

# City of Southfield Fire and Police Retirement System

66th Actuarial Valuation Report  
As of June 30, 2018



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December 4, 2018

Retirement Board  
City of Southfield  
Fire and Police Retirement System  
Southfield, Michigan

Dear Board Members:

The results of the **June 30, 2018** Annual Actuarial Valuation of the City of Southfield Fire and Police 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 Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purpose of the valuation is to measure the System's funding progress and to determine the employer contribution rate for the fiscal year ending June 30, 2020. A separate report will be issued to provide actuarial information for GASB Statements No. 67 and No. 68.

The valuation was based upon information furnished by the City, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal 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 City.

This valuation assumes the continuing ability of the participating employer to make the contributions necessary to fund this system. A determination regarding whether or not the participating employer is actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

This report includes risk metrics in Appendix 2, 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 the assignment.

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. Additional information about the actuarial assumptions is included in Section C of this report.

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 Southfield Fire and Police Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

James R. Sparks and Jeffrey T. Tebeau are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,



James R. Sparks, ASA, MAAA



Jeffrey T. Tebeau, FSA, EA, MAAA

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## **SECTION A**

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### **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 approximately level from year-to-year and will accumulate sufficient assets during each member's period of active service to finance benefits payable throughout retirement.*

## 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, 2019 are shown on page A-2.

## Public Act 728 Certification

The Board of Trustees of the City of Southfield Fire and Police Retirement System confirms that the System provides for payment of the required employer contribution as described in Section 20m of Michigan Public Act No. 728.

# Contributions to Provide Benefits Fiscal Year Beginning July 1, 2019

Contributions for	Contributions Expressed as %’s of Active Member Payroll
<i>Normal Cost of Benefits:</i>	
Age & service	16.91%
Disability	1.55
Death before retirement	0.39
Refunds of member contributions	0.11
Expenses	2.00
Total	20.96
<i>Member Contributions (weighted avg.)</i>	2.78
<i>Employer Normal Cost</i>	18.18
<i>Unfunded Actuarial Accrued Liabilities*</i>	18.18
<b>Computed Employer Rate</b>	<b>36.36%</b>
Minimum Dollar Contribution	\$7,208,026

\* *Unfunded Actuarial Accrued Liabilities were amortized as a level percent-of-payroll over a closed period of 28 years (starting period of 30 years). Includes the effects of the lag between the valuation date and the contribution period.*

## Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars and then contributed to the Retirement System. The established procedure is to contribute bi-weekly, as follows:

- (a) Bi-weekly covered payroll for all active members.
- (b) Employer contribution rate.
- (c) Gross contribution dollars: (a) x (b).

The projected employer dollar contribution based on the payroll information provided for the valuation, adjusted to reflect assumed payroll increases between the valuation date and the fiscal year for which the contributions are being determined, is \$7,208,026. **Therefore, we suggest a minimum contribution of this amount. Please see comment on page A-10.**

**In financing the actuarial accrued liabilities**, the assets of \$204,417,422 were distributed as shown below. Please see pages B-13 and B-14 for information concerning the development of valuation assets.

Reserves for	Present Valuation Assets Applied to			Totals
	Member Accrued Liabilities	Retired Life Liabilities	Contingency Reserve	
Employees' Contributions	\$ 8,789,420	\$ -	\$0	\$ 8,789,420
Employer Contributions	22,906,332	0	0	22,906,332
Retired Benefit Payments	<u>0</u>	<u>170,986,378</u>	<u>0</u>	<u>170,986,378</u>
Pension Total	\$ 31,695,752	\$ 170,986,378	\$0	\$ 202,682,130
Retiree Health Insurance Fund				0
Reserves for Inflation Equity				<u>1,735,292</u>
Grand Total				\$ 204,417,422

Pension Assets were applied against actuarial accrued liabilities in determining Unfunded Actuarial Accrued Liabilities as follows:

	Retired Lives	Active Members*	Totals
Computed Actuarial Accrued Liabilities	\$ 170,986,378	\$ 90,637,273	\$261,623,651
Applied Assets	<u>170,986,378</u>	<u>31,695,752</u>	<u>202,682,130</u>
Unfunded Actuarial Accrued Liabilities	\$ none	\$ 58,941,521	\$ 58,941,521

\* Includes terminated members who are vested.



## Derivation of Experience Gain (Loss) Year Ended June 30, 2018

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is hoped that gains and losses will 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, along with a year-by-year comparative schedule.

(1)	UAAL* at start of year	\$ 56,378,462
(2)	Total normal cost from last valuation	3,905,095
(3)	Actual employer and employee contributions	7,091,697
(4)	Interest Accrual: $[(1) + ((2) - (3)) / 2] \times 7.50\%$	4,108,887
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	57,300,747
(6)	Change due to benefit changes	(359,628)
(7)	Change due to revised actuarial assumptions / methods	0
(8)	Expected UAAL after changes: (5) + (6) + (7)	56,941,119
(9)	Actual UAAL at end of year	58,941,521
(10)	Gain (Loss): (8) - (9)	\$ (2,000,402)
(11)	Gain (Loss) as percent of actuarial accrued liabilities at start of year (\$256,052,447)	(0.8)%

\* *Unfunded Actuarial Accrued Liabilities.*

Valuation Date June 30,	Experience Gain (Loss) as % of Beginning Accrued Liability
2014	2.6 %
2015	(1.5)%
2016	(2.4)%
2017	(1.2)%
2018	(0.8)%

# Summary Statement of System Resources and Obligations Pension Only as of June 30, 2018

## Present Resources and Expected Future Resources

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A. <i>Present valuation assets:</i>	
1. Market value of assets	\$ 198,048,590
2. Reserve for inflation equity	1,735,292
3. Actuarial adjustment	<u>4,633,540</u>
4. Valuation assets	204,417,422
B. <i>Actuarial present value of expected future contributions:</i>	
1. For normal costs	26,513,378
2. For unfunded actuarial accrued liability	<u>58,941,521</u>
3. Total	85,454,899
C. <b>Total Present and Expected Future Resources</b>	<u><u>\$ 289,872,321</u></u>

## Actuarial Present Value of Expected Future Benefit Payments

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A. <i>To retirees and beneficiaries:</i>	
1. Current benefits	\$ 170,986,378
2. Reserve for inflation equity	<u>1,735,292</u>
3. Total	172,721,670
B. <i>To vested terminated members</i>	309,507
C. <i>To present active members:</i>	
1. Allocated to service rendered prior to valuation date - actuarial accrued liability	90,327,766
2. Allocated to service likely to be rendered after valuation date	<u>26,513,378</u>
3. Total	116,841,144
D. <b>Total Actuarial Present Value of Expected Future Benefit Payments</b>	<u><u>\$ 289,872,321</u></u>

## Computed Employer Contributions Comparative Statement

Valuation Date	Active Members					Retirees and Beneficiaries			Fiscal Year Beginning	Employer Contributions as Payroll Percents		
	No.	Active Per Retired	Valuation Payroll			No.	Annual Benefits			Pension	Health	Total
June 30	No.	Retired	\$ Millions	Average	% Incr.	No.	\$ Millions	% of Pay	July 1	Pension	Health	Total
1999 #	263	1.5	\$ 16.9	\$64,603	3.3%	173	\$ 5.7	32.7%	2000	12.85%	8.24%	21.09%
2000 *#	262	1.4	17.9	68,153	5.5	189	7.0	39.2	2001	13.86	8.56	22.42
2001	261	1.3	18.4	70,360	3.2	197	7.3	39.6	2002	14.20	8.63	22.83
2002	262	1.3	19.1	72,961	3.7	198	7.2	37.7	2003	15.39	N/A	15.39
2003 *#	259	1.3	19.6	75,556	3.6	204	7.5	38.3	2004	17.55	N/A	17.55
2004 *#	263	1.3	20.4	77,698	2.8	209	7.6	37.2	2005	17.57	N/A	17.57
2005 *#	257	1.1	19.6	76,107	(2.0)	233	8.8	44.7	2006	16.55	N/A	16.55
2006	253	1.0	19.8	78,366	3.0	247	9.3	47.0	2007	16.30	N/A	16.30
2007	256	1.0	20.1	78,705	0.4	252	9.5	47.2	2008	13.54	N/A	13.54
2008	253	1.0	21.2	83,623	6.2	257	9.7	45.9	2009	13.32	N/A	13.32
2009	250	0.9	20.9	83,669	0.1	264	10.2	48.9	2010	15.94	N/A	15.94
2010	245	0.9	20.7	84,416	0.9	276	10.8	52.1	2011	20.95	N/A	20.95
2011 *#	235	0.8	19.7	83,733	(0.8)	287	11.3	57.2	2012	26.68	N/A	26.68
2012 *	225	0.8	19.0	84,270	0.6	295	11.7	61.5	2013	30.41	N/A	30.41
2013 *#	222	0.7	18.8	84,772	0.6	301	11.9	63.4	2014	31.68	N/A	31.68
2014 *#	214	0.7	18.5	86,227	1.7	308	12.4	67.0	2015	29.28	N/A	29.28
2015	211	0.7	18.6	88,200	2.3	318	13.0	69.6	2016	30.99	N/A	30.99
2016 *	207	0.6	18.7	90,538	2.7	329	13.5	72.1	2017	35.40	N/A	35.40
2017	199	0.6	18.2	91,481	1.0	350	14.6	80.2	2018	37.45	N/A	37.45
2018 #	205	0.6	18.6	90,711	(0.8)	363	15.1	81.5	2019	36.36	N/A	36.36

\* Revised actuarial assumptions or methods.

# Retirement System amended.

# Actuarial Accrued Liabilities and Valuation Assets Comparative Statement

Valuation Date June 30	Actuarial Accrued Liability (AAL) (\$ Millions)	Valuation Assets (\$ Millions)	Unfunded Actuarial Liability (UAAL) (\$ Millions)	Ratio of Present Assets to AAL	Ratio of UAAL to Valuation Payroll
1999 #	\$ 128.0	\$ 175.9	\$ (47.9)	137.4%	- %
2000 *#	141.4	184.4	(43.0)	130.4	-
2001	146.4	186.6	(40.2)	127.5	-
2002	150.8	183.6	(32.8)	121.8	-
2003 *#	164.3	177.3	(13.0)	107.9	-
2004 *#	170.2	177.4	(7.2)	104.2	-
2005 *#	172.3	178.0	(5.7)	103.3	-
2006	178.2	184.0	(5.8)	103.3	-
2007	183.7	197.0	(13.3)	107.2	-
2008	194.2	208.8	(14.6)	107.5	-
2009	195.5	202.6	(7.1)	103.6	-
2010	200.1	192.2	7.9	96.1	38.2
2011 *#	206.4	183.0	23.4	88.7	118.9
2012 *	211.8	174.2	37.6	82.3	198.2
2013 *#	220.7	181.3	39.4	82.2	209.1
2014 *#	225.2	192.7	32.5	85.6	176.0
2015	231.6	195.9	35.7	84.6	191.7
2016 *	248.0	195.6	52.4	78.9	279.6
2017	256.1	199.7	56.4	78.0	309.7
2018 #	261.6	202.7	58.9	77.5	317.0

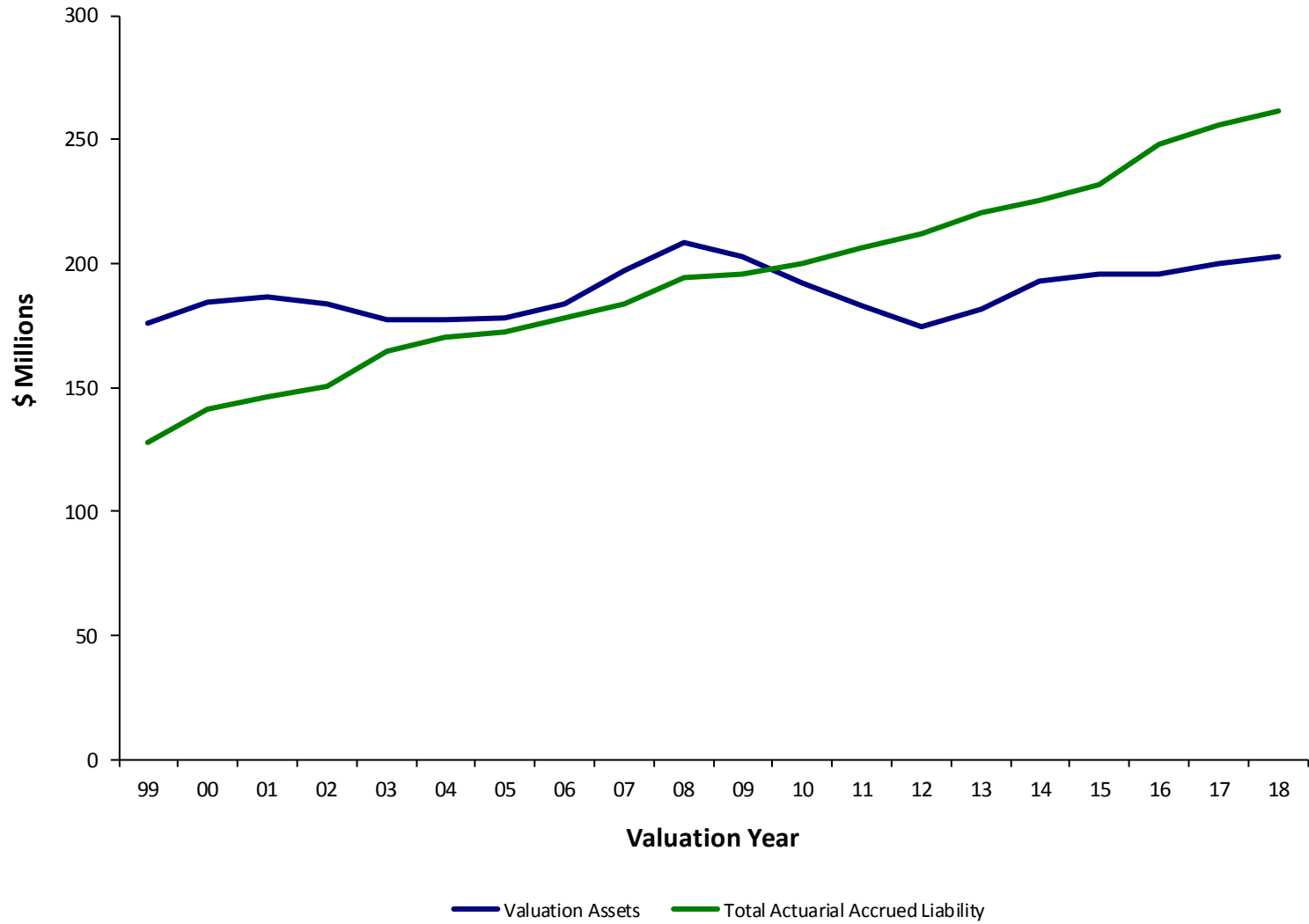
\* Revised actuarial assumptions or methods.

# Retirement System amended.

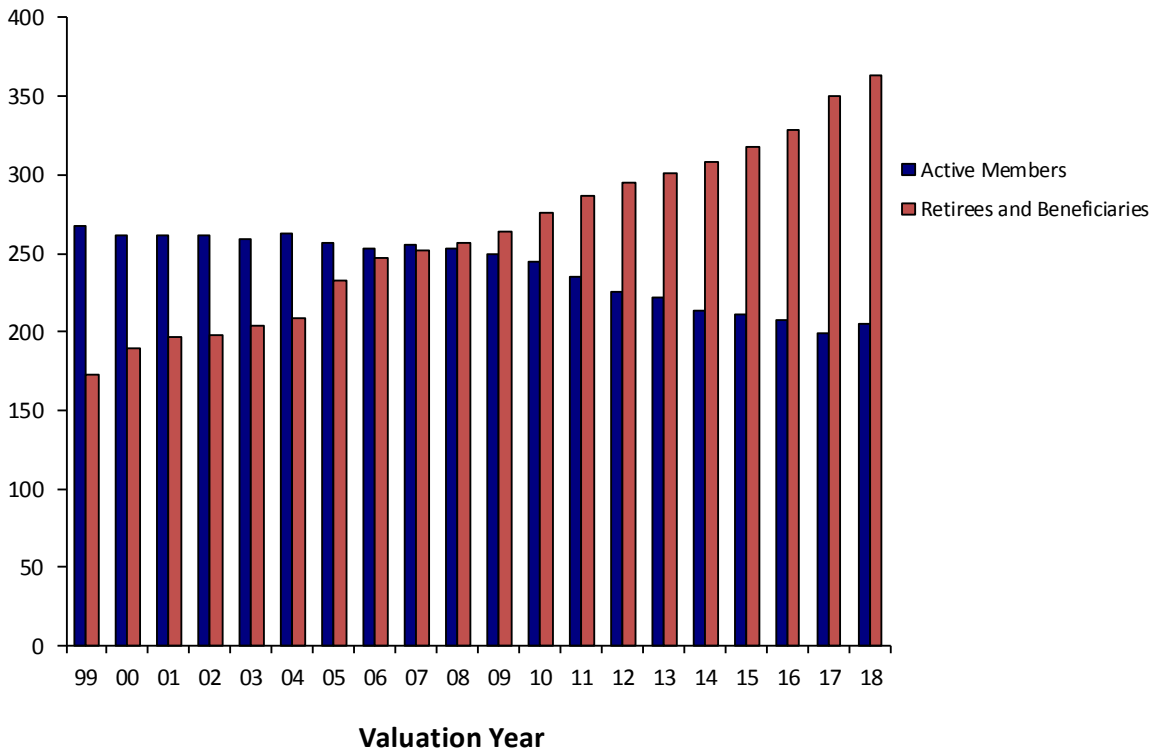
**The Ratio of Valuation Assets to AAL** is a traditional measure of a System's funding progress. Except in years when the system is amended or actuarial assumptions are revised, this ratio can be expected to gradually trend toward 100%.

**The Ratio of UAAL to Valuation Payroll** is another relative index of condition. Unfunded actuarial accrued liabilities represent debt, while active member payroll represents the System's capacity to collect contributions to pay toward debt. The lower the ratio, the greater the financial strength - and vice-versa.

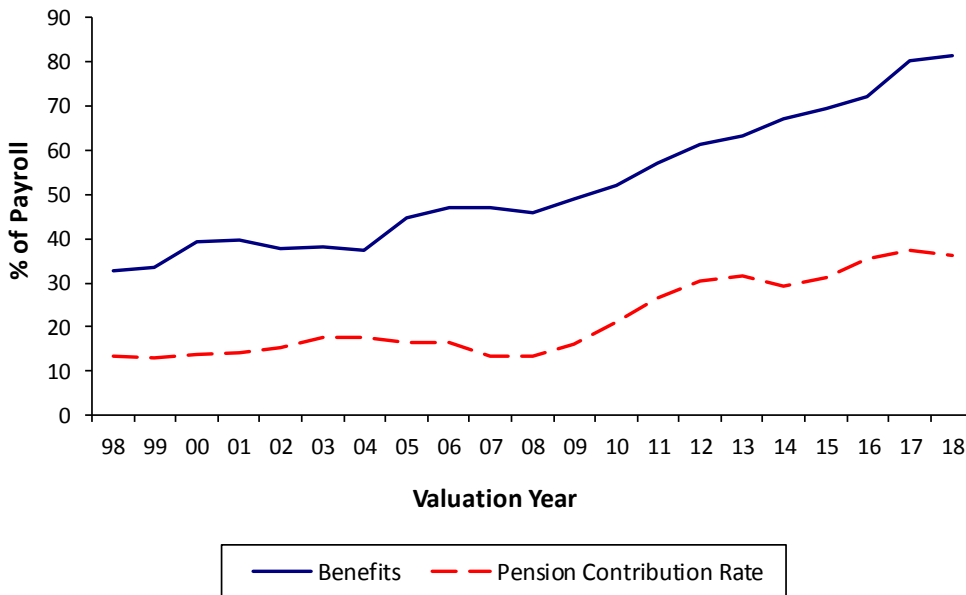
## Assets and Accrued Liabilities



## Active and Retired Members



## Benefits and Pension Contribution Rates as a Percent-of-Payroll



# Comments

## Status

The Retirement System is 77.5% funded based on the Funding Value of assets and 75.7% funded based on the Market Value of assets. The ratio has decreased slightly on a funding value of assets basis and market value of assets basis since the 2017 valuation.

## Retirement System Experience

Overall, fund experience was less favorable than assumed during the year ending June 30, 2018, producing a total experience loss of approximately \$2.0 million. The \$2.0 million total loss was comprised of a \$1.4 million loss attributed to member experience during the year (members retiring, salary increases, mortality experience, etc.). The primary sources of the member-related experience loss was lower retiree mortality than expected, and a \$0.6 million loss due to less than assumed investment returns on the **Funding Value** of assets.

The Market Value rate of return during the fiscal year ending June 30, 2018 was 7.23% for the pension only fund value (excluding assets attributable to RIE) which is less than the assumed rate of 7.50%. A portion of the investment loss was recognized in this valuation along with the recognition of portions of the investment gains and losses that occurred during the previous four fiscal years in accordance with the asset valuation method. The net result of this year's **Market Value** loss and carryover gains and losses from prior years is a net loss of \$0.6 million on the **Funding Value** of assets and a recognized rate of return on the **Funding Value** of assets of 7.21%.

## Asset Smoothing

Under the asset valuation method, gains and losses are spread over a 5-year period (4-year period for gains and losses before June 30, 2012). As of June 30, 2018, the Funding Value of assets is approximately \$4.6 million more than the Market Value. Continued recognition of investment losses from prior years will put upward pressure on contribution rates in the next few valuations in the absence of additional investment gains.

## Amortization of Unfunded Liabilities

The contribution for the unfunded liability is calculated using a level percent-of-payroll method which assumes that **total payroll** will grow 3.25% per year. Total payroll growth at that rate has not been realized in recent years. The Board may wish to consider changing from a level percent-of-payroll method to a level dollar amortization method so that the amortization of the unfunded liabilities is not dependent upon future payroll.

# Comments (Concluded)

## Benefit Changes

Benefit changes implemented between July 1, 2017 and June 30, 2018 included:

- Extension of DROP participation from 5 to 6 years for Police.
- Re-open the DROP to Police Patrol Officers hired after June 16, 2014.
- Maximum pension benefit cannot exceed base wages at retirement or DROP for Police Patrol Officers.
- Increase in employee contributions by 1% beginning July 1, 2009 and another 1% beginning June 29, 2020 for Police Patrol and Police Command Officers.

The above changes decreased the actuarial accrued liability by \$360 thousand and decreased the employer contribution rate by 0.30%.

## Assumption and Method Changes

There were changes in assumptions implemented between July 1, 2017 and June 30, 2018 in connection with the above described benefit changes. Rates of normal retirement were adjusted for members affected by the change in DROP provisions. In addition, an assumption for the ratio of average final compensation and base wages was added to model the maximum benefit for Police Patrol Officers.

## Assumed Rate of Investment Return

Capital market assumptions for future investment returns continue to decline, especially over shorter time horizons. In addition, expectations for inflation continue to decrease as well, which affect the foundation of the investment return assumption. While this assumption will be reviewed in the next five-year experience study, the current assumption of 7.50% is at the top end of what is considered reasonable by actuarial standards, and may not continue to be deemed as reasonable until the next study. We will continue to review the assumption on an annual basis and alert the Board ahead of the actuarial valuation if we believe a change is needed. Based on the general trend in capital market assumptions, we expect that the Board may need to lower the assumed rate of return in the near future.



## Other Observations

### Future Expected System Contributions and Funded Status

Given the System's contribution allocation procedure, *if all actuarial assumptions are met (including the assumption of the System earning 7.50% on the funding value of assets)*, it is expected that:

- (1) The employer normal cost as a percentage of pay will decrease to the level of the benefit provisions for current new entrants (Police Command hired after 3/1/2014, Police hired after 2/22/2013, and Fire hired after 7/1/2009) as time passes and the majority of the active population is comprised of members hired after these dates;
- (2) The unfunded actuarial accrued liabilities will increase for several years before decreasing and will be fully amortized after 28 years (June 30, 2047); and
- (3) The funded status of the plan will decrease for several years and then 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 regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations (for example, transferring the liability to an unrelated third party in a market value type transaction).
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the System's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. The current funded status is 77.5%. Even if the funded status measurement in this report was 100%, it would not be synonymous with no required future contributions. If the funded status were 100%, the System would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

# Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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 System'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:

1. Investment Risk – actual investment returns may differ from the expected returns;
2. 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;
3. 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;
4. Salary and Payroll Risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity Risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. 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 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 rate do not necessarily guarantee benefit security.

## **SECTION B**

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### **SUMMARY OF BENEFIT PROVISIONS AND VALUATION DATA**

# Brief Summary of Act 345 Benefit Provisions (June 30, 2018)

Eligibility	Amount
<b>Service Retirement</b>	
20 or more years of service regardless of age.	
Police Command hired before March 1, 2014, Police Patrol Officers hired before February 22, 2013, and Firefighters hired before September 12, 2011.	Straight life pension equals 2.8% of highest 3-year AFC in last 10 years times years of service up to 25 years.
Police Command hired on or after March 1, 2014.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
Police Patrol Officers hired on or after February 22, 2013.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
Firefighters hired on or after September 12, 2011.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
Maximum Benefits	Benefit cannot exceed 100% of base wages at the time of retirement (or DROP election) for Police Patrol Officers retiring after August 28, 2018.
<b>Deferred Retirement</b>	
10 or more years of service.	Computed as service retirement but based upon service, AFC and plan provisions in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.
<b>Deferred Retirement Option Plan (DROP)</b>	
20 or more years of service regardless of age. (Closed to Police Command hired after March 1, 2014. See page B-4 for additional information.)	Computed as a service retirement but based on service, AFC and plan provisions at the time of DROP election. Monthly pension benefits and annuity withdrawal account value at DROP date accumulate in hypothetical accounts and accrue interest at a rate of 4% (2% for eligible Police Patrol and Command who DROP on or after June 16, 2014) from date of DROP election to date of retirement. At retirement the hypothetical accounts may be paid out by any distribution alternatives available under the Premium Member Annuity Withdrawal Plan and the monthly benefit (previously computed) is paid to the member in the form of a straight life pension (with survivor benefit option, if applicable).

# Brief Summary of Act 345 Benefit Provisions (Continued) (June 30, 2018)

Eligibility	Amount
<b>Death After Retirement Survivor's Pension</b>	
Payable to 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. Includes members who DROP effective July 1, 1999.	Spouse's pension equals 60% of the straight life pension the deceased retiree was receiving.  Must be married to spouse at time of retirement for spouse to be eligible for survivor benefits.
<b>Duty Death-in-Service Survivor's Pension</b>	
Payable to a surviving spouse and eligible children of a member who died in the line of duty.	Straight life pension, calculated with a minimum of 25 years of service, actuarially reduced in accordance with Option 1 election. Workers' Compensation offset.
<b>Non-Duty Disability</b>	
Payable upon the total and permanent disability of a member with 5 or more years of service.	To age 55: 1.5% of AFC times years of service. At age 55: 2.0% of AFC times years of service.
<b>Duty Disability</b>	
Payable upon the total and permanent disability of a member in the line of duty...	
Police:	
...who is unable to perform any occupation	To age 55: 100% of base salary at time of retirement, minimum 85% of active base. At age 55: Frozen at age 55 rate.
...who is unable to perform own occupation	To age 55: 60% of base salary at time of retirement, minimum 51% of active base. At age 55: Frozen at age 55 rate.
Fire:	To age 55: Either 1) 80% of base salary for the first 5 years, then 60% of base salary, or, 2) 60% of base salary with 51% minimum. At age 55: Frozen at age 55 rate.
<b>Post-Retirement Increases</b>	
An ad-hoc increase was granted during the year ended June 30, 2000.	

# Brief Summary of Act 345 Benefit Provisions (Concluded) (June 30, 2018)

Eligibility	Amount
<b>Member Contributions</b>	
Fire Chief	3.00% of pay, non-refundable.
Police Chief	5.00% of pay, non-refundable.
Fire hired before September 12, 2011.	3.00% of pay, non-refundable.
Police Patrol Officers hired before February 22, 2013. Police Command and Deputy Chiefs hired before March 1, 2014.	3.00% of pay, non-refundable. 4.0% of pay beginning July 1, 2019 and 5.0% of pay beginning June 29, 2020.
Fire hired on or after September 12, 2011. Police Patrol Officers hired on or after February 22, 2013. Police Command and Deputy Chiefs hired on or after March 1, 2014.	5.00% of pay, non-refundable.
	All members are eligible for annuity withdrawal with no reduction upon retirement for refundable contributions only. Non-refundable contributions remain in the Retirement System. All members in the DROP no longer contribute.
<b>Interest on Member Accounts</b>	
Active or Former members who have not DROPPed.	Interest at the rate of 2% per annum is paid on member contributions from date of hire to the earlier of DROP date or retirement date.
DROPPed members.	Interest at the rate of 4% (2% for eligible Police Patrol and Command hired as Police Patrol prior to June 16, 2014, that DROP on or after June 16, 2014) per annum is paid on DROP account and annuity withdrawal account from DROP date to retirement date.
<b>Items Included in AFC</b>	
All members.	Overtime, longevity, pay in lieu of holiday time, education pay, and FLSA.
Police and Police Command.	75% of annual excess (over 1,200 hrs.) sick leave, paid compensatory time, and early report time.
Deputy Chiefs.	Up to 900 hours of unused sick/vacation/comp. leave.

# Summary of DROP Provisions

## Effective Date

July 1, 1999.

## Eligibility

A member of the Southfield Fire and Police Retirement System who has satisfied the minimum requirements for a normal service retirement under the FPRS. This eligibility is currently 20 years of service. The DROP is closed to Police Command hired or promoted after March 1, 2014. However, if a promoted Command member was a Patrol member, they retain the ability to DROP. In addition, if a Patrol member is promoted while in the DROP, the member may remain in the DROP.

## Election of DROP

A member satisfying DROP eligibility conditions would be permitted to either:

- 1) Retire; or
- 2) Continue working and retire at a future date with a pension based on credited service and Average Final Compensation (AFC) at date of termination of employment; or
- 3) Irrevocably elect to participate in the DROP and retire at a date no more than 5 years (6 years for Police) in the future with a pension based on AFC and service at date of election to participate in the DROP.

## DROP Credits

The account of a participating member is credited with:

- The pension payments the member would have been paid if the member had retired on the date of DROP election; and
- Interest credits at the rate of 4% (2% for Police Patrol and Command (who were Police Patrol) who DROP on or after June 16, 2014) per annum.

## Retirement from DROP

Upon termination of employment the frozen monthly pension begins and the member can elect any of the distribution alternatives available under the Premium Member Annuity Withdrawal Plan for the DROP account.

# Summary of DROP Provisions (Concluded)

## Disability or Death during DROP Participation

Benefits payable to a member (or surviving spouse) if death or disability occurs during the DROP participation period will be computed in the same manner as if the member had retired from the DROP plan the day prior to the death or disability.

## Covered Payroll

The payroll of DROP participants will be included in the covered compensation upon which regular City contributions are based. However, member contributions will cease upon election of DROP.

## Revocation of DROP Election

Under certain, limited circumstances, members who become disabled in the line of duty, or who die in the line of duty, may revoke the DROP election and be treated as if they never participated in the DROP plan.



# Summary of Reserve for Inflation Equity (RIE) Provisions

## Effective Date

October 25, 1999 for Fire and July 1, 2000 for Police Command.

## Coverage of Program

All members retiring after July 1, 1999 for Fire and July 1, 2000 for Police Command.

## Accumulation Formula

Each year, beginning July 1, 1999 for Fire and July 1, 2000 for Police Command, funds will be credited to the RIE fund in accordance with the following formula: 55% of the 5-year average of the funding value rate of return over a threshold of 8.0% as of June 30<sup>th</sup>, not to exceed 3.0%, multiplied by the System assets of retired member and members who have elected to participate in the Deferred Retirement Option Plan (DROP), who will be eligible to receive distributions from the RIE program either now or in the future. (This Accumulation Formula can be found on page B-15 of this report.) The RIE receives 7.50% interest each year.

## Point Accumulation

Each covered member shall accumulate points in accordance with the following formula:

- a) One point for each full year of service, not to exceed 25; plus
- b) Two points for each full year since retirement.

## Eligibility for Distribution

A covered member will be eligible for an immediate distribution on the later of (a), (b), or (c) below:

- a) The first July 1<sup>st</sup>, which is at least five years after the member's retirement, defined as the later of the date that a member either separated from service or began to receive a pension.
- b) The year after the member's pension has lost 15% of its original purchasing power, defined as a 15% increase in the Consumer Price Index for All Urban Consumers (CPI-U), U. S. City average, all items 1982-1984 = 100.
- c) The member's accumulation of 35 points.

## Distributable Reserve

No more than 35% of the funds in the RIE fund shall be distributed in any given year.

# Summary of Reserve for Inflation Equity (RIE) Provisions (Concluded)

## Individual Distributions

Each benefit recipient's share will be computed by dividing the benefit recipient's total points by the total points of all eligible benefit recipients and multiplying the result by the Distribution Reserve. The maximum amount payable to any benefit recipient is the amount which would restore 85% of the member's original purchasing power. A surviving spouse of a member will receive 60% of the amount which would have been payable to the member had the member survived.

## Distribution Date

Distributions of RIE Program benefit checks shall be determined by the City of Southfield Fire and Police Retirement Board for years in which sufficient funds are available for distribution.

## Retirees and Beneficiaries Added to and Removed from Rolls Comparative Schedule

Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls End of Year		Average Pensions	Actuarial Present Value of Pensions
	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions		
1999	13	\$ 344,928	4	\$ 83,908	173	\$ 5,682,569	\$32,847	\$ 61,095,749
2000	19	1,391,574 *	3	82,421	189	6,991,722	36,993	73,774,229
2001	9	325,140	1	43,199	197	7,273,663	36,922	76,214,081
2002	7	159,227	6	233,271	198	7,199,619	36,362	74,620,482
2003	6	291,862			204	7,491,481	36,723	76,980,093
2004	11	334,099	6	220,863	209	7,604,717	36,386	77,198,240
2005	30	1,387,608	6	241,514	233	8,750,811	37,557	91,796,051
2006	16	653,409	2	83,928	247	9,320,292	37,734	97,367,873
2007	5	187,442			252	9,507,734	37,729	98,106,085
2008	10	369,849	5	156,481	257	9,721,102	37,825	102,542,904
2009	12	657,359	5	140,338	264	10,238,123	38,781	106,846,499
2010	15	651,237	3	112,260	276	10,777,100	39,047	112,131,334
2011	16	626,106	5	146,013	287	11,257,193	39,224	117,349,975
2012	13	628,673	5	218,358	295	11,667,508	39,551	120,894,365
2013	8	384,217	2	114,181	301	11,937,544	39,660	122,796,805
2014	12	599,147	5	177,256	308	12,359,435	40,128	127,796,315
2015	15	773,603	5	174,207	318	12,958,831	40,751	133,403,324
2016	22	972,319	11	411,480	329	13,519,670	41,093	146,779,745
2017	29	1,335,915	8	261,632	350	14,593,953	41,697	163,433,450
2018	19	749,191	6	195,632	363	15,147,512	41,729	170,986,378

\* Additions to annual pensions include post-retirement increases of \$8,422.

## Retirees and Beneficiaries June 30, 2018 Tabulated by Type of Benefit Being Paid

Pension Benefits		
Type of Benefit	No.	Annual Amount
<b>Age and Service Pensions</b>		
Regular Pension - terminating at death	74	\$ 2,426,319
- auto. 60% to spouse	221	11,092,794
Option I - 100% Joint and Survivor	9	243,721
Option II - 50% Joint and Survivor	3	58,508
Survivor Beneficiary	44	1,088,666
<b>Age and Service Totals</b>	351	\$ 14,910,008
<b>Casualty Pensions</b>		
Duty Disability	8	178,984
Non-Duty Disability	2	12,512
Non-Duty Death-Survivor Benefit	2	46,008
<b>Casualty Totals</b>	12	\$ 237,504
<b>Total Pensions</b>	<b>363</b>	<b>\$ 15,147,512</b>

## Retirees and Beneficiaries June 30, 2018 Tabulated by Attained Age and Type of Retirement

Attained Age	Age & Service		Casualty		Totals	
	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions
40 - 44					-	\$ -
45 - 49	20	\$ 914,275			20	914,275
50 - 54	45	1,949,265	1	\$ 7,528	46	1,956,793
55 - 59	40	2,095,188	4	85,872	44	2,181,060
60 - 64	59	2,845,067	1	26,916	60	2,871,983
65 - 69	41	1,842,921	1	4,984	42	1,847,905
70 - 74	71	2,596,683	1	11,934	72	2,608,617
75 - 79	47	1,618,268	3	89,689	50	1,707,957
80 - 84	16	603,044	1	10,580	17	613,624
85 - 89	8	316,639			8	316,639
90 - 94	4	128,659			4	128,659
<b>Totals</b>	<b>351</b>	<b>\$ 14,910,009</b>	<b>12</b>	<b>\$ 237,503</b>	<b>363</b>	<b>\$15,147,512</b>

Average Age at Retirement: 51.2 years

Average Age Now: 66.3 years

## Active Members in Pension Valuation - Comparative Statement

Year Ended June 30	Number Added		Terminations During Year										End of Year	Valuation Payroll	Averages			
	During Year		Normal Retirement		Disabled		Died-in-Service		Withdrawals			Annual Pay			Age	Service		
	A	E	A	E	A	E	A	E	Vested	Other	Total	\$					Change	
2004	8	4	3	22.2	0	0.6	1	0.4	0	0	0	4.1	263	\$20,434,525	\$77,698	2.8 %	41.7 yrs.	14.5 yrs.
2005	19	25	25	22.2	0	0.7	0	0.5	0	0	0	3.6	257	19,559,486	76,107	(2.0)	40.2	12.8
2006	13	17	12	7.3	3	0.7	0	0.3	1	1	2	3.8	253	19,826,520	78,366	3.0	40	12.6
2007	9	6	4	7.1	0	0.7	0	0.3	0	2	2	4	256	20,148,421	78,705	0.4	40.4	13.1
2008	3	6	6	7.1	0	0.7	0	0.3	0	0	0	3.9	253	21,156,661	83,623	6.2	41.0	13.6
2009	8	11	10	8.7	1	0.7	0	0.4	0	0	0	3.4	250	20,917,249	83,669	0.1	41.0	13.6
2010	7	12	10	8.8	0	0.7	0	0.4	0	2	2	3.3	245	20,681,885	84,416	0.9	41.3	13.6
2011	0	10	9	7.4	0	0.6	0	0.3	0	1	1	2.9	235	19,677,191	83,733	(0.8)	42.0	14.3
2012	0	10	10	6.1	0	0.7	0	0.1	0	0	0	1.3	225	18,960,852	84,270	0.6	42.7	14.9
2013	6	9	7	6.6	0	0.6	0	0.1	2	0	2	1.0	222	18,819,454	84,772	0.6	43.2	15.3
2014	2	10	8	8.2	0	0.6	0	0.1	1	1	2	1.2	214	18,452,501	86,227	1.7	43.8	15.8
2015	6	9	9	7.8	0	0.6	0	0.1	0	0	0	1.0	211	18,610,174	88,200	2.3	43.8	15.9
2016	10	14	12	11.2	0	0.4	0	0.1	1	1	2	1.2	207	18,741,427	90,538	2.7	43.6	15.6
2017	16	24	21	12.2	0	0.4	0	0.3	0	3	3	1.6	199	18,204,757 *	91,481	1.0	42.6	14.6
2018	22	16	<u>12</u>	<u>10.1</u>	<u>0</u>	<u>0.4</u>	<u>1</u>	<u>0.3</u>	0	3	<u>3</u>	<u>2.0</u>	205	18,595,691	90,711	(0.8)	41.2	13.6
5-Yr. Totals			62	49.5	0	2.4	1	0.9			10	7.0						
10-Yr. Totals			108	87.1	1	5.7	1	2.2			15	18.9						

A = actual  
E = expected

\*Reported pays were adjusted by 26/27 to account an additional pay period during the 2017 Fiscal Year.

## Active Members June 30, 2018 By Attained Age and Years of Service

Attained Age	Years of Service to Valuation Date							No.	Valuation	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus		Payroll	
20-24	17							17	\$	844,393
25-29	22							22		1,240,316
30-34	7	5	1					13		918,207
35-39	2	7	25	1				35		3,243,430
40-44	1	5	10	13	4			33		3,233,445
45-49		1	6	11	10	1		29		2,928,017
50-54			2	7	19	6		34		3,808,102
55-59				2	14	4		20		2,181,458
60						1		1		110,988
61					1			1		87,335
<b>Totals</b>	<b>49</b>	<b>18</b>	<b>44</b>	<b>34</b>	<b>48</b>	<b>12</b>	<b>0</b>	<b>205</b>	<b>\$</b>	<b>18,595,691</b>

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

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**Group Averages:**

Age: 41.2 years  
Service: 13.6 years  
Annual Pay: \$90,711

The valuation includes 1 vested terminated member with total estimated annual benefits of \$34,861.

## Actuarial Value of Assets

Actuarial Value of Assets		Reserve for (1)	
Cash & cash equivalents	\$ 1,367,366	Employee's Contributions	\$ 8,789,420
Debt securities	41,482,102	Employers Contribution	20,008,084
Equity securities	151,985,818	Retired Benefit Payments	170,986,378
Short-term investments	4,081,394	Funding Value Adjustment	4,633,540
Other investments	1,081,853	<b>Actuarial Value of Assets</b>	<b><u>\$ 204,417,422</u></b>
Collateral for securities lending	21,428,622		
Accounts Receivable	7,337	Funding Value of Pension Assets (2)	\$ 202,682,130
Accounts Payable	(21,650,610)	Funding Value of Health Assets (3)	-
Funding Value Adjustment	<u>4,633,540</u>	Reserve for Inflation Equity	<u>1,735,292</u>
<b>Actuarial Value of Assets</b>	<b><u>\$204,417,422</u></b>	<b>Actuarial Value of Assets</b>	<b><u>\$ 204,417,422</u></b>

- (1) Note that these reserve amounts were not supplied by staff. We have set the Employee's Contributions Reserve to the sum of the employee contributions submitted for each individual in the valuation. The Retired Benefit Payments Reserve has been set equal to the liability for retired members. The Employer Contribution Reserve is the balancing item.
- (2) The funding value of pension assets includes \$14,181,484 of retiree account balances to be disbursed (\$1,065,444 of outstanding employee contributions and \$13,116,040 of outstanding DROP account balances).
- (3) The Retiree Health Insurance Fund has been exhausted.

Market value of assets was reported to be \$199,783,882.

## Revenues and Expenditures

	Reserve for			
	Pension	Inflation Equity	Health	Totals
<b>Actuarial Value 6/30/2017</b>	\$ 199,673,985	\$ 1,910,266	\$ 0	\$ 201,584,251
<b>Revenues</b>				
Employee Contributions	453,274	0	0	453,274
Employer Contributions	6,638,423	0	0	6,638,423
Income (net of investment expenses)	<u>14,009,326</u>	<u>131,767</u>	<u>0</u>	<u>14,141,093</u>
Total Revenues	\$ 21,101,023	\$ 131,767	\$ 0	\$ 21,232,790
<b>Expenditures</b>				
Benefit Payments	17,787,036	306,741	0	18,093,777
Refund of Member Contributions	(3,297)	0	0	(3,297)
Other - Audit Adjustment	1,660	0	0	1,660
Expenses Paid from System	<u>307,479</u>	<u>0</u>	<u>0</u>	<u>307,479</u>
Total Expenditures	\$ 18,092,878	\$ 306,741	\$ 0	\$ 18,399,619
<b>Actuarial Value 6/30/2018</b>	<b>\$ 202,682,130</b>	<b>\$ 1,735,292</b>	<b>\$ 0</b>	<b>\$ 204,417,422</b>
Nominal Rate of Return*	7.21%	7.50%		7.22%

\* The nominal rate of return was computed using the approximate formula:  $i = I$  divided by  $1/2 (A+B-I)$ , where  $I$  is recognized investment income, plus the additional market value adjustment,  $A$  is the beginning of year asset value and  $B$  is the end of year asset value.



## Derivation of Funding Value of Retirement System Assets

Beginning of Year Value	June 30, 2018	June 30, 2019	June 30, 2020	June 30, 2021	June 30, 2022
(1) Market Value	\$ 195,327,451				
(2) Funding Value	199,673,985				
(3) Non Investment Cash Flow*	(11,001,181)				
(4) Assumed Interest Rate	7.50%				
Expected Income	14,562,942				
(5) Actual Income	<u>13,722,320</u>				
(6) Gain/(Loss)	\$ (840,622)				
(7) Recognized Income					
(a) Expected	\$ 14,562,942				
(b) 0.20 x Gain/(Loss)	(168,124)				
(c) Base from 1 year ago	1,150,529	\$ (168,124)			
(d) Base from 2 years ago	(2,542,652)	1,150,529	\$ (168,124)		
(e) Base from 3 years ago	(2,327,319)	(2,542,652)	1,150,529	\$ (168,124)	
(f) Base from 4 years ago	<u>3,333,950</u>	<u>(2,327,321)</u>	<u>(2,542,654)</u>	<u>1,150,527</u>	<u>\$ (168,126)</u>
(g) Total Income Recognized	\$ 14,009,326	\$ (3,887,568)	\$ (1,560,249)	\$ 982,403	\$ (168,126)
<b>End of Year Values</b>					
(8) Market Value	\$ 198,048,590				
(9) Funding Value (2) + (3) + (7)(g)	\$ 202,682,130				
(10) Funding Value as a Percent of Market Value	102.34%				
(11) Rate of Return on Funding Value During Year	7.21%				
(12) Rate of Return on Market Value During Year	7.23%				

\*Includes audit adjustment of \$1,660 as of the beginning of the fiscal year.

Beginning June 30, 2012, all values exclude assets and activity associated with retiree health assets and RIE assets.

The funding value in (9) is applied to the financing of actuarial accrued liabilities. The funding value is intended to give recognition to long-term changes in asset values while minimizing the effect of short-term fluctuations in the capital markets. After the initial year, the funding value treats realized and unrealized capital gains and losses in the same manner.

## Derivation of Reserve for Inflation Equity

	<u>7/1/2016</u>	<u>7/1/2017</u>	<u>7/1/2018</u>
Rate of investment return:			
1. Actual return on funding value of assets:			
(a) from prior year	5.33%	7.75%	7.21%
(b) from 1 year ago	6.65%	5.33%	7.75%
(c) from 2 years ago	11.41%	6.65%	5.33%
(d) from 3 years ago	8.88%	11.41%	6.65%
(e) from 4 years ago	0.29%	8.88%	11.41%
(f) 5-year average	6.51%	8.00%	7.67%
2. Threshold	8.00%	8.00%	8.00%
3. Fifty-five percent of excess, if any, of 1(f) over 2, but not more than 3.0%	0.00%	0.00%	0.00%
4. Actuarial present value of pensions #:			
(a) For current DROP members	\$32,266,869	\$30,745,761	\$30,650,284
(b) For retirees since RIE inception*	69,206,929	80,330,179	86,465,675
(c) Total	101,473,798	111,075,940	117,115,959
5. Dollars available for allocation	0	0	0
6. Reserve Balance - start of year	2,115,290	2,026,961	1,910,266
Disbursements from reserve during year	242,853	259,004	306,741
Current year addition	0	0	0
Interest	154,524	142,309	131,767
Reserve Balance - end of year	2,026,961	1,910,266	1,735,292
# <i>Included Participants</i>			
<i>DROP</i>			
- <i>Fire</i>	20	20	21
- <i>Police Command</i>	12	11	9
<i>Retirees</i>			
- <i>Fire</i>	65	72	81
- <i>Police Command</i>	44	51	53

\* July 1, 1999 for Fire, July 1, 2000 for Police Command.

## SECTION C

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### SUMMARY OF ACTUARIAL COST METHODS AND ASSUMPTIONS

## Actuarial Cost Methods

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual entry-age actuarial cost 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.** Unfunded actuarial accrued liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were amortized by level percent-of-payroll contributions over a period of 28 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.

**The funding value of 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 20% of the difference between expected and actual investment income for each of the previous five years, starting with the June 30, 2012 valuation. Prior to June 30, 2012, 25% of the difference between expected and actual investment income for each of the previous four years was added.

## Actuarial Assumptions Used for the Valuation

The actuary calculates the contribution requirements and benefit values of the Fund by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost methods described on the previous page.

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

- long-term rates of investment return to be generated by the assets of the Fund
- patterns of pay increases to members
- rates of mortality among members, retirees and beneficiaries
- rates of withdrawal of active members (without entitlement to a retirement benefit)
- rates of disability among members
- the age patterns of actual retirement
- rate of increase in the cost of retiree health insurance

In making a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - - a period of time which can be as long as a century.

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Actual experience of the Fund will not coincide exactly with assumed experience, regardless of the accuracy of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations). The assumptions are established by the Board after consulting with the actuary. New assumptions were adopted for the June 30, 2016 valuation pursuant to the Experience Study dated April 8, 2016, which contains the rationale for these assumptions. All assumptions are based on future expectations, not market measures.

## Actuarial Assumptions Used for the Valuation

*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.

Salary Increase Assumptions for Individual Members			
Years of Service	Merit & Seniority	Base (Economic)	Increase Next Year
1 to 3	5.00%	3.25%	8.25%
4	2.50%	3.25%	5.75%
5	1.50%	3.25%	4.75%
6	0.50%	3.25%	3.75%
7	0.30%	3.25%	3.55%
8	0.20%	3.25%	3.45%
9 & Up	0.00%	3.25%	3.25%

If the number of active members remains constant, then the total active member payroll will increase 3.25% annually, the base portion of the individual salary increase assumptions. This increasing payroll was recognized in amortizing Unfunded Actuarial Accrued Liabilities.

*The assumed nominal rate of investment return* net of investment expenses was 7.50% a year compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time. *The assumed real return* for funding purposes is the rate of return in excess of wage inflation: 4.25%.

## Actuarial Assumptions Used for the Valuation

**The mortality table** for healthy retirees was the RP-2014 Blue Collar Healthy Annuitant mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale released by the Society of Actuaries.

Age	Post-Retirement Healthy Life Expectancy Determined by Age in Given Future Year					
	Year 2018		Year 2028		Year 2038	
	Male	Female	Male	Female	Male	Female
50	34.13	37.14	35.17	38.10	36.17	39.05
55	29.30	32.20	30.29	33.14	31.26	34.06
60	24.72	27.45	25.64	28.34	26.56	29.22
65	20.37	22.87	21.22	23.70	22.07	24.53
70	16.31	18.51	17.08	19.29	17.86	20.06
75	12.62	14.50	13.31	15.20	14.00	15.90
80	9.41	10.95	10.00	11.55	10.59	12.16

For mortality of disabled retirees the RP-2014 Disabled Annuitant mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale was used.

For pre-retirement mortality the RP-2014 Blue Collar Employees mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale was used. 50% of the pre-retirement deaths are assumed to be duty related and 50% are assumed to be non-duty related.

The MP-2015 projection scale was applied to the aforementioned RP-2014 tables adjusted to the base year of 2006 as recommended by the Society of Actuaries.

Additional margin for future mortality improvements are included in the projection scale.

## Actuarial Assumptions Used for the Valuation

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

Years of Service	% Retiring During the Next Year		
	Fire	Police with 2.8% Multiplier	Police with 2.5% Multiplier
20	10.0 %	10.0 %	10.0 %
21	5.0	5.0	5.0
22	5.0	5.0	5.0
23	5.0	5.0	5.0
24	15.0	15.0	15.0
25	20.0	20.0	10.0
26	10.0	20.0	10.0
27	10.0	15.0	10.0
28	25.0	25.0	20.0
29	50.0	50.0	50.0
30	50.0	50.0	50.0
31	50.0	50.0	50.0
32	50.0	50.0	50.0
33	50.0	50.0	50.0
34	50.0	50.0	50.0
35 & Up	100.0	100.0	100.0

A member is eligible for retirement after completing 20 or more years of service.

Active members in the DROP are assumed to follow the retirement rates above. However, they are assumed to retire at a rate of 100% in the fifth year following DROP for Fire and in the sixth year for Police.



## Actuarial Assumptions Used for the Valuation

**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 the Next Year
ALL	0	8.00%
	1	5.00%
	2	3.00%
	3	2.00%
	4	2.00%
20	5 & Over	1.00%
25		1.00%
30		0.90%
35		0.65%
40		0.50%
45		0.35%
50		0.25%
55		0.20%
60		0.20%
65		0.20%
70		0.20%

**Rates of disability** were as follows:

Sample Ages	% of Active Members Becoming Disabled Within the Next Year	
	Men	Women
20	0.11%	0.05%
25	0.14%	0.08%
30	0.15%	0.11%
35	0.22%	0.20%
40	0.32%	0.29%
45	0.49%	0.43%
50	0.79%	0.68%
55	1.38%	1.15%
60	2.30%	1.66%

In addition, 25% of the disabilities are assumed to be non-duty related and 75% are assumed to be duty related; of the 75% assumed to be duty disability, half were assumed to be covered under their own occupation provisions.

**Expense Load.** Normal cost for pensions was loaded by 2.0% of active payroll to cover administrative expenses.

# Miscellaneous and Technical Assumptions

## June 30, 2018

<b>Marriage Assumption:</b>	100% are assumed to be married for purposes of death-in-service benefits and 84% are assumed to be married for deaths after retirement. Male spouses are assumed to be three years older than female spouses.
<b>Pay Increase Timing:</b>	Beginning of the valuation year.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
<b>Decrement Relativity:</b>	Decrement rates are used directly from experience, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Only withdrawal operates the first 5 years of service. Only mortality operates during retirement eligibility.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year.
<b>Incidence of Contributions:</b>	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.
<b>Normal Form of Benefit:</b>	A 60% automatic joint and survivor payment is the assumed normal form of benefit for married people.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Annualized Salary Adjustment:</b>	None.
<b>Base Wages:</b>	50% of Patrol Officers hired before February 22, 2013 have an AFC that is 152% of their base wages.

## **SECTION D**

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### **OPERATION OF THE RETIREMENT SYSTEM**

# 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 value of benefits likely to be paid which is assigned to 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).

# Basic Financial Objective and Operation of the Retirement System

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 over time on behalf of the group

... plus ...

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

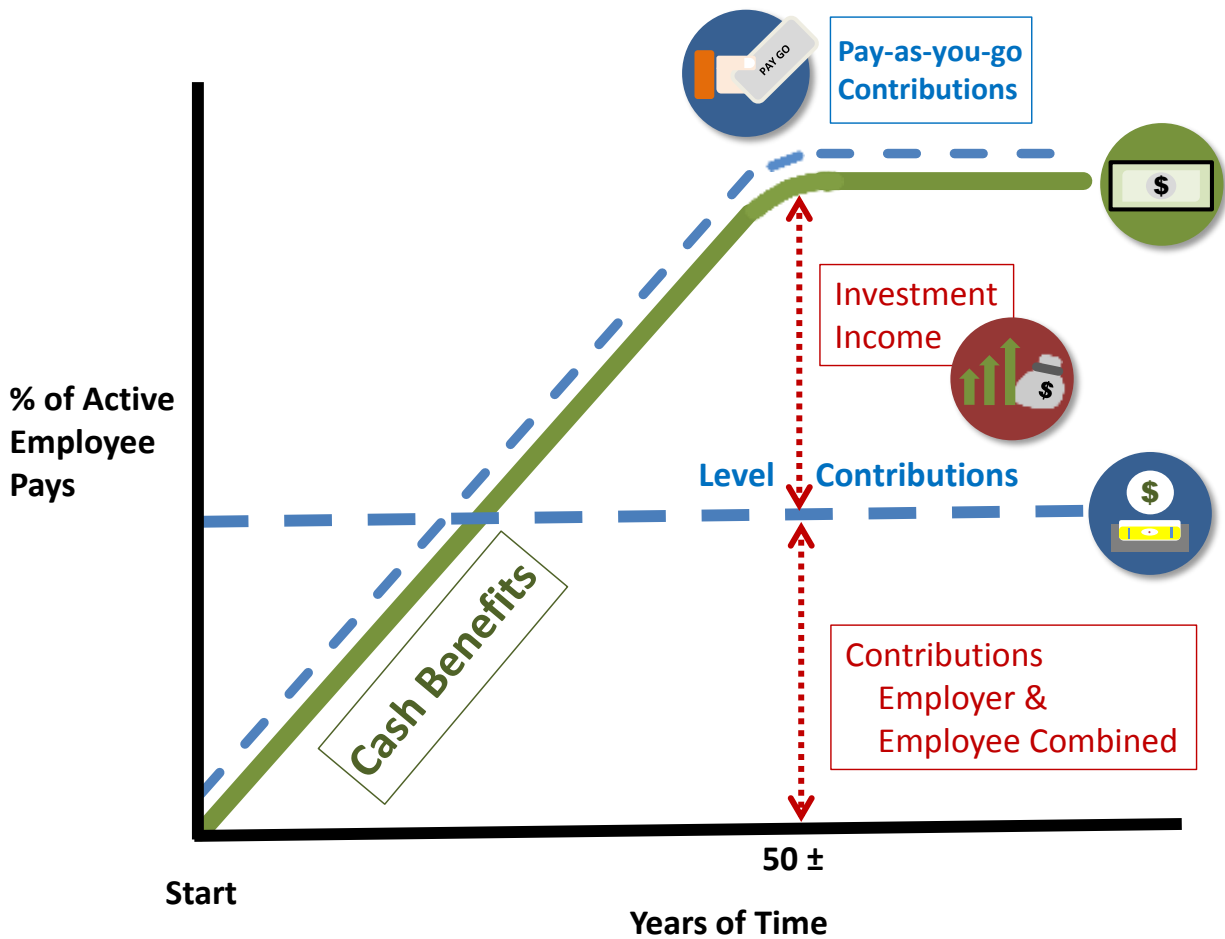
... minus ...

**Expenses** incurred in operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. They are lured by artificially low present contributions, but the inevitable consequence is 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.***

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Invested assets are a by-product of level percent-of-payroll contributions, not the objective. Investment income becomes a major contributor to the retirement program, and the amount is directly related to the amount of past contributions and investment performance.

**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.

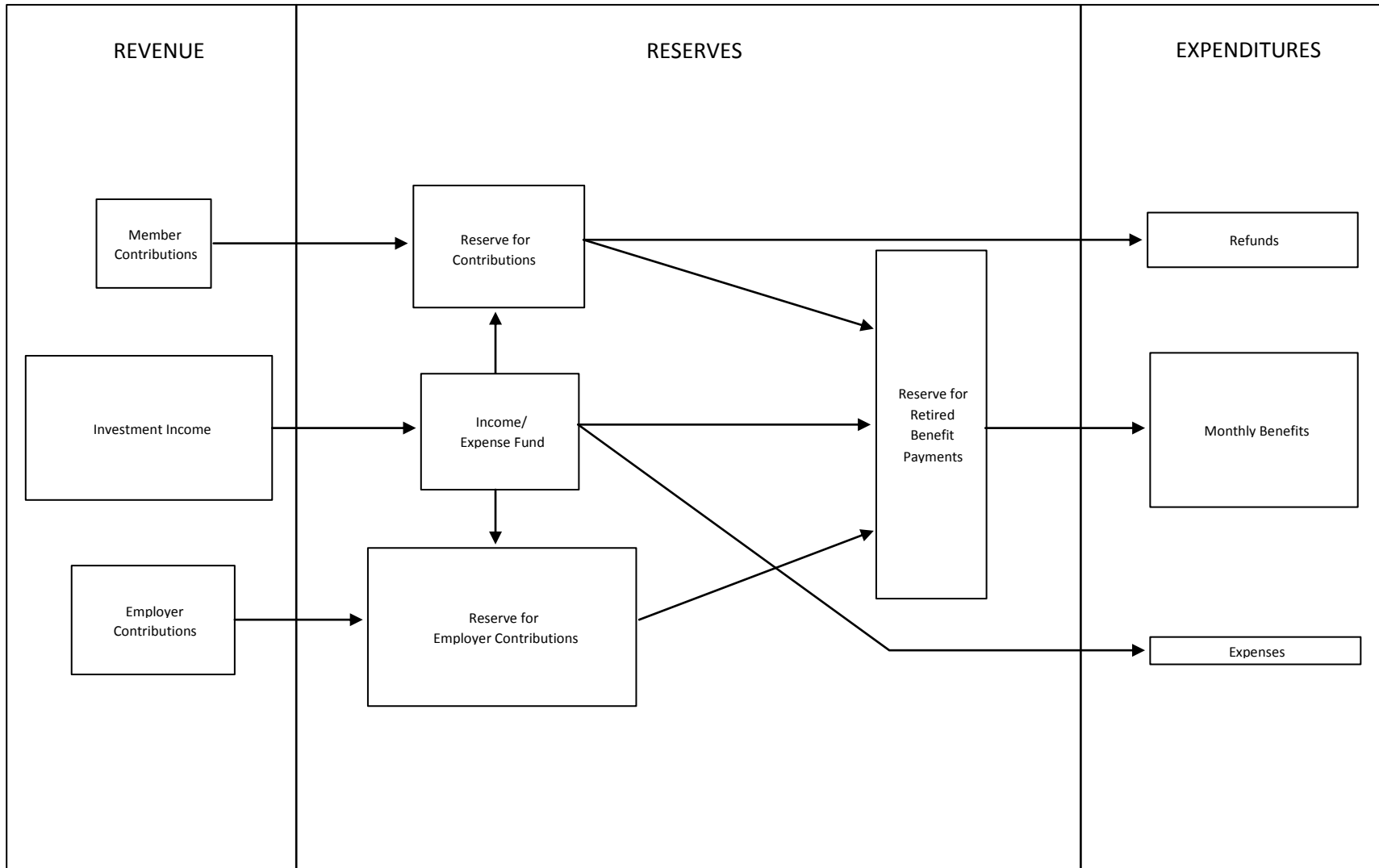


**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**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



## Glossary

### **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."

### **Accrued Service**

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

### **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, turnover 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.

### **DROP**

Deferred Retirement Option Plan. This plan acts like an optional form of payment. It is selected by active members who wish to have their accrued retirement benefit frozen and paid into an account (monthly) that is available for cash withdrawal at the time of retirement.



**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.

**Plan Termination Liability**

The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for the future service and salary. The termination liability will generally be less than the liabilities computed on a "going-concern" basis and is not normally determined in a routine actuarial valuation.

**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. Generally based on book value plus a portion of unrealized appreciation or depreciation.

## **APPENDIX 1**

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### **ACTUARIAL FUNDING POLICY**

# City of Southfield Fire and Police Retirement System

## Actuarial Funding Policy

**WHEREAS**, the City of Southfield Fire and Police 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

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

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

- (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**

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**

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 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**

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 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 determined by the Board in consultation with its actuary.

## **D. Assumptions**

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 70%, 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 once every five years. The results of the experience study shall be the basis for the actuarial assumptions recommended to the Board.
  - (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**

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**

The Board, in consultation with its Actuary and Legal Counsel, may amend this Actuary 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 2**

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### **RISK MEASURES**



## 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:

	2018	2017	2016	2015	2014
Ratio of actives to retirees and beneficiaries	0.56	0.57	0.63	0.66	0.69
Ratio of retiree actuarial accrued liability to total liability	65%	64%	59%	58%	57%
Ratio of net cash flow to market value of assets	-6%	-5%	-6%	-5%	-4%

### **RATIO OF ACTIVE 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 RETIREE ACTUARIAL ACCRUED LIABILITY TO TOTAL LIABILITY**

The ratio of retiree liability to the total actuarial accrued liability gives an indication of the maturity of the plan. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system. In the case of a closed plan, this ratio will eventually reach 100%.

### **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 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.

## Risk Measures

Actuarial Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Unfunded AAL (UAAL) (2) - (1)	(4) Covered Payroll	(5) Funded Ratio (1) / (2)	(6) Assets / Payroll (1) / (4)	(7) Liability / Payroll (2) / (4)	(8) Unfunded / Payroll (3) / (4)
6/30/2009	\$ 192,160,601	\$200,058,754	\$7,898,153	\$20,681,885	96.1 %	929.1 %	967.3 %	38.2 %
6/30/2010	182,973,491	206,368,685	23,395,194	19,677,191	88.7	929.9	1,048.8	118.9
6/30/2011 <sup>(a)</sup>	173,231,198	211,803,567	38,572,369	18,960,852	81.8	913.6	1,117.1	203.4
6/30/2012 <sup>(a)</sup>	174,215,687	211,803,567	37,587,880	18,960,852	82.3	918.8	1,117.1	198.2
6/30/2013 <sup>(a)</sup>	181,342,197	220,687,538	39,345,341	18,819,454	82.2	963.6	1,172.7	209.1
6/30/2014 <sup>(a)</sup>	192,685,680	225,157,311	32,471,631	18,452,501	85.6	1,044.2	1,220.2	176.0
6/30/2015	195,940,267	231,608,365	35,668,098	18,610,174	84.6	1,052.9	1,244.5	191.7
6/30/2016 <sup>(a)</sup>	195,645,031	248,037,025	52,391,994	18,741,427	78.9	1,043.9	1,323.5	279.6
6/30/2017	199,673,985	256,052,447	56,378,462	18,204,757	78.0	1,096.8	1,406.5	309.7
6/30/2018 <sup>(a)</sup>	202,682,130	261,623,651	58,941,521	18,595,691	77.5	1,089.9	1,406.9	317.0

*(a) Revised actuarial assumptions, methods, and/or benefit changes.*

(5) The Funded Ratio is the most widely known measure of a retirement system’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.

(6) and (7) The ratios of assets and liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of pay. For systems that are closed to new hires, it is expected that these ratios will grow as payroll declines.

(8) The ratio of the unfunded liability to payroll gives an indication of the retirement system sponsor’s ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.