City of Ann Arbor Employees' Retirement System

Annual Actuarial Valuation
as of June 30, 2020

GRS

Contents

October 20, 2020

Retirement Board
City of Ann Arbor Employees' Retirement System
Ann Arbor, Michigan

Re: **City of Ann Arbor Employees' Retirement System Actuarial Valuation as of June 30, 2020**
Actuarial Disclosures

Dear Board Members:

The results of the June 30, 2020 Annual Actuarial Valuation of the City of Ann Arbor Employees'
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, and to determine the
employer contribution rate for the fiscal year ending June 30, 2022. This report should not be relied on for
any purpose other than the purposes described herein.   Determinations of financial results, associated
with the benefits described in this report, for purposes other than those identified above may be
significantly different.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed
in Section C of this report. This report includes risk metrics in the appendix 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 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.

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. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the City of Ann Arbor Employees' 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.

James D. Anderson, Richard C. Koch Jr., and Francois Pieterse are members of the American Academy of Actuaries. 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,

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

 Richard C. Koch Jr., ASA, EA, MAAA

Francois Pieterse, ASA, MAAA

JDA/RCK/FP:sc

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SECTION A

VALUATION RESULTS

Summary of Key Actuarial Valuation Results

Valuation Date	June 30, 2020	June 30, 2019
Summary of Member Data		
Number of Members Included in Valuation		
Active Members	725	711
Inactive Members (Deferred and Retirees & Beneficiaries)	1,205	1,230
Total	1,930	1,941
Annual Payroll (Average)	$77,501	$77,735
Annual Benefit Payments (Average)		
Inactive Members	$14,773	$14,319
Retirees and Beneficiaries	$35,439	$34,939
Summary of Assets		
Market Value	$512,676,260	$512,898,230
Market Value Rate of Return	4.62%	6.21%
Funding Value	$520,439,737	$513,611,366
Funding Value Rate of Return	6.02%	6.07%
Summary of Liabilities		
Total Actuarial Accrued Liability	$614,077,223	$601,108,981
Unfunded Actuarial Liability (UAL)	$93,637,486	$87,497,615
Funded Ratio	84.75%	85.44%
Employer Actuarially Determined Contribution (ADC)		
Total Normal Cost Rate	18.33%	18.24%
Employee Contribution Rate (weighted avg.)	5.31%	5.39%
Employer Normal Cost Rate	13.02%	12.85%
Amortization of UAL Rate	13.77%	12.91%
Total Employer ADC	26.79%	25.76%
Actual/Statutory Contribution Rate	32.10%	31.15%
Amortization Period (years)	21	22

Funding Objective

The funding objective of the Retirement System is to establish and receive contributions that will accumulate assets during each member's working years which, together with regular interest, will be sufficient to pay promised benefits after 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 methods 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 (the unfunded actuarial accrued liability).

Computed contribution rates for the fiscal year ending June 30, 2022 are shown on page A-3.

Contributions to Provide Benefits Computed June 30, 2020
for Fiscal Year Ending June 30, 2022

Contributions for	General	General Hybrid	Police	Police Hybrid	Fire	Fire Hybrid	Total#
Normal Cost of Benefits:							
1. Age & service	15.94 %	7.73 %	25.27 %	12.89 %	25.04 %	10.88 %	17.11 %
2. Disability	0.66 %	0.35 %	0.89 %	0.39 %	0.22 %	0.13 %	0.57 %
3. Death-in-service	0.39 %	0.15 %	0.35 %	0.09 %	0.47 %	0.00 %	0.33 %
4. Refunds of member contributions	0.42 %	0.37 %	0.17 %	0.19 %	0.13 %	0.24 %	0.32 %
5. Total normal cost	17.41 %	8.60 %	26.68 %	13.56 %	25.86 %	11.25 %	18.33 %
6. Member contributions (average)	6.00 %	3.00 %	6.00 %	3.00 %	6.28 %	3.00 %	5.31 %
7. Employer Normal Cost (5. - 6.)	11.41 %	5.60 %	20.68 %	10.56 %	19.58 %	8.25 %	13.02 %
8. Payment for Unfunded Actuarial Liabilities (UAL)*	$ 4,251,949	$ 25,067	$ 2,415,101	$ 553	$ 1,596,316	$ 588	$ 8,289,574
9. Payment for UAL as a Percentage of Projected Payroll	16.55 %	0.18 %	19.31 %	0.37 %	20.75 %	0.45 %	13.77 %
10. Projected Fiscal Year Payroll	$ 25,695,366	$ 14,014,434	$ 12,506,333	$ 151,232	$ 7,693,199	$ 130,005	$ 60,190,569
11. Preliminary Actuarially Determined Contribution (ADC) (7. * 10. + 8.)	$ 7,183,790	$ 809,875	$ 5,001,411	$ 16,523	$ 3,102,644	$ 11,313	$ 16,125,556
12. Preliminary ADC as a Percent of Projected Payroll	27.96 %	5.78 %	39.99 %	10.93 %	40.33 %	8.70 %	26.79 %
13. Prior Fiscal Year Budgeted Contribution^							$ 15,251,454
14. Prior Fiscal Year Budgeted Contribution with 2% Increase!							$ 15,251,454
15. Estimated City Contribution (Greater of 11. & 14.)							$ 16,125,556

* Amortized as a level dollar amount over a closed period of 21 years.

^ Provided by the City.

Total Employer Normal Cost is a weighted average and applying this percentage to projected fiscal year payroll may not match the preliminary ADC due to rounding.

! Funding policy temporarily suspended in 2020-2022 due to COVID-19.

All percents in the table above are expressed as a percent of active member payroll.

Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars -- and then promptly contributed to the Retirement System.

The recommended procedure is: (1) **at the end of each payroll period, multiply the active member payroll for the period by the employer normal cost percent;** (2) **add the payment for unfunded actuarial liabilities divided by the number of payroll periods from (1);** and (3) **promptly contribute the dollar amount so determined**.

Present Value of Future Benefits and Accrued Liabilities

	June 30, 2020							June 30, 2019
	General	General Hybrid	Police	Police Hybrid	Fire	Fire Hybrid	Total	Total
A. Accrued Liability								
1. For retirees and beneficiaries	$ 216,511,681	$ 0	$ 123,366,498	$ 0	$ 83,310,671	$ 0	$ 423,188,850	$ 408,737,399
2. For vested terminated members	8,390,830	0	2,374,727	0	0	0	10,765,557	14,663,784
3. For present active members								
a. Value of expected future benefit payments	124,744,833	10,747,800	79,572,383	195,213	51,006,166	132,972	266,399,367	261,639,690
b. Value of future normal costs	34,670,278	8,890,916	26,407,131	154,249	16,064,529	89,448	86,276,551	83,931,892
c. Active member accrued liability: (a) - (b)	90,074,555	1,856,884	53,165,252	40,964	34,941,637	43,524	180,122,816	177,707,798
4. Total accrued liability	314,977,066	1,856,884	178,906,477	40,964	118,252,308	43,524	614,077,223	601,108,981
B. Present Assets (Funding Value)*	266,947,829	1,573,737	151,625,946	34,718	100,220,620	36,887	520,439,737	513,611,366
C. Unfunded Accrued Liability: (A.4) - (B)	48,029,237	283,147	27,280,531	6,246	18,031,688	6,637	93,637,486	87,497,615
D. Funding Ratio: (B) / (A.4)	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	85.4%

* Funding Value of Assets was allocated to each group based on total accrued liability.

Development of Funding Value of Retirement System Assets
June 30, 2020

Valuation Date June 30:	2019	2020	2021	2022	2023	2024
A. Funding Value Beginning of Year (BOY)	$505,014,630	$513,611,366				
B. Market Value End of Year (EOY)	512,898,230	512,676,260				
C. Market Value BOY	503,705,603	512,898,230				
D. Audit Adjustment	0	(360,337)				
E. Non-Investment Net Cash Flow	(21,406,724)	(23,005,632)				
F. Investment Income						
1) Market Total: B-C-D-E	30,599,351	23,143,999				
2) Interest Rate	7.0%	7.0%	6.9%			
3) Amount for Immediate Recognition (F2 x (A + D + 0.5 x E))	34,601,789	35,122,375				
4) Amount for Phased-In Recognition F1 - F3	(4,002,438)	(11,978,376)				
G. Phased-In Recognition of Investment Income						
1) Current Year: 0.20 x F4	(800,488)	(2,395,675)				
2) First Prior Year	(14,929)	(800,488)	$ (2,395,675)			
3) Second Prior Year	4,250,545	(14,929)	(800,488)	$ (2,395,675)		
4) Third Prior Year	(5,967,488)	4,250,545	(14,929)	(800,488)	$ (2,395,675)	
5) Fourth Prior Year	(2,065,969)	(5,967,488)	4,250,545	(14,930)	(800,486)	$ (2,395,676)
6) Total Recognized Investment Gain	(4,598,329)	(4,928,035)	1,039,453	(3,211,093)	(3,196,161)	(2,395,676)
H. Funding Value EOY: A + D + E + F3 + G6	513,611,366	520,439,737				
I. Difference Between Market Value and Funding Value	(713,136)	(7,763,477)				
J. Net Funding Value Rate of Return	6.07%	6.02%				
K. Net Market Value Rate of Return	6.21%	4.62%				
L. Funding Value / Market Value	100.1%	101.5%				

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) are phased-in over a closed 5-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.

Historical Asset Rate of Return

Year ending June 30	Actuarial Value Annual Recognized Rate of Return	Market Value Annual Recognized Rate of Return
2011	3.78%	23.37%
2012	0.60%	0.01%
2013	4.04%	12.28%
2014	11.18%	14.23%
2015	9.96%	4.22%
2016	6.22%	0.37%
2017	8.42%	11.96%
2018	6.96%	6.98%
2019	6.07%	6.21%
2020	6.02%	4.62%

Derivation of Experience Gain (Loss)
Year Ended June 30, 2020

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often offset one another 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
(1) UAAL* at start of year	$ 87,497,615
(2) Normal cost from last valuation	10,252,093
(3) Actual contributions	17,288,894
(4) Interest	7.00%
(5) Interest accrual: (1) x (4) + ((2) - (3)) x (4) / 2	5,878,545
(6) Expected UAAL before changes: (1) + (2) - (3) + (5)	86,339,359
(7) Change from benefit improvements and revised actuarial assumptions	6,120,630
(8) Expected UAAL after changes: (6) + (7)	92,459,989
(9) Actual UAAL at end of year	93,637,486
(10) Gain (loss): (8) - (9)	$(1,177,497)
(11) Gain (loss) as percent of actuarial accrued liabilities at start of year $(601,108,981)	(0.2%)

* *Unfunded Actuarial Accrued Liability.*

Comments and Recommendation

Comment 1: Aggregate experience during the year ending June 30, 2020 was less favorable than assumed, generating an overall experience loss of approximately $1.2 million as indicated on page A-7. The actuarial loss was approximately 0.2% of the beginning of year Actuarial Accrued Liabilities, arising from lower than assumed recognized investment return with respect to the funding value of assets and a loss on retiree liabilities. The actuarial losses due to assets and retirees were partially offset by gains from data updates made by Retirement Staff to deferred member data for this valuation. After reflecting the experience described above and the update to the investment return assumption noted in Comment 2, computed contribution requirements increased from the prior year from $15.3 million to $16.1 million. In addition, valuation assets represent 84.8% of accrued liabilities; last year the ratio was 85.4%. If the valuation results were based on market value of assets instead of smoothed funding value, the funded percent of the plan would be 83.5%.

Comment 2: This valuation reflects a change in the investment return assumption from 7.0% to 6.9% as adopted by the Retirement Board. Therefore, all calculated liabilities in the June 30, 2020 valuation were based on the new 6.9% interest rate. This resulted in a $6.1 million increase in the actuarial accrued liability and a $0.7 million increase in the actuarially determined contribution. Note that development of the smoothed actuarial value of assets on page A-5 of this report employs a rate of 7.0%, since the new 6.9% rate is not effective until the end of the period. Said another way, the fund expected 7.0% investment return during the period July 1, 2019 through June 30, 2020 and 6.9% thereafter. This is the prevalent approach used in public sector pension and VEBA asset smoothing.

Comment 3: Investment return of 4.6% was lower than the assumed level of 7.0% on a market value basis. However, under the asset valuation method, investment gains and losses are spread over a 5-year period. Partial recognition of this year's loss was combined with the continued phase-in of investment gains and losses from prior years resulting in a net recognized asset loss for 2020. The Funding Value of Assets now exceeds the Market Value by approximately $7,763,000 (see page A-5), which is the net amount of unrecognized prior year gains and losses to be recognized over the coming four years.

Comment 4: Reserve transfers between the active and retired life accounts are required whenever retired life liabilities differ from the Reserve for Retired Benefit Payments. If a reserve is maintained for the City of Ann Arbor, the Reserve for Retired Benefit Payments should be equal to $423,188,850 (the actuarial accrued liability for retired lives).

Comment 5: Under Public Act 202 of the State of Michigan, Michigan municipalities are required to report liabilities under new uniform assumption guidelines. While the current guidelines are only for reporting purposes (and not funding), governments may be encouraged to use these new assumptions for funding.

The uniform assumptions include the following:
- Investment return no higher than 7.0%;
- Assumed wage inflation no lower than 3.5%*;
- Mortality assumption that uses a version of the PUB-2010 table with generational mortality improvements using scale MP-2018*; and
- Amortization period no longer than 19 years for Pension Plans and 29 years for Retiree Health Plans.

* or based on an actuarial experience study performed in the last 5 years

The information needed to satisfy PA 202 reporting requirements are provided in the appendix of this report.

PA 202 also requires an actuarial audit be performed every 8 years. GRS will work with the Board and Staff to ensure compliance.

Comment 6: Demographic assumptions were last updated for the June 30, 2018 valuation after a review was performed by the prior actuary. The Retirement Board elected to change the investment return assumption from 7.0% to 6.9% for the June 30, 2020 valuation. The State of Michigan now requires experience studies once every 5 years, consistent with guidelines set by the Government Finance Officers Association (GFOA).

Comment 7:   Please see the Appendix to this valuation for presentation of information related to Actuarial Standard of Practice ("ASOP") No. 51 entitled "Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions."

Comment 8:   This report does not reflect the recent and still developing impact of COVID-19, which is likely to influence demographic and economic experience, at least in the short-term. We will continue to monitor these developments and their impact on the Retirement System. Actual experience will be reflected in each subsequent annual valuation, as experience emerges.

Actuarial Accrued Liabilities and Valuation Assets
Comparative Statement

Valuation Date	Actuarial Accrued Liability (AAL)	Funding Value of Assets	Unfunded Actuarial Accrued Liability (UAAL)	Ratio of Present Assets to AAL	Ratio of UAAL to Valuation Payroll
2011	$ 481,330,000	$ 423,734,000	$ 57,596,000	88.0 %	125.4 %
2012	496,770,000	410,709,000	86,061,000	82.7 %	195.6 %
2013	507,435,000	407,170,000	100,265,000	80.2 %	222.5 %
2014	523,461,000	433,854,000	89,607,000	82.9 %	186.8 %
2015	533,198,000	459,480,000	73,718,000	86.2 %	151.2 %
2016	548,201,000	470,029,000	78,172,000	85.7 %	156.2 %
2017	571,074,000	489,943,000	81,131,000	85.8 %	151.4 %
2018*^	583,601,000	505,015,000	78,586,000	86.5 %	147.6 %
2019	601,108,981	513,611,366	87,497,615	85.4 %	158.3 %
2020	614,077,223	520,439,737	93,637,486	84.8 %	166.6 %

* Actuarial assumptions revised.
^ Valuation results for 2018 and prior years were calculated by the City's prior actuary.

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 move gradually toward 100%.

The Ratio of UAAL to Valuation Payroll is another relative index of condition. Actuarial unfunded 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.

Solvency Test

Valuation Date	(1) Active Member Contributions	(2) Inactive Members	(3) Active Members (Employer-Financed Portion)	Valuation Assets (in thousands)	Portion of Accrued Liabilities Covered by Assets (1)	(2)	(3)
	Actuarial Liabilities (in thousands)						
2011	$ 2,790	$ 327,964	$ 150,576	$ 423,734	100.00%	100.00%	61.75%
2012	2,797	348,249	145,724	410,709	100.00%	100.00%	40.94%
2013	2,858	353,683	150,895	407,170	100.00%	100.00%	33.55%
2014	2,948	356,397	164,116	433,854	100.00%	100.00%	45.40%
2015	3,013	361,314	168,871	459,480	100.00%	100.00%	56.35%
2016	3,139	374,798	170,264	470,029	100.00%	100.00%	54.09%
2017	3,325	389,354	178,395	489,943	100.00%	100.00%	54.52%
2018*	3,185	413,119	170,478	505,015	100.00%	100.00%	52.04%
2019	3,085	423,401	174,623	513,611	100.00%	100.00%	49.89%
2020	3,103	433,954	177,020	520,440	100.00%	100.00%	47.10%

* Valuation results for 2018 and prior years were calculated by the City's prior actuary.

Expected Development of Present Population

Closed Group Active Population Projection
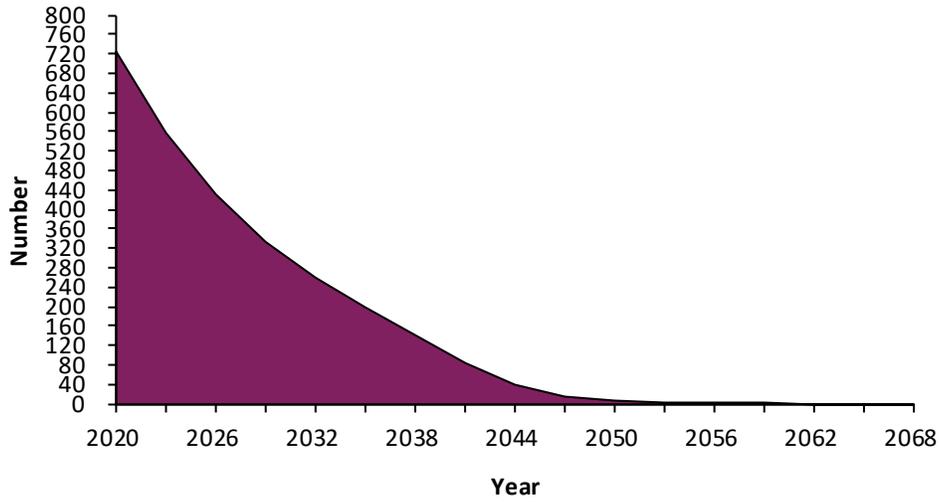
Expected Terminations from Active Employment
for Current Active Members

Retirements - 74%

Vested Separations - 12%

Deaths and Disabilities - 3%

Non-Vested Separations - 11%
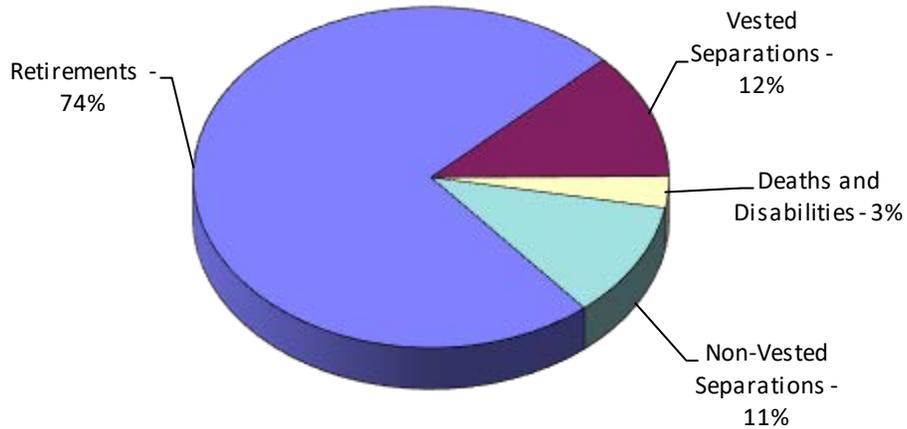
Assets and Accrued Liabilities
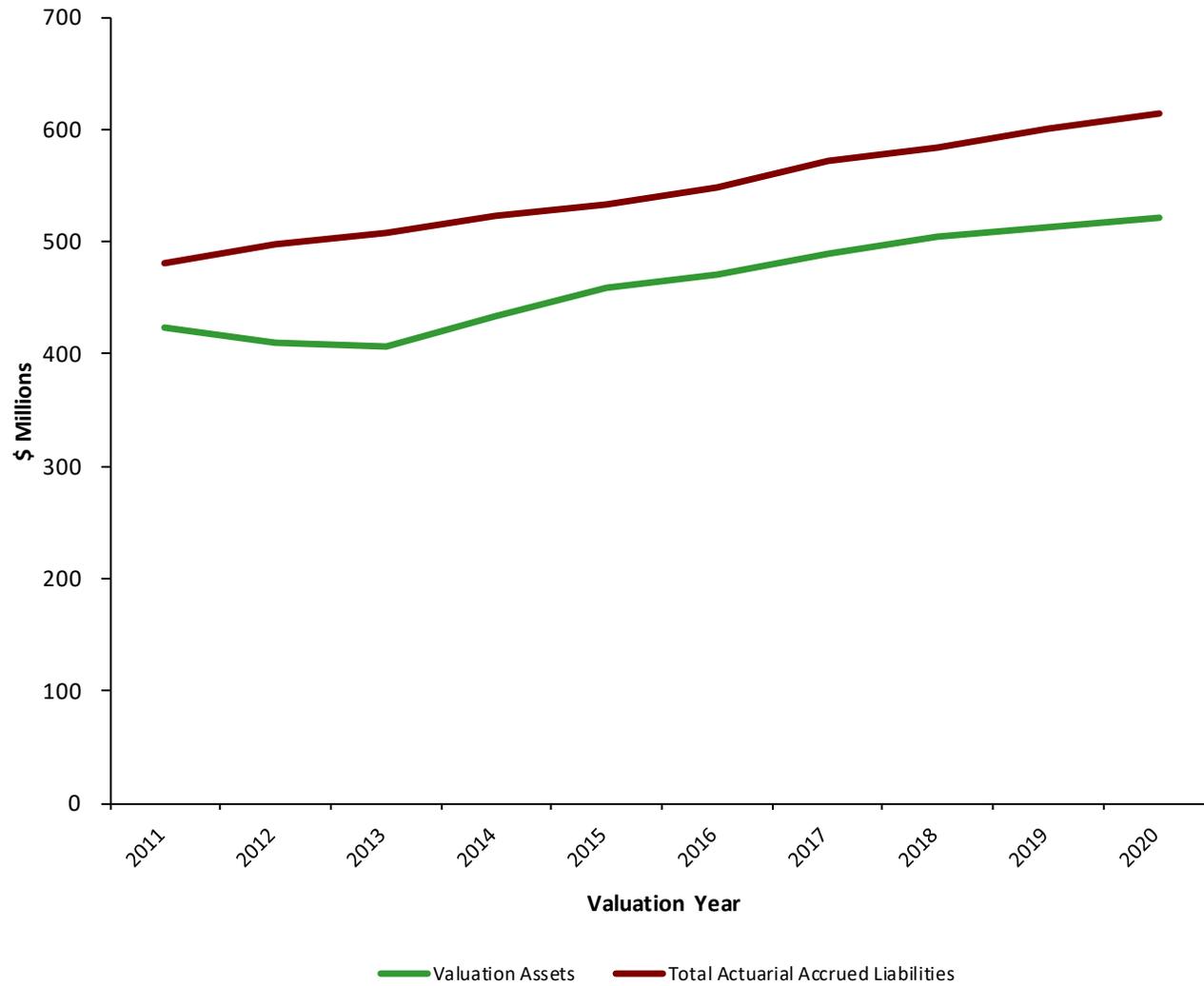
SECTION B

SUMMARY VALUATION DATA

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Schedule

Year Ended June 30	No. Added to Rolls	No. Removed from Rolls	Rolls End of Year	
			No.	Annual Allowances
2011	70	16	933	$ 29,163,874
2012	52	23	962	30,539,094
2013	39	30	971	31,056,330
2014	34	25	980	31,734,475
2015	36	20	996	32,249,188
2016	45	24	1,017	33,495,093
2017	53	30	1,040	34,825,341
2018	63	33	1,067	36,707,905
2019	49	35	1,081	37,768,548
2020	42	21	1,102	39,054,103

Retirees and Beneficiaries as of June 30, 2020
Tabulated by Attained Ages

Attained Ages	Age and Service No.	Age and Service Annual Allowances	Disability No.	Disability Annual Allowances	Total No.	Total Annual Allowances
Under 50	19	$ 855,126			19	$ 855,126
50-54	58	3,284,658	1	$ 6,655	59	3,291,313
55-59	111	5,067,054	2	46,916	113	5,113,970
60-64	200	7,409,440	2	43,384	202	7,452,824
65-69	210	7,832,186			210	7,832,186
70-74	199	7,107,201	2	48,777	201	7,155,978
75-79	139	3,752,131	1	19,049	140	3,771,180
80-84	73	1,750,804			73	1,750,804
85-89	49	1,234,140			49	1,234,140
90 & Over	36	596,582			36	596,582
Totals	**1,094**	**$ 38,889,322**	**8**	**$ 164,781**	**1,102**	**$ 39,054,103**

Inactive Members Eligible for Deferred Benefits
as of June 30, 2020
Tabulated by Attained Ages

Attained Ages	No.	Annual Allowances
32	1	$ 11,008
39	2	27,513
40	3	46,798
41	3	54,329
42	1	9,059
43	3	69,838
44	6	82,758
45	3	36,292
46	2	29,341
47	2	7,057
48	7	106,639
49	5	57,283
50	8	146,813
51	5	96,156
52	8	137,808
53	5	66,444
54	2	22,579
55	11	147,276
56	2	32,158
57	1	3,369
58	4	68,523
59	9	145,883
60	4	58,043
61	1	4,072
62	1	5,708
64	1	17,483
65	1	14,842
66	1	6,327
73	1	10,192
Totals	**103**	**$1,521,591**

Retirees and Beneficiaries as of June 30, 2020
Tabulated by Valuation Divisions

Valuation Divisions	No.	Annual Allowances
General	711	$20,372,232
Police	222	10,851,545
Fire	169	7,830,326
Total	1,102	$39,054,103

Inactive Members Eligible for Deferred Benefits as of June 30, 2020
Tabulated by Valuation Divisions

Valuation Divisions	No.	Estimated Annual Allowances
General	88	$1,174,704
Police	15	346,887
Fire	0	0
Total	103	$1,521,591

Active Members as of June 30, 2020
Tabulated by Valuation Divisions

Valuation Divisions	No.	Annual Payroll
General	357	$ 27,707,492
General Hybrid	165	9,362,031
Police	121	11,674,796
Police Hybrid	1	141,177
Fire	80	7,181,683
Fire Hybrid	1	121,361
Total Active Members	725	$ 56,188,540

The average accumulated contributions balance for active members is $71,293.

Active and Retired Members

Legend: Active Members, Retirants and Beneficiaries

Year	Active Members	Retirants and Beneficiaries
2010	728	879
2011	664	933
2012	650	962
2013	660	971
2014	675	980
2015	688	996
2016	685	1017
2017	696	1040
2018	695	1067
2019	711	1081
2020	725	1102
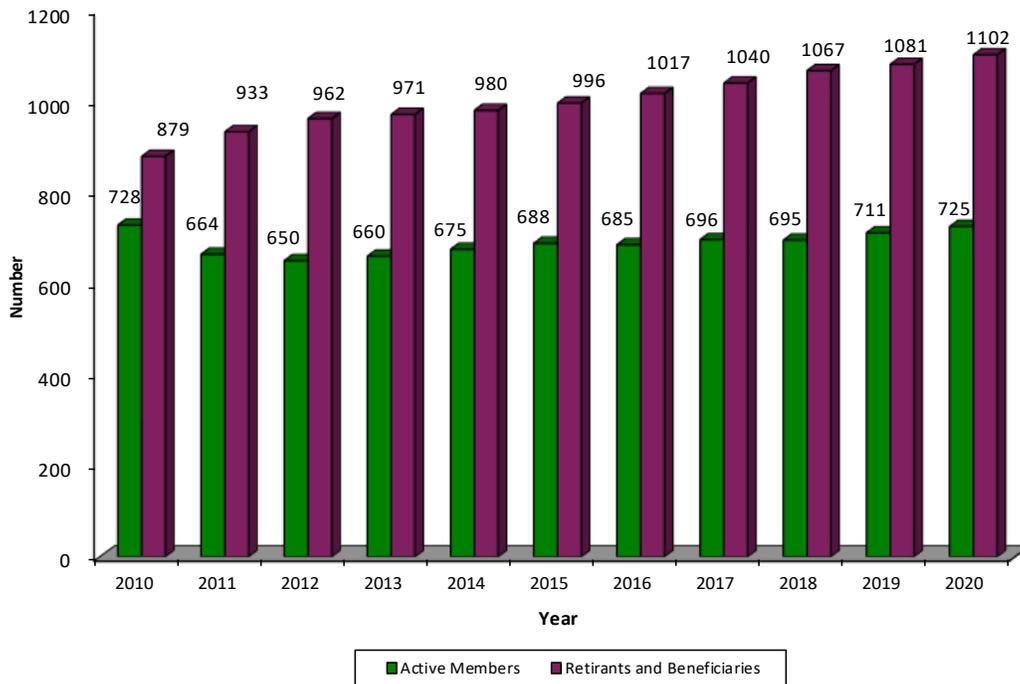
General Members as of June 30, 2020
by Age and Years of Service

Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
20-24	9							9	$ 400,892
25-29	28	3						31	1,488,530
30-34	36	17						53	3,094,809
35-39	34	20	3	1				58	3,867,838
40-44	40	20	15	10	2			87	6,235,678
45-49	24	22	21	11	13	3		94	7,122,319
50-54	12	8	14	13	15	10	1	73	5,734,701
55-59	18	11	10	9	8	5	3	64	4,954,700
60	3	2	2	2	2			11	734,486
61		2	2	2	2	1		9	833,456
62	2	3		1		2	1	9	773,314
63		1	1	2	2			6	508,984
64	3	2	1	1				7	506,046
65					1			1	72,881
66	1			1			1	3	292,157
67		1	2					3	237,844
68	2					1		3	124,212
69		1						1	86,676
Totals	**212**	**113**	**71**	**53**	**45**	**22**	**6**	**522**	**$ 37,069,523**

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

Age:	45.39	years
Service:	9.49	years
Annual Pay:	$71,014	

Police Members as of June 30, 2020
by Age and Years of Service

| | Years of Service to Valuation Date | | | | | | | Totals | |
Age	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
20-24	2							2	$ 114,830
25-29	11							11	746,011
30-34	9	13						22	1,846,568
35-39	9	7	1					17	1,458,325
40-44	5	5	1	2	7			20	1,987,718
45-49	1			3	18			22	2,481,448
50-54	1		1	4	16	1		23	2,568,568
55-59					1	1	2	4	512,277
60					1			1	100,228
Totals	**38**	**25**	**3**	**9**	**43**	**2**	**2**	**122**	**$ 11,815,973**

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

Age:	41.25	years
Service:	13.00	years
Annual Pay:	$96,852	

Fire Members as of June 30, 2020
by Age and Years of Service

| | Years of Service to Valuation Date | | | | | | | Totals | |
Age	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
15-19	1							1	$ 35,272
20-24	1							1	48,574
25-29	8							8	445,068
30-34	8	1						9	609,273
35-39	4	4						8	608,082
40-44		1	3	1	3			8	773,397
45-49		1	6	3	17			27	2,771,278
50-54		1	2		8	2	1	14	1,439,392
55-59	1			1	1	2		5	572,708
Totals	**23**	**8**	**11**	**5**	**29**	**4**	**1**	**81**	**$ 7,303,044**

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

Age:	42.77	years
Service:	14.33	years
Annual Pay:	$90,161	

Active Members Added to and Removed from Rolls

General Members

Year	No. Added During Year[1]	Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals Vested A	Withdrawals Other[2] A	Withdrawals Total A	Withdrawals Total E	Active Members End of Year
2016	46	23	27	1	1	0	1	9	8	17	18	488
2017	51	19	27	0	1	0	1	11	14	25	18	495
2018*	59	23	26	0	1	0	1	13	21	34	20	499
2019	56	16	19	0	1	0	1	0	26	26	21	513
2020	51	17	19	1	1	1	0	1	22	23	22	522
5-Year Total		98	118	2	5	1	4	34	91	125	99	

Police Members

Year	No. Added During Year[1]	Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals Vested A	Withdrawals Other[2] A	Withdrawals Total A	Withdrawals Total E	Active Members End of Year
2016	7	7	7	0	0	0	0	0	1	1	2	120
2017	10	9	7	0	0	0	0	0	0	0	2	121
2018*	6	5	12	0	0	0	0	2	2	4	3	118
2019	11	8	8	0	0	1	0	1	1	2	3	118
2020	10	3	6	0	0	0	0	0	3	3	2	122
5-Year Total		32	40	0	0	1	0	3	7	10	12	

Fire Members

Year	No. Added During Year[1]	Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals Vested A	Withdrawals Other[2] A	Withdrawals Total A	Withdrawals Total E	Active Members End of Year
2016	-2	5	4	0	0	0	0	0	0	0	1	77
2017	9	6	4	0	0	0	0	0	0	0	1	80
2018*	4	5	7	0	0	0	0	1	0	1	1	78
2019	5	3	4	0	0	0	0	0	0	0	1	80
2020	6	4	3	0	0	0	0	0	1	1	1	81
5-Year Total		23	22	0	0	0	0	1	1	2	5	

A = Actual

E = Expected

Revised actuarial assumptions
[1] *Includes individuals transferring into a group*
[2] *Includes individuals transferring out of a group*

Summary of
Current Asset Information

Balance Sheet

Valuation Assets

Cash, receivables, accruals and other short-term	$ 10,856,773
Equity securities	329,100,310
Debit securities	126,250,501
Real Estate	45,868,984
Other - Sundry, Notes, and Mortgages	4,121,076
Accounts payable	(3,521,384)
Funding value adjustment	7,763,477
Total Current Assets	$520,439,737

Revenues and Expenditures

	2019-2020	2018-2019
Balance - July 1	$512,898,230	$503,705,603
Audit Adjustment	(360,337)	0
Revenues		
Member contributions	3,164,729	3,264,590
Employer contributions	14,124,165	13,621,926
Recognized investment income	23,143,999	30,599,351
Total	40,432,893	47,485,867
Expenditures		
Benefit payments	38,377,862	37,258,219
Refund of member contributions	1,227,436	363,827
Administrative expenses	689,228	671,194
Total	40,294,526	38,293,240
Balance - June 30	$512,676,260	$512,898,230
Net investment income/mean assets	4.6%	6.2%

SECTION C

SUMMARY OF VALUATION METHODS, ASSUMPTIONS, AND BENEFIT PROVISIONS

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: "Your 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.

There are retirement programs designed to defer the bulk of contributions far into the future. Lured by artificially low present contributions, 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 the major contributor** to the retirement program, and the amount is directly related to the amount of contributions and investment performance.

Computed Contribution Rate Needed to Finance Benefits. From a given schedule of benefits and from the data furnished him, 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.
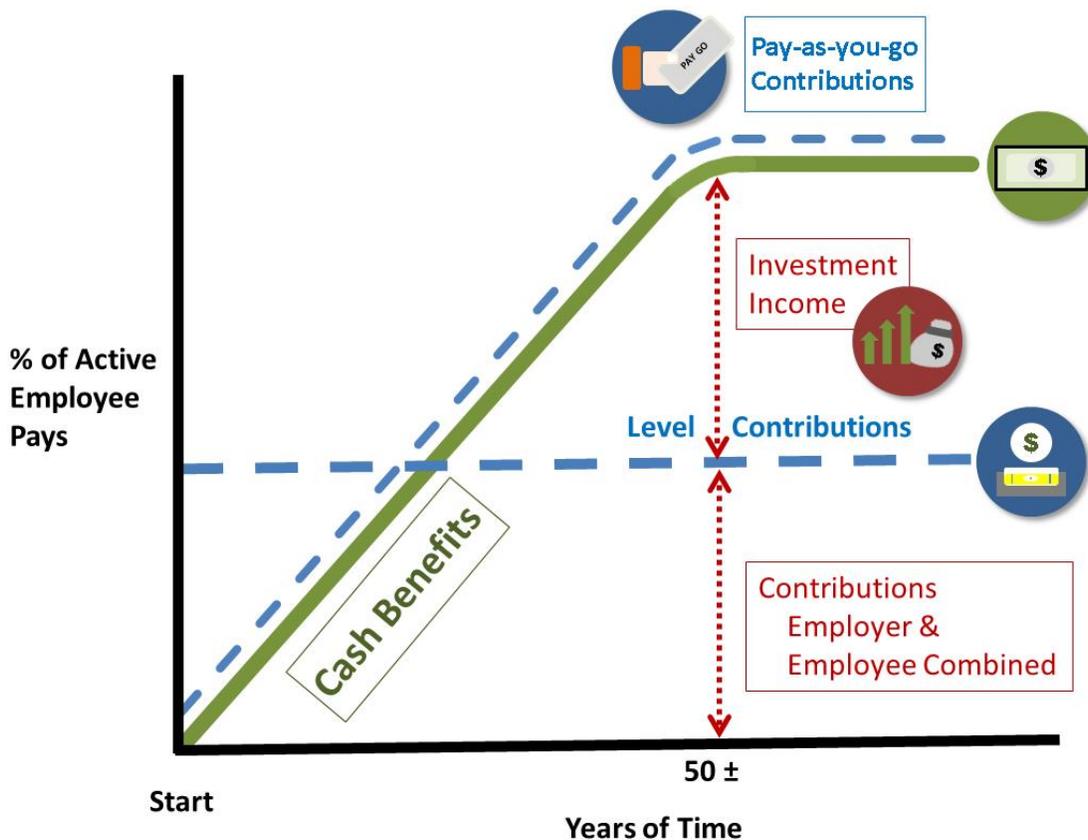
CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

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
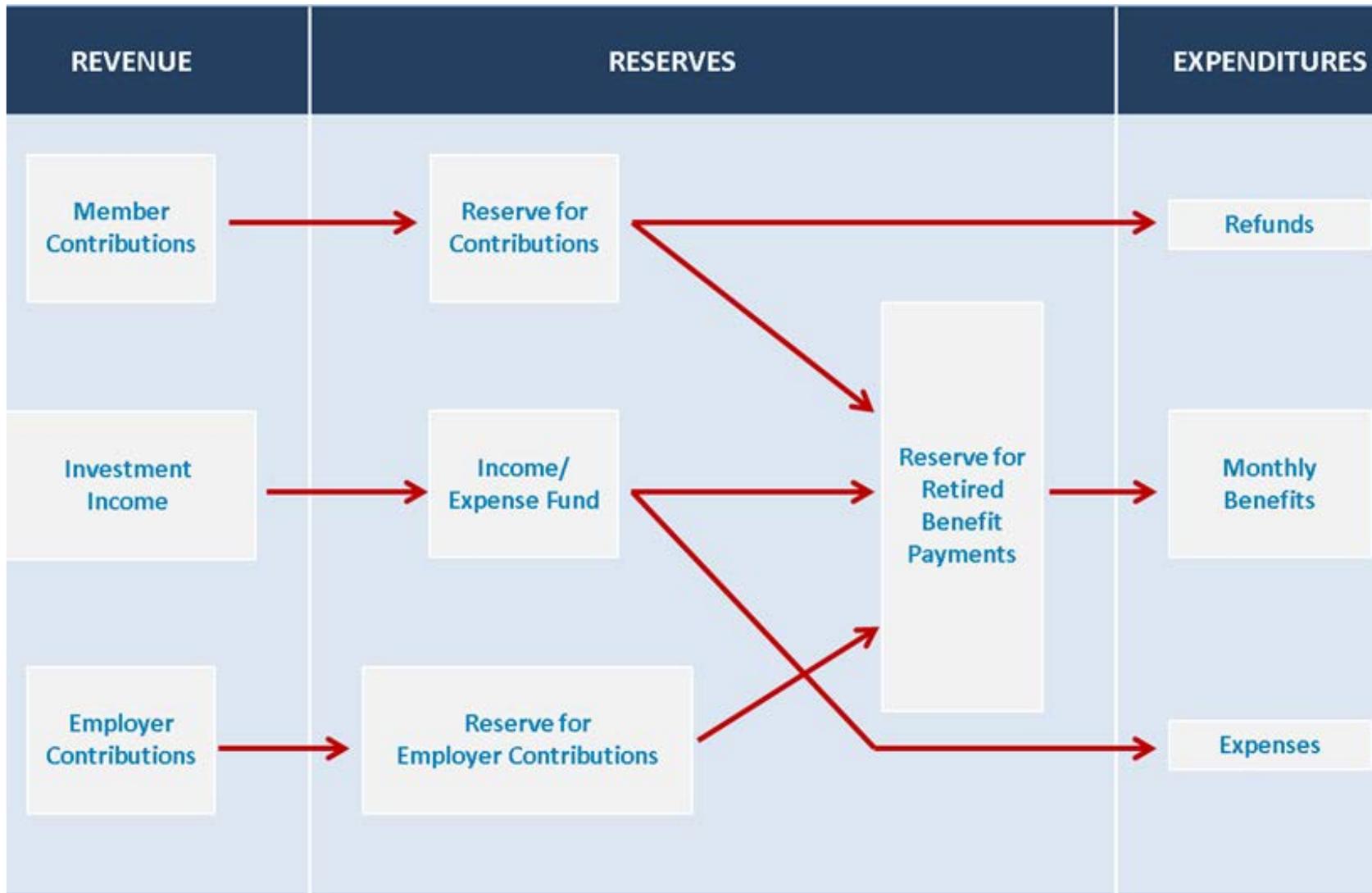
Actuarial Cost Methods

Normal Cost. 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:

(i) The annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) 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 (full funding credit if assets exceed liabilities) are amortized by level dollar contributions.

The City of Ann Arbor Employees' Retirement System is funded by Employer and Member Contributions in accordance with the funding policy adopted by the Retirement Board, based on actuarially determined contributions (ADC), which require contributions be sufficient to pay the Normal Costs of active plan members, Plan expenses, and amortize the Unfunded Actuarial Accrued Liability over a declining period. Effective with the 2017 valuation, the Board approved a change to a level dollar amortization that decreases by one year in each year until a 15-year open amortization period is obtained.

Additionally, Section 1.3 of the City of Ann Arbor General Pension Policy allows for more than the Minimum Required policy as follows:

"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

The funding policy has been temporarily suspended for fiscal years 2020-2022 due to COVID-19.

Actuarial Assumptions Used for the Valuation

The actuary calculates the contribution requirements and benefit values by applying actuarial assumptions to the benefit provisions and census data 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 system assets;
- patterns of pay increases to members;
- rates of mortality among members, retirees and beneficiaries;
- rates of separation (withdrawal) from active membership;
- rates of disability among active members; and
- the age patterns of actual retirement.

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

Actual experience of the Fund will not coincide exactly with assumed experience, regardless of the quality 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 is appropriate to modify one or more of the assumptions to reflect experience trends (but not random year-to-year fluctuations). Actuarial assumptions were last revised for the June 30, 2018 valuation, based on an experience study performed by the City's prior actuary. Subsequently, the Board adopted an investment return assumption of 6.9% for this valuation.

Investment Return (net of investment and administrative expenses):

Investment Return	6.90%
Wage Inflation	3.50%
Price Inflation	2.50%
Spread Between Investment Return and Wage Inflation	3.40%

The investment return assumption is used to equate the value of payments due at different points in time and was first used for the June 30, 2020 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 benefits will be based.

Sample Ages	% Increase in Salary at Sample Ages						
	Merit and Seniority			Base	Increase Next Year		
	General	Police	Fire	(Economic)	General	Police	Fire
20	4.00%	7.50%	7.29%	3.50%	7.50%	11.00%	10.79%
25	3.58%	6.60%	6.52%	3.50%	7.08%	10.10%	10.02%
30	2.82%	4.74%	4.86%	3.50%	6.32%	8.24%	8.36%
35	2.14%	3.36%	3.44%	3.50%	5.64%	6.86%	6.94%
40	1.84%	2.70%	2.70%	3.50%	5.34%	6.20%	6.20%
45	1.47%	2.38%	2.38%	3.50%	4.97%	5.88%	5.88%
50	0.98%	2.18%	2.18%	3.50%	4.48%	5.68%	5.68%
55	0.68%	2.04%	2.04%	3.50%	4.18%	5.54%	5.54%
60	0.50%	1.80%	1.90%	3.50%	4.00%	5.30%	5.40%

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			
		General		Police	Fire
		Males	Females		
	1	6.00%	16.00%	6.00%	4.50%
	2	4.80%	13.00%	6.00%	4.00%
	3	4.00%	11.00%	4.00%	3.60%
	4	3.20%	8.00%	3.00%	3.60%
	5	2.50%	6.00%	2.50%	3.60%
25	6 & Over	3.20%	4.50%	2.40%	1.40%
30		3.20%	4.50%	2.40%	1.10%
35		3.25%	3.50%	1.75%	0.90%
40		3.25%	3.50%	0.74%	1.00%
45		3.25%	3.50%	0.48%	0.90%
50		3.25%	3.50%	0.48%	0.50%
55		3.25%	3.50%	0.48%	0.50%
60		3.25%	3.50%	0.48%	0.50%
65		3.25%	3.50%	0.48%	0.50%

The mortality tables used are as follows:

- **Healthy Pre-Retirement:** The RP-2014 Employee Generational Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

- **Healthy Post-Retirement:** The RP-2014 Healthy Annuitant Generational Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

- **Disability Retirement:** The RP-2014 Disabled Mortality Table, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

Sample Attained Ages	Healthy Pre-Retirement Future Life Expectancy (Years)*		Healthy Post-Retirement Future Life Expectancy (Years)*		Disabled Retirement Future Life Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	31.25	35.49	29.74	32.13	21.35	25.08
60	26.32	30.47	25.18	27.37	18.30	21.53
65	21.68	25.58	20.85	22.83	15.43	18.11
70	17.38	20.81	16.79	18.51	12.68	14.74
75	13.42	16.23	13.02	14.47	10.05	11.57
80	9.85	11.92	9.65	10.84	7.66	8.82

* *Based on retirements in 2020. Retirements in future years will reflect improvements in life expectancy.*

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

Retirement Ages	General Normal	General Early	Police Normal	Police Early	Fire Normal	Fire Early	Retirement Service	Police	Fire
50	25%	10%		10%		10%	25	50%	25%
51	25%	10%		10%		10%	26	50%	25%
52	25%	10%		10%		10%	27	50%	25%
53	25%	10%		10%		10%	28	50%	25%
54	25%	10%		10%		10%	29	50%	25%
55	25%	10%	50%		25%		30	50%	25%
56	25%	10%	50%		25%		31	50%	25%
57	25%	10%	50%		25%		32	50%	25%
58	25%	10%	50%		25%		33	50%	25%
59	25%	10%	50%		25%		34	50%	25%
60	30%		100%		100%		35	100%	100%
61	30%								
62	30%								
63	30%								
64	30%								
65	60%								
66	40%								
67	40%								
68	40%								
69	40%								
70	100%								

Rates of disability among active members.

Sample Ages	% Becoming Disabled within Next Year General	Police	Fire
20	0.06%	0.08%	0.02%
25	0.06%	0.08%	0.02%
30	0.06%	0.08%	0.02%
35	0.06%	0.08%	0.02%
40	0.11%	0.14%	0.03%
45	0.24%	0.32%	0.08%
50	0.42%	0.56%	0.14%
55	0.65%	0.86%	0.22%
60	0.86%	1.14%	0.29%
65	0.99%	1.32%	0.33%

For General members, 75% of the disabilities are assumed to be non-duty and 25% of the disabilities are assumed to be duty related. For Police/Fire members, 50% of the disabilities are assumed to be non-duty and 50% of the disabilities are assumed to be duty related.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2020

Regular Retirement (no reduction factor for age):

Union	5 Year Vesting 3 Year / 36 Mo FAC[1]	10 Year Vesting 5 Year / 60 Mo FAC[2]	Eligibility	Annual Amount
Non-Union	Hired before July 1, 2011	Hired on/after July 1, 2011	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
American Federation of State, County, and Municipal Employees, AFL CIO (AFSCME)	Hired before August 29, 2011	Hired on/after August 29, 2011	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
Ann Arbor Police Officers Association (AAPOA)	Hired before January 1, 2012	Hired on/after January 1, 2012	25 years of service or Age 55 and vested	2.75% of FAC times total years of service
International Association of Fire Fighters (IAFF)	Hired before July 1, 2012	Hired on/after July 1, 2012	25 years of service or Age 55 and vested	2.75% of FAC times total years of service
Teamsters Fire Assistant Chief	Hired before January 1, 2016	Hired on/after January 1, 2016	25 years of service or Age 55 and vested	Hired before 1/1/2017: 2.75% of FAC times total years of service Hired after 1/1/2017: 1.375% of FAC times total years of service
Teamsters Civilian Supervisiors	Hired before July 2, 2012	Hired on/after July 2, 2012	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
Teamsters Police Professional Assistants	Hired before July 2, 2012	Hired on/after July 2, 2012	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2018: 2.5% of FAC times total years of service Hired after 1/1/2018: 1.25% of FAC times total years of service
Teamsters Police Deputy Chiefs	Hired before July 2, 2012	Hired on/after July 2, 2012	25 years of service or Age 55 and vested	Hired before 6/5/2017: 2.75% of FAC times total years of service Hired after 6/5/2017: 1.375% of FAC times total years of service
Police Service Specialists	Hired before July 1, 2013	Hired on/after July 1, 2013	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2018: 2.5% of FAC times total years of service Hired after 1/1/2018: 1.25% of FAC times total years of service
Command Officers Association of Michigan (COAM)	Hired before July 1, 2013	Hired on/after July 1, 2013	25 years of service or Age 55 and vested	2.75% of FAC times total years of service

[1] Highest 3 consecutive calendar years out of last 10 or the last 36 months for members with 5 year vesting.

[2] Highest 5 consecutive calendar years out of last 10 or the last 60 months for members with 10 year vesting.

Annuity Withdrawal - Upon regular retirement, a member may elect to withdraw his or her accumulated contributions. If this lump sum election is made, the retirement allowance is reduced by the actuarial equivalent of the amount withdrawn.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2020

Early Retirement (reduction factor for age):

Eligibility – *All Members:* Age 50 with 20 or more years of service.

Benefit – Computed as a regular retirement but the pension portion of the allowance is reduced by 0.33% for each month by which retirement precedes normal retirement eligibility.

Deferred Retirement (vested benefit):

Eligibility – Must be vested. Refer to table on page C-10.

Annual Amount – Computed as regular retirement but based upon service and final average compensation at time of termination. Benefit begins at age 60. A member may elect to receive all or a portion of his/her accumulated contributions at termination if the member's age plus service total at least 50 and receive a lesser benefit at age 60.

Duty Disability Retirement:

Eligibility - No age or service requirement.

Annual Amount – *Police/Fire:* Computed as a regular retirement. Minimum benefit is 25% of FAC. Upon termination of worker's compensation, additional service credit is granted for period in receipt of worker's compensation and benefit is recomputed.

All Others: Computed as a regular retirement. Minimum to age 60 is 18% of FAC. Minimum after age 60 is the sum of a) 12% of the portion of FAC not in excess of Social Security base plus b) 18% of FAC in excess of Social Security base. Upon termination of worker's compensation, additional service credit is granted for period in receipt of worker's compensation and benefit is recomputed.

Non-Duty Disability Retirement:

Eligibility - Must be vested. Refer to table on page C-10.

Annual Amount – *Police/Fire:* Computed as a regular retirement. Minimum benefit is 25% of FAC.

All Others: Computed as a regular retirement. Minimum to age 60 is 18% of FAC. Minimum after age 60 is the sum of a) 12% of the portion of FAC not in excess of Social Security base plus b) 18% of FAC in excess of Social Security base.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2020

Duty Death Before Retirement:

Eligibility - No age or service requirements.

Annual Amount – Computed as regular retirement but actuarially reduced in accordance with a 100% joint and survivor election. If the member had less than 25 years of service at time of death, a minimum of 25 years of service will be used to compute the benefits. Worker's compensation payments made to the member's beneficiary will offset the benefits paid by the Retirement System. Upon termination of worker's compensation payments the amount paid to the beneficiary will be the greater of the annual worker's compensation payment and the computed 100% joint and survivor retirement benefit.

Non-Duty Death Before Retirement:

Eligibility - Must be vested. Refer to table on page C-10.

Annual Amount - Computed as regular retirement but actuarially reduced in accordance with a 100% joint and survivor election. If there is no named beneficiary, a lump sum will be payable to the estate.

Post-Retirement Increases:

Subject to Ordinance provisions, adjustments may be made every July 1 to retirees and beneficiaries on the rolls at least 12 months. Adjustments are funded by financial gains and are not guaranteed.

Member Contributions:

AFSCME, Non-Union and Teamsters hired on/after 1/1/2017, Assistant Fire Chiefs hired on/after 7/1/2017, Police Deputy Chiefs hired on/after 6/5/2017, Police Service Specialist and Police Professional Assistants hired on/after 01/01/2018: 3.0% of annual compensation.

Fire hired prior to 7/1/2012: 6.0% of annual compensation until 1/1/2022.
Fire hired on/after 7/1/2012: 6.5% of annual compensation.

All Others: 6.0% of annual compensation.

Miscellaneous and Technical Assumptions
June 30, 2020

Benefit Service: Exact Fractional service is used to determine the amount of benefit payable.

Decrement Operation: Disability and mortality decrements do not operate during the first five years of service. Disability also does not operate during normal retirement eligibility.

Decrement Relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: 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.

Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed dollar amount shown in this report.

Liability Adjustments: None.

Missing Data: For any participant data (i.e., beneficiary information, pop-up benefit amount, etc.) that was not provided for the current valuation, the information from the prior year data was used if it was available. For instances where beneficiary information was not available, males were assumed to be 3 years older than females.

Normal Form of Benefit: A straight life benefit is the normal form of benefit.

Pay Increase Timing: Middle of (Fiscal) year. Reported pays for Fire members were adjusted for purposes of this valuation.

Service Credit Accruals: It is assumed that members accrue one year of service credit per year.

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.

Glossary

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 related to market value in a manner which spreads unexpected gains or losses over a period of future years.

SECTION D

PROJECTIONS

Projection Assumptions and Methods

For purposes of the funding projection, the following assumptions were used:

- 6.9% discount rate for determining liability.
- The Actuarial Value of Assets reflects the deferred gains and losses generated by the smoothing method. The current deferred amounts are recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section C. All future demographic experience is assumed to be exactly realized.
- The actuarially calculated contribution rate is determined as a percent of total payroll and contributed each year.
- Projections assume a 0% increase in the total active member population. All new future members are expected to enter the plan upon date of hire, under applicable plan provisions.
- The projections are based on the impact of the Minimum Required Policy.
- The Funding Plan policy establishing a minimum contribution amount equal to the prior year budgeted contribution increased by 2% was assumed to be temporarily suspended through fiscal year 2022
- The projections were developed utilizing the GRS Foresight^{TM} modelling tool.
- For the Sensitivity Analysis, all assumptions and methods are the same except investment returns on the Fair Value of Assets are assumed as follows:

Base:	6.90% for all future years
Optimistic:	7.90% for all future years
Pessimistic:	5.90% for all future years

Projected Actuarial Results – Base
Assumes 6.9% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2020	$ 3,164,729	$ 14,124,165	$ 17,288,894	$ 39,605,298	$ 520,439,737	$ 614,077,223	84.75%	$ 93,637,486	2022	$ 16,125,556	$ 16,125,556
2021	3,088,038	15,251,454	18,339,492	40,385,752	533,775,616	625,714,198	85.31%	91,938,582	2023	16,373,758	16,448,067
2022	3,187,091	16,125,556	19,312,647	42,144,768	542,841,211	636,721,186	85.26%	93,879,975	2024	16,978,109	16,777,028
2023	3,289,294	16,448,067	19,737,361	43,730,112	551,258,622	647,170,067	85.18%	95,911,445	2025	17,516,398	17,317,672
2024	3,339,942	16,978,109	20,318,051	45,243,274	560,047,032	657,105,499	85.23%	97,058,467	2026	18,019,125	17,866,726
2025	3,390,105	17,516,398	20,906,503	46,676,164	570,953,220	666,404,788	85.68%	95,451,568	2027	18,314,152	18,379,508
2026	3,446,596	18,019,125	21,465,721	47,949,647	581,973,839	675,196,123	86.19%	93,222,284	2028	18,596,755	18,747,098
2027	3,510,037	18,379,508	21,889,545	49,016,123	593,214,486	683,691,946	86.77%	90,477,459	2029	18,515,074	19,122,040
2028	3,581,095	18,747,098	22,328,193	49,921,749	604,835,145	692,064,388	87.40%	87,229,243	2030	18,404,399	19,504,481
2029	3,660,486	19,122,040	22,782,526	50,690,059	616,978,627	700,511,210	88.08%	83,532,583	2031	18,261,243	19,894,571
2030	3,741,048	19,504,481	23,245,529	51,269,658	629,850,397	709,266,516	88.80%	79,416,119	2032	18,085,009	20,292,462
2031	3,830,968	19,894,571	23,725,539	51,731,346	643,635,876	718,490,099	89.58%	74,854,223	2033	17,874,835	20,698,311
2032	3,922,599	20,292,462	24,215,061	52,253,312	658,342,289	728,173,562	90.41%	69,831,273	2034	17,638,941	21,112,277
2033	4,015,952	20,698,311	24,714,263	52,660,833	674,159,622	738,482,302	91.29%	64,322,680	2035	17,356,781	21,534,523
2034	4,120,129	21,112,277	25,232,406	52,963,485	691,291,699	749,593,443	92.22%	58,301,744	2036	17,040,572	21,965,213
2035	4,226,680	21,534,523	25,761,203	53,283,232	709,822,300	761,561,407	93.21%	51,739,107	2037	16,677,804	22,404,517
2036	4,335,641	21,965,213	26,300,854	53,620,678	729,840,699	774,450,248	94.24%	44,609,550	2038	16,258,984	22,852,607
2037	4,447,053	22,404,517	26,851,570	54,108,503	751,305,443	788,181,570	95.32%	36,876,127	2039	15,780,584	23,309,659
2038	4,560,952	22,852,607	27,413,559	54,833,399	774,082,844	802,574,909	96.45%	28,492,065	2040	15,246,312	23,775,852
2039	4,688,178	23,309,659	27,997,837	55,598,103	798,245,349	817,641,731	97.63%	19,396,382	2041	14,654,252	24,251,369
2040	4,818,723	23,775,852	28,594,575	56,371,168	823,892,763	833,447,341	98.85%	9,554,578	2042	14,002,743	24,736,396
2041	4,952,664	24,251,369	29,204,033	57,143,064	851,141,903	850,065,368	100.13%	(1,076,535)	2043	13,404,455	13,404,455
2042	5,090,077	24,736,396	29,826,473	57,915,083	880,116,580	867,575,312	101.45%	(12,541,269)	2044	13,827,344	13,827,344
2043	5,243,438	13,404,455	18,647,893	58,720,336	898,700,131	886,031,757	101.43%	(12,668,374)	2045	14,254,848	14,254,848
2044	5,401,299	13,827,344	19,228,643	59,611,729	918,244,766	905,441,414	101.41%	(12,803,352)	2046	14,711,190	14,711,190

Section 1.3 of the City of Ann Arbor General Pension Policy states:

"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

Projected Actuarial Results – Optimistic
Assumes 7.9% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2020	$ 3,164,729	$ 14,124,165	$ 17,288,894	$ 39,605,298	$ 520,439,737	$ 614,077,223	84.75%	$ 93,637,486	2022	$ 16,125,556	$ 16,125,556
2021	3,088,038	15,251,454	18,339,492	40,385,752	534,779,031	625,714,198	85.47%	90,935,168	2023	16,282,861	16,448,067
2022	3,187,091	16,125,556	19,312,647	42,144,768	546,009,089	636,721,186	85.75%	90,712,097	2024	16,683,884	16,777,028
2023	3,289,294	16,448,067	19,737,361	43,730,112	557,912,233	647,170,067	86.21%	89,257,835	2025	16,881,258	17,112,569
2024	3,339,942	16,777,028	20,116,970	45,243,274	571,460,734	657,105,499	86.97%	85,644,765	2026	16,896,252	17,454,820
2025	3,390,105	17,112,569	20,502,674	46,676,164	588,545,592	666,404,788	88.32%	77,859,197	2027	16,524,885	17,803,916
2026	3,446,596	17,454,820	20,901,416	47,949,647	606,346,511	675,196,123	89.80%	68,849,612	2028	16,024,893	18,159,994
2027	3,510,037	17,803,916	21,313,953	49,016,123	625,120,975	683,691,946	91.43%	58,570,971	2029	15,148,226	18,523,194
2028	3,581,095	18,159,994	21,741,089	49,921,749	645,045,863	692,064,388	93.21%	47,018,526	2030	14,161,269	18,893,658
2029	3,660,486	18,523,194	22,183,680	50,690,059	666,294,046	700,511,210	95.12%	34,217,164	2031	13,057,364	19,271,531
2030	3,741,048	18,893,658	22,634,706	51,269,658	689,117,608	709,266,516	97.16%	20,148,908	2032	11,830,993	19,656,962
2031	3,830,968	19,271,531	23,102,499	51,731,346	713,768,463	718,490,099	99.34%	4,721,636	2033	10,474,278	20,050,101
2032	3,922,599	19,656,962	23,579,561	52,253,312	740,329,283	728,173,562	101.67%	(12,155,721)	2034	10,270,181	10,270,181
2033	4,015,952	20,050,101	24,066,053	52,660,833	769,074,441	738,482,302	104.14%	(30,592,138)	2035	10,569,300	10,569,300
2034	4,120,129	10,270,181	14,390,310	52,963,485	789,765,228	749,593,443	105.36%	(40,171,785)	2036	10,888,434	10,888,434
2035	4,226,680	10,569,300	14,795,980	53,283,232	812,252,354	761,561,407	106.66%	(50,690,947)	2037	11,218,171	11,218,171
2036	4,335,641	10,888,434	15,224,076	53,620,678	836,665,145	774,450,248	108.03%	(62,214,897)	2038	11,551,679	11,551,679
2037	4,447,053	11,218,171	15,665,224	54,108,503	862,994,592	788,181,570	109.49%	(74,813,023)	2039	11,889,329	11,889,329
2038	4,560,952	11,551,679	16,112,631	54,833,399	891,133,692	802,574,909	111.03%	(88,558,783)	2040	12,239,762	12,239,762
2039	4,688,178	11,889,329	16,577,507	55,598,103	921,192,334	817,641,731	112.66%	(103,550,603)	2041	12,607,500	12,607,500
2040	4,818,723	12,239,762	17,058,485	56,371,168	953,329,837	833,447,341	114.38%	(119,882,496)	2042	12,994,522	12,994,522
2041	4,952,664	12,607,500	17,560,164	57,143,064	987,732,766	850,065,368	116.19%	(137,667,398)	2043	13,404,455	13,404,455
2042	5,090,077	12,994,522	18,084,599	57,915,083	1,024,603,061	867,575,312	118.10%	(157,027,750)	2044	13,827,344	13,827,344
2043	5,243,438	13,404,455	18,647,893	58,720,336	1,064,141,002	886,031,757	120.10%	(178,109,245)	2045	14,254,848	14,254,848
2044	5,401,299	13,827,344	19,228,643	59,611,729	1,106,485,961	905,441,414	122.20%	(201,044,547)	2046	14,711,190	14,711,190

Section 1.3 of the City of Ann Arbor General Pension Policy states:

"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

Projected Actuarial Results – Pessimistic
Assumes 5.9% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2020	$ 3,164,729	$ 14,124,165	$ 17,288,894	$ 39,605,298	$ 520,439,737	$ 614,077,223	84.75%	$ 93,637,486	2022	$ 16,125,556	$ 16,125,556
2021	3,088,038	15,251,454	18,339,492	40,385,752	532,772,305	625,714,198	85.15%	92,941,893	2023	16,464,645	16,448,067
2022	3,187,091	16,125,556	19,312,647	42,144,768	539,693,725	636,721,186	84.76%	97,027,461	2024	17,270,441	16,793,938
2023	3,289,294	16,464,645	19,753,939	43,730,112	544,707,425	647,170,067	84.17%	102,462,642	2025	18,141,762	17,615,850
2024	3,339,942	17,270,441	20,610,383	45,243,274	548,969,315	657,105,499	83.54%	108,136,184	2026	19,108,945	18,504,597
2025	3,390,105	18,141,762	21,531,867	46,676,164	554,177,258	666,404,788	83.16%	112,227,530	2027	20,020,384	19,491,124
2026	3,446,596	19,108,945	22,555,541	47,949,647	559,370,260	675,196,123	82.85%	115,825,863	2028	20,981,938	20,420,792
2027	3,510,037	20,020,384	23,530,421	49,016,123	564,788,503	683,691,946	82.61%	118,903,443	2029	21,514,651	21,401,577
2028	3,581,095	20,981,938	24,563,033	49,921,749	570,680,056	692,064,388	82.46%	121,384,332	2030	22,008,525	21,944,944
2029	3,660,486	21,514,651	25,175,137	50,690,059	576,773,865	700,511,210	82.34%	123,737,345	2031	22,503,745	22,448,695
2030	3,741,048	22,008,525	25,749,572	51,269,658	583,222,144	709,266,516	82.23%	126,044,372	2032	23,005,332	22,953,820
2031	3,830,968	22,503,745	26,334,712	51,731,346	590,179,325	718,490,099	82.14%	128,310,774	2033	23,515,696	23,465,439
2032	3,922,599	23,005,332	26,927,931	52,253,312	597,621,911	728,173,562	82.07%	130,551,651	2034	24,046,299	23,986,010
2033	4,015,952	23,515,696	27,531,648	52,660,833	605,707,583	738,482,302	82.02%	132,774,719	2035	24,580,002	24,527,225
2034	4,120,129	24,046,299	28,166,428	52,963,485	614,615,715	749,593,443	81.99%	134,977,729	2036	25,131,603	25,071,602
2035	4,226,680	24,580,002	28,806,682	53,283,232	624,384,512	761,561,407	81.99%	137,176,896	2037	25,693,401	25,634,235
2036	4,335,641	25,131,603	29,467,244	53,620,678	635,068,546	774,450,248	82.00%	139,381,702	2038	26,259,565	26,207,269
2037	4,447,053	25,693,401	30,140,454	54,108,503	646,580,227	788,181,570	82.03%	141,601,343	2039	26,831,436	26,784,756
2038	4,560,952	26,259,565	30,820,517	54,833,399	658,729,849	802,574,909	82.08%	143,845,059	2040	27,418,632	27,368,065
2039	4,688,178	26,831,436	31,519,615	55,598,103	671,531,247	817,641,731	82.13%	146,110,484	2041	28,025,423	27,967,005
2040	4,818,723	27,418,632	32,237,356	56,371,168	685,031,594	833,447,341	82.19%	148,415,747	2042	28,655,702	28,585,932
2041	4,952,664	28,025,423	32,978,087	57,143,064	699,295,966	850,065,368	82.26%	150,769,402	2043	29,313,998	29,228,816
2042	5,090,077	28,655,702	33,745,779	57,915,083	714,396,860	867,575,312	82.34%	153,178,451	2044	29,991,096	29,900,278
2043	5,243,438	29,313,998	34,557,436	58,720,336	730,394,897	886,031,757	82.43%	155,636,860	2045	30,678,017	30,590,918
2044	5,401,299	29,991,096	35,392,395	59,611,729	747,278,346	905,441,414	82.53%	158,163,068	2046	31,400,930	31,291,577

Section 1.3 of the City of Ann Arbor General Pension Policy states:

"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

APPENDIX

RISK MEASURES

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)
6/30/2011	$423,734,000	$481,330,000	$57,596,000	$45,921,381	88.0 %	922.7 %	1048.2 %	125.4 %
6/30/2012	410,709,000	496,770,000	86,061,000	44,003,987	82.7	933.3	1128.9	195.6
6/30/2013	407,170,000	507,435,000	100,265,000	45,063,112	80.2	903.6	1126.1	222.5
6/30/2014	433,854,000	523,461,000	89,607,000	47,956,745	82.9	904.7	1091.5	186.8
6/30/2015	459,480,000	533,198,000	73,718,000	48,759,189	86.2	942.3	1093.5	151.2
6/30/2016	470,029,000	548,201,000	78,172,000	50,057,471	85.7	939.0	1095.1	156.2
6/30/2017	489,943,000	571,074,000	81,131,000	53,583,277	85.8	914.4	1065.8	151.4
6/30/2018 *^	505,015,000	583,601,000	78,586,000	53,231,121	86.5	948.7	1096.4	147.6
6/30/2019	513,611,366	601,108,981	87,497,615	55,269,697	85.4	929.3	1087.6	158.3
6/30/2020	520,439,737	614,077,223	93,637,486	56,188,540	84.8	926.2	1092.9	166.6

* Revised actuarial assumptions.
^ Valuation results for 2018 and prior years were calculated by the City's prior actuary.

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

(6) and (7) The ratios of assets and liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5 and 7. 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 plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 3 or 4 may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

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-3 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	9.12	9.28	9.17
Ratio of actuarial accrued liability to payroll	10.93	10.88	10.63
Ratio of actives to retirees and beneficiaries	0.66	0.66	0.65
Ratio of net cash flow to market value of assets	-4.5%	-4.2%	-4.3%

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 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.

State Reporting Assumptions
As of June 30, 2020

The Protecting Local Government Retirement and Benefits Act, Public Act 202 of 2017, was put into law effective December 20, 2017. One outcome of the law is the requirement for the local unit of government to provide select reporting disclosures to the State. Sec. 5(1) of the Act provides the State treasurer with the authority to annually establish uniform actuarial assumptions for purposes of developing the requisite disclosures. Below you will find information which may be used to assist the local unit of government with required reporting.

Uniform Assumptions, as applicable to the measurement and the required disclosures under uniform assumptions are denoted below. Additional discussion of PA 202 and uniform assumptions may be found on the State website in the uniform assumption memo dated September 25, 2018.

Uniform Assumption	PA 202	Valuation Assumptions Used	Uniform Assumption Used
Investment Rate of Return Discount Rate	Maximum of 7.00%[1]	6.90%	6.90%
Salary Increase	Minimum of 3.50% or based on experience study within last 5 years	3.50% + Merit and longevity	3.50% + Merit and longevity
Mortality	Version of Pub-2010 or based on experience study within last 5 years	A version of RP-2014 (based on an experience study performed by the City's prior actuary)	A version of RP-2014 (based on an experience study performed by the City's prior actuary)
Amortization of the Unfunded Accrued Actuarial Liability: Period	Maximum Period of 19 Years	21 years	**19 years**
Method	Closed Plans: Level Dollar Open Plans: Level Percent of Payroll or Level Dollar	Level Dollar	Level Dollar
Type	Closed	Closed	Closed

State Reporting Assumptions
As of June 30, 2020

The following information has been prepared to provide some of the information necessary to complete the pension reporting requirements for the State of Michigan's Local Government Retirement System Annual Report (Form No. 5572). Additional resources are available on the State website.

3	**Financial Information[1]**		
4	Enter retirement pension system's assets (system fiduciary net position ending)	$	520,439,737
5	Enter retirement pension system's liabilities (total pension liability ending)	$	614,077,223
6	Funded ratio		Auto[5]
7	Actuarially Determined Contribution (ADC)[6]	$	16,125,556
8	Governmental Fund Revenues		TBD[4]
9	All systems combined ADC/Governmental fund revenues		Auto[5]
10	**Membership[1]**		
11	Indicate number of active members		725
12	Indicate number of inactive members		103
13	Indicate number of retirees and beneficiaries		1,102
14	**Investment Performance**		
15	Enter actual rate of return - prior 1-year period		TBD[4]
16	Enter actual rate of return - prior 5-year period		TBD[4]
17	Enter actual rate of return - prior 10-year period		TBD[4]
18	**Actuarial Assumptions[1]**		
19	Actuarial assumed rate of investment return[2]		6.90%
20	Amortization method utilized for funding the system's unfunded actuarial accrued liability, if any		Level Dollar
21	Amortization period utilized for funding the system's unfunded actuarial accrued liability, if any		21
22	Is each division within the system closed to new employees?		No
23	**Uniform Assumptions[3]**		
24	Enter retirement pension system's actuarial value of assets using uniform assumptions	$	520,439,737
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$	614,077,223
26	Funded ratio using uniform assumptions		Auto[5]
27	Actuarially Determined Contribution (ADC) using uniform assumptions[6]	$	16,531,213
28	All systems combined ADC/Governmental fund revenues		Auto[5]

[1.] Information on lines 4-5, lines 11-13, and lines 19-22 can be found in the Annual Actuarial valuation report.

[2.] Net of administrative and investment expenses.

[3.] Information on lines 24-28 is based on assumption listed on the prior page as of the most recent valuation date, June 30, 2020.

[4.] To be supplied by the City of Ann Arbor.

[5.] Automatically calculated by State of Michigan Form No. 5572.

[6.] Calculated as of June 30, 2020 applicable for fiscal year ending June 30, 2022.