**
- **Start**
- **50 ±**
- **Years of Time** (x-axis)
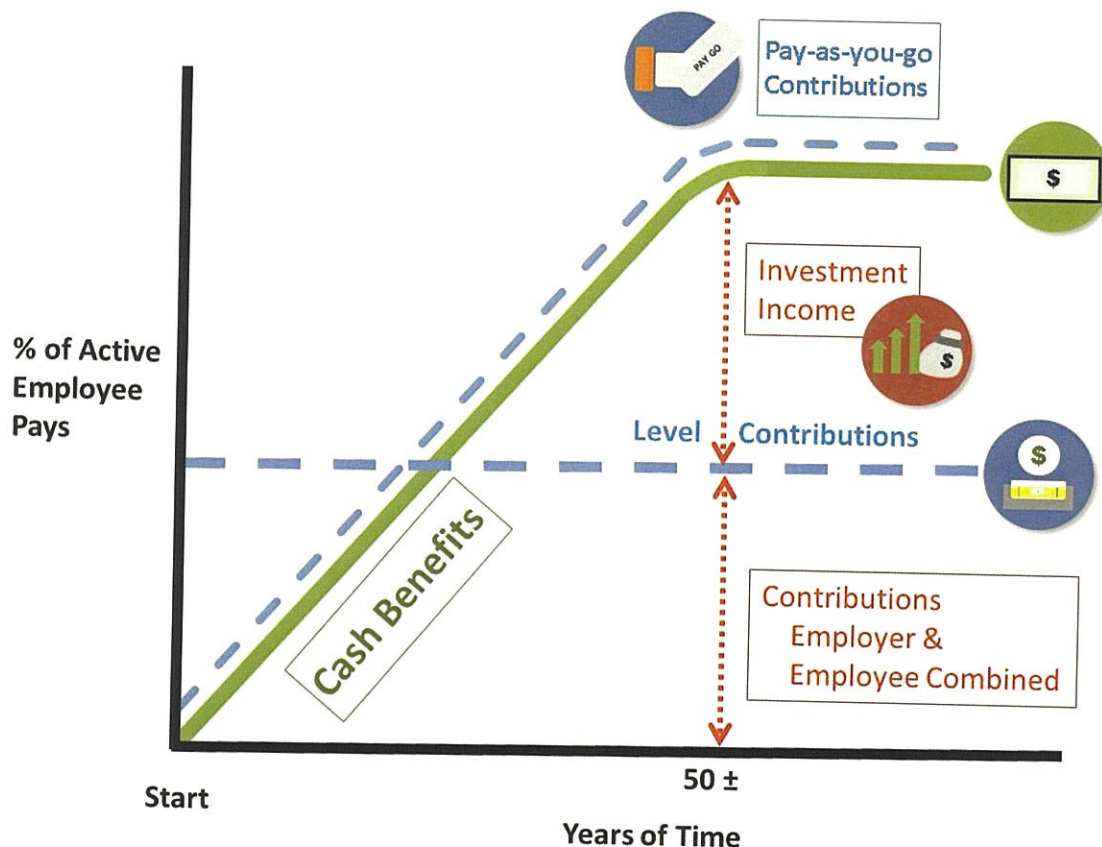
CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

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

REVENUE

RESERVES

EXPENDITURES

Member Contributions

Investment Income

Employer Contributions

Reserve for Contributions

Income/ Expense Fund

Reserve for Employer Contributions

Reserve for Retired Benefit Payments

Refunds

Monthly Benefits

Expenses

Valuation Methods

The assumptions and methods are based on an experience study dated September 9, 2016 adopted by the Board on October 20, 2016.

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. (1) and (3), a portion of the UAAL was financed over a period of four years, and the remaining UAAL over a period of six 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. 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%	3.5%	6.4%
25	2.3%	3.5%	5.8%
30	2.0%	3.5%	5.5%
35	1.8%	3.5%	5.3%
40	1.6%	3.5%	5.1%
45	1.3%	3.5%	4.8%
50	0.9%	3.5%	4.4%
55	0.5%	3.5%	4.0%
60	0.1%	3.5%	3.6%
Ref:	458		

If the number of active members remains constant, then the total active member payroll will increase 3.5% annually, the base portion of the individual salary increase assumptions.

The rate of investment is compounded annually net of expenses.

Investment Return	7.25%
Wage Inflation	3.50%
Price Inflation	2.75%
Spread Between Investment Return and Wage Inflation	3.75%
Spread Between Investment Return and Price Inflation	4.50%

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 Average
	2020	2019	2018	2017	2016	
1) Nominal rate of return*	5.0 %	5.2 %	4.3 %	5.6 %	4.6 %	5.0 %
2) Increase in CPI (6/30)	0.6 %	1.6 %	2.9 %	1.6 %	1.0 %	1.6 %
3) Average salary increase	2.2 %	(1.4)%	0.6 %	5.3 %	0.8 %	1.5 %
4) Spread between recognized investment return and:						
CPI						3.4 %
Average salary increase						3.5 %

* 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 RP-2014 tables, as extended, and include a margin for future mortality improvements projected using a fully generational improvement scale. The tables used were as follows:

Post-Retirement Mortality: The RP-2014 Healthy Annuitant Generational Mortality Tables, with blue collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 is utilized with future mortality improvements assumed each year using scale MP-2015.

Pre-Retirement Mortality: RP-2014 Employee Generational Mortality Tables, with blue collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 is utilized with future mortality improvements assumed each year using scale MP-2015.

Post-Retirement Disabled Mortality: The RP-2014 Disabled Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 is utilized with future mortality improvements assumed each year using scale MP-2015.

These tables were first used for the June 30, 2016 valuation.

Future Life Expectancy (Years)* at Sample Ages						
Sample Age	Healthy Pre-Retirement^		Healthy Post-Retirement		Disabled Retirement	
	Men	Women	Men	Women	Men	Women
45	40.98	46.14	39.38	42.43	29.37	34.28
50	35.75	40.92	34.35	37.33	25.78	30.10
55	30.67	35.80	29.50	32.39	22.44	26.22
60	25.80	30.79	24.91	27.63	19.30	22.57
65	21.24	25.87	20.54	23.04	16.26	18.95
70	17.03	21.09	16.47	18.67	13.31	15.42
75	13.19	16.53	12.76	14.64	10.55	12.17
80	9.76	12.24	9.53	11.07	8.08	9.37
Ref:	2308	2309	2310	2311	2137	2138
Multiplier:	1.00	1.00	1.00	1.00	1.00	1.00
Setback:	0	0	0	0	0	0
Base Year:	2006	2006	2006	2006	2006	2006
MP Scale:	919	920	919	920	919	920

* Based on retirements in 2020. 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)

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

Retirement Ages	Percent
50	50%
51	35%
52	30%
53	25%
54	25%
55	25%
56	25%
57	20%
58	20%
59	30%
60	100%
Ref.	557

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

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

Valuation Assumptions (Concluded)

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, 2020

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 7.25% interest and the RP-2014 Healthy Annuitant Mortality Table, with blue collar adjustments and extended via cubic spline with a 100% Unisex Blend. A base year of 2006 is utilized. Future improvements are projected to 2017 with scale MP-2015. The assumptions are effective for retirements after January 1, 2017.

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 actuarial equivalent interest rate for annuity withdrawal was assumed to be 3.0% 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	Period	Unfunded Actuarial Accrued Liability (UAAL) (Beg. of Year)	Funded Ratio (Beg. of Year)	UAAL Payment %	UAAL Payment $	Interest	UAAL (End of Year)
June 30, 2020		$ 27,249,929	64.4%				
July 1, 2021	6, 4	25,109,491	67.6%	88.64%	$ 4,732,903	$ 1,650,872	$ 22,027,460
July 1, 2022	5, 3	22,027,460	72.0%	88.64%	4,898,554	1,421,490	18,550,395
July 1, 2023	4, 2	18,550,395	76.7%	88.64%	5,070,004	1,163,260	14,643,651
July 1, 2024	3, 1	14,643,651	81.8%	88.64%	5,247,454	873,663	10,269,860
July 1, 2025	2	10,269,860	87.4%	88.32%	5,411,333	550,692	5,409,219
July 1, 2026	1	5,409,219	93.4%	88.32%	5,600,730	191,510	0
July 1, 2027	0	0	100.0%	0.00%	-	0	(0)

UAAL at June 30, 2020 adjusted to July 1, 2021 with payments expected to be made between the valuation date and July 1, 2021. Payment based on 7.25% interest and 3.5% wage base over 6 (4 for a portion) years beginning on the Fiscal Year starting July 1, 2021.

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 7/1/2019	$279,772
2) 2019 Transfer Amount	0
3) 2019/2020 Scheduled Distribution	45,216
4) 2019/2020 Distribution not made as a result of death*	5,928
5) Balance as of 7/1/2020: (1)+(2)-(3)+(4)	**240,484**
6) 2020 Maximum Transfer Amount	0
7) 2020/2021 Scheduled Distribution	29,100
8) Balance Available for Distribution as of 7/1/2021: (5)+(6)-(7)	**$211,384**

* Includes an adjustment to the 2018/2019 distribution as a result of a reported data correction.

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 (7.25%) multiplied by the actuarial present value of pensions being paid to retired members and beneficiaries. The calculation of the 2020 maximum transfer amount is detailed below:

Development of Maximum Transfer Amount	
a) Rate of return on Actuarial Value of Assets	5.03%
b) Assumed rate of return on Actuarial Value of Assets	7.25%
c) Excess rate of return: maximum ((a)-(b), 0%)	0.00%
d) Present Value of pensions for retired members and beneficiaries	$56,940,385
e) 2020 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 7/1/2021 includes both expected payouts and expected transfers for the 12-month period following June 30, 2020.

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, 2020, 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	Fiscal Year Ending June 30,	Projected Benefit Payment	Fiscal Year Ending June 30,	Projected Benefit Payment
2021	$5,421,374	2054	$5,973,250	2087	$875,406
2022	5,529,763	2055	5,804,692	2088	779,458
2023	5,560,786	2056	5,643,310	2089	688,820
2024	5,696,699	2057	5,440,628	2090	603,861
2025	5,903,776	2058	5,258,450	2091	524,869
2026	6,034,170	2059	5,077,311	2092	452,008
2027	6,154,760	2060	4,896,658	2093	385,407
2028	6,298,532	2061	4,716,237	2094	325,146
2029	6,389,424	2062	4,536,905	2095	271,219
2030	6,480,664	2063	4,358,865	2096	223,494
2031	6,549,758	2064	4,182,291	2097	181,750
2032	6,595,081	2065	4,007,357	2098	145,730
2033	6,592,353	2066	3,834,182	2099	115,119
2034	6,591,387	2067	3,662,856	2100	89,504
2035	6,570,639	2068	3,493,549	2101	68,399
2036	6,549,030	2069	3,326,460	2102	51,313
2037	6,910,032	2070	3,161,751	2103	37,765
2038	7,031,343	2071	2,999,512	2104	27,244
2039	6,980,699	2072	2,839,823	2105	19,236
2040	7,056,466	2073	2,682,814	2106	13,271
2041	7,081,255	2074	2,528,691	2107	8,944
2042	7,019,120	2075	2,377,695	2108	5,885
2043	7,027,732	2076	2,230,030	2109	3,776
2044	6,913,577	2077	2,085,905	2110	2,360
2045	6,899,687	2078	1,945,556	2111	1,434
2046	7,171,750	2079	1,809,242	2112	847
2047	7,021,214	2080	1,677,172	2113	490
2048	6,886,386	2081	1,549,451	2114	275
2049	6,752,267	2082	1,426,063	2115	149
2050	6,648,867	2083	1,306,999	2116	76
2051	6,503,513	2084	1,192,281	2117	39
2052	6,324,624	2085	1,082,009	2118	19
2053	6,156,772	2086	976,332	2119	9
				2120	3

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:

	2020	2019	2018
Ratio of the market value of assets to payroll	9.00	8.89	9.16
Ratio of actuarial accrued liability[!] to payroll	15.39	14.38	14.49
Ratio of actives to retirees and beneficiaries	0.63	0.69	0.69
Ratio of net cash flow to market value of assets	-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 active 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

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