City of Berkley Public Safety Retirement System

Actuarial Valuation Report

as of June 30, 2022

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December 16, 2022

The Retirement Board
City of Berkley
Public Safety Retirement System
Berkley, Michigan

Dear Board Members:

Submitted in this report are the results of the annual actuarial valuation of the City of Berkley Public Safety Retirement System which is based on Act 345, Public Acts of 1937, as amended. The date of the valuation was June 30, 2022. The purpose of the valuation is to measure the System's funding progress and liabilities and to determine the employer contribution for the fiscal year ending June 30, 2024. This report should not be relied upon for any other purpose.

This report was prepared at the request of the Retirement Board and is intended for use by the Board and those designated or approved by the Board. The report may be provided to parties other than the Board only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. The computed contribution shown on page A-2 may be considered a minimum contribution that complies with the Board's funding objectives. Users of this report should be aware that contributions made at this rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include analysis of the potential range of such future measurements.

This valuation is based upon the assumption that the plan sponsor will be able to make the contributions necessary to fund this plan in the future. A determination of the plan sponsors ability to do so is outside of the scope of our expertise and was not performed by us.

The valuation was based upon the assumptions and methods adopted by the Board, and information furnished by the City, including System benefits, financial transactions, plan provisions and member data. The information was checked for internal consistency but was not audited by us. As a result, we are unable to assume responsibility for the data provided.

The fiscal year 2024 contribution amounts shown in this report were determined using the actuarial assumptions and methods shown in Section C of this report. This report includes risk metrics on page D-1 but does not include additional risk metrics such as those that assess the risk of future experience not meeting actuarial assumptions. These additional risk metrics were beyond the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material impact on the System's financial condition.

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

This report has been prepared by consultants 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 Retirement System, as of June 30, 2022. The valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with the applicable state statutes. Louise Gates and Mark Buis are independent of the plan sponsor and are Members of the American Academy of Actuaries (MAAA) who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Louise Gates, ASA, FCA, MAAA

Mark Buis, FSA, EA, FCA, MAAA

SECTION A

VALUATION RESULTS AND COMMENTS

Financial Objective

The financial objective of the Retirement System is to establish and receive contributions, expressed as percentages of active member payroll, which will remain approximately level from year-to-year and will not have to be increased for future generations of citizens. This objective meets the requirements of the Act 345 and Section 24 of the Constitution of the State of Michigan.

Contribution Rates

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

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

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

(2) Amortize 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).

Contribution requirements for the fiscal year beginning July 1, 2023 are shown on page A-2.

General Implications of Contribution Allocation Procedure on Expected Future Contributions and Funded Status

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

1. The employer normal cost as a percentage of pay is expected to remain fairly level as a percentage of payroll.

2. The unfunded liability is expected to be paid off in approximately 12 years, which is the number of years remaining in the amortization period.

3. The funded status of the plan will gradually trend toward a 100% funded ratio

Contributions to Meet the Financial Objective of the Retirement System

	Contributions Expressed as Percents-of-Payroll Fiscal Year Beginning July 1	
	2023	**2022**
Normal Cost		
Age & service benefits	19.03 %	19.12 %
Disability benefits	1.46 %	1.45 %
Survivor benefits	0.17 %	0.16 %
Deferred age & service benefits	2.05 %	2.04 %
Refunds of member contributions	0.01 %	0.01 %
Total Normal Cost	22.72 %	22.78 %
Amortization Payment **		
Unfunded Accrued Liabilities (UAL)	29.30 %	22.47 %
Total Contribution Requirement	52.02 %	45.25 %
Member portion	0.22 %	0.20 %
City's portion *	51.80 %	45.05 %
Computed Dollar Contribution	$1,232,358	$1,143,410

** *The UAL was amortized over a period of 12 years (13 years for the prior year's valuation)*

* *Weighted average employee contribution rate*

Note: The computed City contribution dollars shown above equal the City contribution rate multiplied by projected fiscal year payroll.

Computed and Actual City Contributions
Comparative Statement

Fiscal Year Beginning July 1	Valuation Date June 30	Valuation Payroll	City Contributions		
			As a Percent-of-Payroll	As a Dollar Amount	Amount Contributed
1994	1994	$ 1,414,937	25.88 %	$ 378,325	$ 378,325
1995	1995	1,424,214	23.02 %	344,247	344,247
1996	1996	1,494,071	19.96 %	313,127	313,127
1997@	1997	1,524,038	6.94 %	111,057	111,057
1998	1998	1,557,337	0.00 %	0	0
1999	1999	1,580,061	0.00 %	0	0
2000	2000	1,692,169	0.00 %	0	0
2001	2001	1,589,553	0.00 %	0	0
2002	2002	1,705,343	0.00 %	0	0
2003!	2002	1,705,343	0.00 %	0	0
2004#!	2003	1,586,780	16.73 %	292,625	292,625
2005	2004	1,694,995	20.19 %	377,256	377,256
2006	2005	1,733,726	21.95 %	419,560	419,560
2007	2006	1,786,622	25.71 %	506,423	506,423
2008	2007	1,817,975	24.94 %	499,877	499,877
2009	2008	1,647,768	24.91 %	452,531	452,531
2010	2009	1,688,980	38.02 %	719,836 *	719,836
2011	2010	1,832,223	38.66 %	780,942	781,547
2012	2011	1,654,634	39.19 %	770,451 *	770,451
2013	2012	1,647,404	39.69 %	780,105 *	780,105
2014	2013	1,608,110	37.77 %	726,568 *	726,568
2015@#	2014	1,545,682	37.31 %	660,531 *	703,468
2016	2015	1,634,162	37.26 %	713,669 *	713,669
2017	2016	1,714,050	37.90 %	743,054 ^	743,054
2018	2017	1,886,521	37.14 %	774,630 *	774,630
2019@	2018	2,071,292	45.68 %	1,013,557	1,013,557
2020	2019	2,092,363	48.66 %	1,090,661	1,203,500
2021	2020	2,261,324	48.19 %	1,167,348	1,303,500
2022	2021	2,369,336	45.05 %	1,143,410	
2023	**2022**	**2,220,886**	**51.80 %**	**1,232,358**	

 # After changes in benefit provisions
@ After changes in actuarial assumptions or methods
! Fiscal year moved one year forward
** The recommended dollar contribution was based on projected pay for a 28 member active population.*
^ The recommended dollar contribution was based on projected pay for a 27 member active population.

Note: Valuation payroll is pay reported for the corresponding actuarial valuation.

Development of Funding Value of Retirement System Assets

Year Ended June 30	2019	2020	2021	2022
A. Funding Value Beginning of Year	$ 19,084,176	$ 19,062,554	$ 19,477,065	$ 21,003,782
B. Market Value End of Year	18,825,707	18,772,194	23,079,740	19,072,555
C. Market Value Beginning of Year	18,896,917	18,825,707	18,772,194	23,079,740
D. Non-Investment Net Cash Flow	(952,568)	(742,878)	(364,120)	(480,673)
E. Investment Income				
E1. Market Total: B - C - D	881,358	689,365	4,671,666	(3,526,512)
E2. Amount for Immediate Recognition	1,302,552	1,308,378	1,350,650	1,453,441
E3. Amount for Phased-In Recognition: E1-E2	(421,194)	(619,013)	3,321,016	(4,979,953)
F. Phased-In Recognition of Investment Income				
F1. Current Year: 0.25 x E3	(105,299)	(154,753)	830,254	(1,244,988)
F2. First Prior Year	(30,014)	(105,299)	(154,753)	830,254
F3. Second Prior Year	139,079	(30,014)	(105,299)	(154,753)
F4. Third Prior Year	(375,372)	139,077	(30,015)	(105,297)
F5. Total Recognized Investment Gain / (Loss)	(371,606)	(150,989)	540,187	(674,784)
G. Funding Value End of Year				
G1. Preliminary Funding Value End of Year: A+D+E2+F5	19,062,554	19,477,065	21,003,782	21,301,766
G2. Upper Corridor Limit: 120% x B	22,590,848	22,526,633	27,695,688	22,887,066
G3. Lower Corridor Limit: 80% x B	15,060,566	15,017,755	18,463,792	15,258,044
G4. Adjustment to Funding Value	0	0	0	0
G5. Funding Value End of Year	19,062,554	19,477,065	21,003,782	21,301,766
H. Difference between Market & Funding Value: B-G5	(236,847)	(704,871)	2,075,958	(2,229,211)
I. Recognized Rate of Return	5.0%	6.2 %	9.8%	3.8%
J. Market Value Rate of Return	4.8%	3.7%	25.1%	(15.4)%

Actuarial Balance Sheet at June 30, 2022

Present Resources and Expected Future Resources

A. Accrued value of System assets	
1. Net assets from System financial statements (market value)	$19,072,555
2. Market value adjustment	2,229,211
3. Actuarial value of assets	21,301,766
B. Present value of expected future contributions	
1. For normal costs	4,461,434
2. For unfunded actuarial accrued liability	6,998,411
3. Totals	11,459,845
C. Present value of expected future member contributions	45,100
D. Total Present and Expected Future Resources	$32,806,711

Present Value of Expected Future Benefit Payments and Reserves

A. To retirants and beneficiaries	$19,935,558
B. To vested terminated members	380,461
C. To present active members to valuation date	
1. Allocated to service rendered prior to valuation date	7,984,158
2. Allocated to service likely to be rendered after valuation date	4,506,534
3. Totals	12,490,692
D. Total Present Value of Expected Future Benefit Payments	$32,806,711

Derivation of Actuarial Gain (Loss)
Year Ended June 30, 2022

The actuarial gains or losses realized in the operation of the Retirement System provide an experience test. Gains and losses are expected to cancel each other over a period of years and sizable year-to-year fluctuations are common. Detail on the derivation of the actuarial gain (loss) is shown below, along with a comparative schedule.

1. Unfunded Actuarial Accrued Liability (UAAL) at beginning of year	$6,219,589
2. Total normal cost	539,735
3. Actual contributions	1,362,482
4. Interest accrual	407,062
5. Expected UAAL before changes: (1)+(2)-(3)+(4)	5,803,904
6. Change due to plan changes	0
7. Change due to revised actuarial assumptions and methods	0
8. Expected UAAL after changes: (5)+(6)+(7)	5,803,904
9. Actual UAAL at end of year	6,998,411
10. Gain (loss): (8)-(9)	(1,194,507)
11. Gain (loss) as percent of actuarial accrued liabilities at beginning of year ($27,223,371)	(4.4)%

Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
2018	(4.3)%
2019	(2.5)%
2020	(0.9)%
2021	1.3 %
2022	(4.4)%

Comments and Recommendations

Comment A: There were no assumption changes reflected in this valuation of the System. No benefit changes were reported to the actuary in connection with this valuation of the System. The change in contributions over the prior valuation is due primarily to System experience.

Comment B: Retirement System experience was overall unfavorable for the year ending June 30, 2022. During the year, the net return on System assets was lower than long term expectations. The market smoothing techniques used in this valuation of the System recognize both past and present investment experience, and as a result, the recognized rate of investment return was 3.8%. Additional information about the asset smoothing method is shown on page A-4 of this report. Additional sources of unfavorable experience include more retirees than expected and higher retiree liabilities than projected by actuarial assumptions. This unfavorable experience was offset slightly by additional City contributions made to the pension fund during the 2021-2022 fiscal year.

Comment C: The funded ratio of the System (measured using the funding value of assets) as of June 30, 2022 was 75.3%. The funded ratio measured on the same basis as of June 30, 2021 was 77.2%. If the market value of System assets were used to measure the funded ratio as of June 30, 2022 the result would be 67.4%.

Unless otherwise indicated, a funded status measurement presented in this report is based on the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to the funded status measurements shown in this report we note the following:

- The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
- The measurement is inappropriate for assessing the need for or the amount of future employer contributions.
- The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

Comment D: Each year, the actuary compares the actuarial present value of retired benefit payments to the value of assets in the Retired Benefit Payments Reserve. To the extent that there is a shortfall, a reserve transfer is made. As of the valuation date, the value of retiree benefits ($19,935,558) was greater than the assets held in the reserve for those payments ($18,302,699) by $1,632,859. Based on the information provided, and in accordance with the Retirement System Ordinance, we recommend the transfer of $1,632,859 to the Reserve for Retirement Benefit Payments as soon as practical.

Comment E: Michigan Public Act 202 of 2017 has created new reporting and other requirements for local units of government. One of the requirements of the Act is to engage the System's actuary to conduct an experience study at least once every 5 years. Since the last study was prepared in January, 2019 we recommend that the study be conducted before January 2024.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the actuarial 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 actuarial 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 actuarial 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 actuarial 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 actuarial 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.

SECTION B

SUMMARY OF BENEFITS, ASSETS AND VALUATION DATA

Brief Summary of Act 345 Benefit Conditions Evaluated June 30, 2022

Eligibility	Amount
Service Retirement	
25 or more years of service or age 60 regardless of service. Military service prior to employment and other public employment may be purchased.	Straight life pension equals 2.8% (2.5% for PSO members hired on or after 7/1/2013) of 3 year Average Final Compensation (AFC) times first 25 years of service plus 1% of AFC times years of service in excess of 25 years. Maximum benefit is 85% of "base" wages.
Deferred Retirement	
10 or more years of service.	Computed as service retirement but based upon service, AFC and benefit in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.
Death After Retirement Survivor's Pension	
Payable to a surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later.	Spouse's pension equals 60% of the straight life pension the deceased retirant was receiving. If the pension is deferred the benefit terminates after the retiree expires, with no survivor benefit.
Non-Duty Death-In-Service Survivor's Pension	
Payable to a surviving spouse, if any, upon the death of a member with 20 or more years of service.	Accrued straight life pension actuarially reduced in accordance with an Option I Election.
Duty Death-In-Service Survivor's Pension	
Payable upon the expiration of worker's compensation to the survivors of a member who died in the line of duty.	Same amount that was paid by worker's compensation.
Non-Duty Disability	
Payable upon the total and permanent disability of a member with 5 or more years of service.	To Age 55: 1.5% of AFC times years of service. At Age 55: Same as Service Retirement Pension.
Duty Disability	
Payable upon the total and permanent disability of a member in the line of duty.	To Age 55: 50% of AFC. At Age 55: Same as Service Retirement Pension with service credit from date of disability to age 55.
Member Contributions	
The Police Chief contributes 5% of pay.	
Annuity Withdrawal	
Accumulated member contributions, (including interest and contributions made for purchasing service), may be withdrawn at retirement with an actuarial reduction in the pension that would otherwise be payable.	

Summary of Reported Asset Information for the Year Ending June 30, 2022

Assets

	Market Value June 30, 2022
Cash & Equivalents	$ 1,187,817
Receivables	0
Bonds	6,554,586
Mortgages	324,651
Stocks	10,708,307
Short term Investment Funds	327,592
Other	0
Total Assets	19,102,953
Less Accounts Payable	(30,398)
Net Assets Available for Benefits	$ 19,072,555

Revenues and Expenses

	2021-2022
Balance - July 1,	$23,079,740
Revenues	
Employees' Contributions	58,982
Employer Contributions	1,303,500
Investment Return	(3,317,097)
Miscellaneous	1,030
Total Revenues	(1,953,585)
Expenses	
Benefit Payments	1,843,155
Refunds of Member Contributions	0
Investment Expense	131,636
Administrative Expenses	78,809
Total Expenses	2,053,600
Balance - June 30,	$19,072,555

Asset Information Reported for Valuation
Comparative Statement

Year Ended June 30	Assets Beginning of Year	Revenues			Expenses			Assets End of Year
		Employee Contrib.	Employer Contrib.	Investment Income	Retirement Benefits	Contrib. Refunds	Other Expenses	
1998	$ 16,080,089	$ 81,254	$ 111,057	$ 3,762,185	$ 560,624			$ 19,473,961
1999	19,473,961	81,395	0	2,561,968	614,674			21,502,650
2000	21,502,650	88,649	0	1,812,161	636,402	$ 14,168		22,752,890
2001	22,752,890	93,699	0	(2,392,068)	756,044	0	$ 183,766	19,514,711
2002	19,514,711	96,804	0	(2,453,331)	767,649	8,384	0	16,382,151
2003	16,382,151	111,965	0	170,760	889,334	0	126,768	15,648,774
2004	15,648,774	104,386	0	2,427,293	984,655	0	145,931	17,049,867
2005	17,049,867	7,971	292,625	455,205	938,432	0	18,268	16,848,968
2006	16,848,968	5,322	377,256	1,452,669	963,993	0	151,565	17,568,657
2007	17,568,657	15,742	419,560	2,583,235	989,037	0	196,187	19,401,970
2008	19,401,970	4,364	506,423	(1,233,491)	1,094,152	0	202,100	17,383,014
2009	17,383,014	66,965	499,877	(2,950,976)	1,239,764	0	173,434	13,585,682
2010	13,585,682	4,333	452,531	2,294,799	1,265,067	0	194,160	14,878,118
2011	14,878,118	4,332	719,836	3,058,201	1,463,789	0	162,961	17,033,737
2012	17,033,737	4,332	781,547	53,953	1,375,119	0	161,430	16,337,020
2013	16,337,020	956	770,451	1,999,573	1,499,465	0	157,763	17,450,772
2014	17,450,772	90,169	780,105	2,881,903	1,575,360	62,921	180,407	19,384,261
2015	19,384,261	0	726,568	490,876	1,682,082	0	175,824	18,743,799
2016	18,743,799	0	703,468	24,920	1,704,339	0	166,978	17,600,870
2017	17,600,870	0	713,669	2,115,613	1,742,208	0	182,062	18,505,882
2018	18,505,882	121,717	743,054	1,461,708	1,752,501	0	182,943	18,896,917
2019*	18,900,211	38,385	774,630	1,063,649	1,768,877	0	182,291	18,825,707
2020	18,825,707	6,718	1,013,557	875,510	1,763,153	0	186,145	18,772,194
2021	18,772,194	204,534	1,203,500	4,870,632	1,772,154	0	198,966	23,079,740
2022	**23,079,740**	**58,982**	**1,303,500**	**(3,316,067)**	**1,843,155**	**0**	**210,445**	**19,072,555**

* *Includes an audit adjustment of $3,294.*

Retirants and Beneficiaries Added to and Removed from Rolls
Comparative Statement

Year Ended June 30	Added to Rolls#		Removed from Rolls		Rolls End of Year				Average Pensions	Present Value of Pensions
	No.	Annual Pensions	No.	Annual Pensions	No.	Active per Retired	Annual Pensions Dollars	Annual Pensions % of Pay		
1991	3	$ 103,610			25	1.2	$ 425,926	34.4%	$ 17,037	$ 4,645,389
1992	3	58,036	1	$ 6,783	27	1.1	477,179	37.3%	17,673	5,215,578
1993	2	65,854	1	4,070	28	1.0	538,963	41.5%	19,249	5,931,622
1994	1	11,333	1	18,887	28	1.0	531,409	37.6%	18,979	5,763,025
1995	1	22,178	1	36,965	28	1.0	516,622	36.3%	18,451	5,513,187
1996	1	3,848	1	6,414	28	1.1	514,056	34.4%	18,359	5,410,663
1997	2	34,774	1	5,530	29	1.1	543,300	35.6%	18,734	5,678,617
1998	2	56,645	1	3,849	30	1.0	596,097	38.3%	19,870	6,284,914
1999	2	46,523	1	14,173	31	1.0	628,447	39.8%	20,272	6,570,560
2000			1	5,294	30	1.0	623,153	36.8%	20,772	6,455,369
2001	1	42,625			31	0.9	665,778	41.9%	21,477	6,839,727
2002	2	71,192	1	6,744	32	0.9	730,226	42.8%	22,820	7,495,638
2003	3	145,171	2	16,383	33	0.8	859,014	54.1%	26,031	8,958,356
2004			1	14,278	32	0.9	844,737	49.8%	26,398	8,737,103
2006					33	0.8	892,606	50.0%	27,049	9,025,910
2007	1	42,670			34	0.8	935,276	51.4%	27,508	9,405,669
2008	4	177,044			38	0.7	1,112,320	67.5%	29,272	11,359,299
2009@	3	179,333	2	27,277	39	0.7	1,264,376	74.9%	32,420	12,781,894
2010					39	0.7	1,264,376	69.0%	32,420	12,569,401
2011	2	113,798			41	0.6	1,378,174	83.3%	33,614	13,641,380
2012	3	97,326	2	63,615	42	0.6	1,411,885	85.7%	33,616	13,906,305
2013	4	127,462	2	27,273	44	0.6	1,512,074	94.0%	34,365	15,018,784
2014	6	216,242	2	46,234	48	0.5	1,682,082	108.8%	35,043	17,698,072
2015	1*				49	0.5	1,682,082	102.9%	34,328	17,384,622
2016	3	106,752	3	48,778	49	0.5	1,740,056	101.5%	35,511	18,143,792
2017	3*	53,671	2	75,456	50	0.5	1,718,271	91.1%	34,365	17,775,644
2018	1	64,435	1	13,828	50	0.6	1,768,878	85.4%	35,378	19,063,414
2019					50	0.5	1,768,878	84.5%	35,378	18,739,827
2020	1	17,174	1	28,624	50	0.6	1,757,428	77.7%	35,149	18,302,699
2021	2	74,017	1	32,822	51	0.6	1,798,623	75.9%	35,267	18,632,203
2022	5	150,281	2	36,751	54	0.5	1,912,153	86.1%	35,410	19,935,558

@ Amounts include post-retirement increases.

 # Includes beneficiaries of deceased retirees.

** Includes Alternate Payee(s).*

Retirants and Beneficiaries as of June 30, 2022
Tabulated by Type of Pensions Being Paid

Type of Pensions Being Paid	Number	Annual Pensions
Age and Service Pensions		
Regular pension - benefit terminating at death of retirant	14	$ 354,340
Regular pension automatic 60% to surviving spouse	18	772,635
Option 1 - joint and 100% survivor benefit	11	525,737
Option 2 - joint and 50% survivor benefit	0	0
Survivor beneficiary	10	227,733
Total age and service pensions	53	1,880,445
Disability Pensions		
Duty Disability*	1	31,708
Total disability pensions	1	31,708
Total	**54**	**$1,912,153**

** Includes only individuals reported to be receiving disability benefits (generally, those under age 55 which is the benefit re-computation age).*

The valuation of the System also includes 2 terminated vested members who are not yet receiving their benefits, with an average age of 55.0 years and average annual estimated benefits of $16,208.

Active Members Included in Valuation
Comparative Statement

Valuation Date June 30	No. of Actives	Valuation Payroll	Averages			% Incr. in Average Pay
			Age	Years of Service	Pay	
1998	30	$1,557,337	41.2	14.5	$51,911	5.6 %
1999	31	1,580,061	40.4	13.6	50,970	(1.8)%
2000	31	1,692,169	41.4	14.6	54,586	7.1 %
2001	28	1,589,553	42.5	16.1	56,770	4.0 %
2002	29	1,705,343	42.0	15.5	58,805	3.6 %
2003	27	1,586,780	42.6	14.7	58,770	(0.1)%
2004	28	1,694,995	42.9	16.0	60,536	3.0 %
2005	28	1,733,726	42.9	16.1	61,919	2.3 %
2006	28	1,786,622	43.9	17.2	63,808	3.1 %
2007	28	1,817,975	44.0	17.2	64,928	1.8 %
2008	26	1,647,768	41.0	14.4	63,376	(2.4)%
2009	27	1,688,980	40.0	13.3	62,555	(1.3)%
2010	28	1,832,223	40.8	13.8	65,437	4.6 %
2011	25	1,654,634	40.8	13.5	66,185	1.1 %
2012	25	1,647,404	41.1	13.3	65,896	(0.4)%
2013	25	1,608,110	40.3	11.8	64,324	(2.4)%
2014	26	1,545,682	36.6	8.0	59,449	(7.6)%
2015	25	1,634,162	38.1	9.3	65,366	10.0 %
2016	25	1,714,050	39.4	8.2	68,562	4.9 %
2017	27	1,886,521	39.6	8.5	69,871	1.9 %
2018	28	2,071,292	40.5	8.7	73,975	5.9 %
2019	27	2,092,363	41.3	10.0	77,495	4.8 %
2020	29	2,261,324	41.4	10.3	77,977	0.6 %
2021	30	2,369,336	41.4	10.4	78,978	1.3 %
2022	27	2,220,886	41.5	10.6	82,255	4.1 %

Additions to and Removals from Active Membership
Actual and Expected Numbers

Year Ended June 30	Number Added During Year		Terminations During Year										Active Members End of Year
			Normal Retirement		Disabled		Died In Service		Withdrawals				
									Vested	Other	Total		
	A	E	A	E	A	E	A	E	A	A	A	E	
2013	3	3	3	3.4	0	0.0	0	0.0	0	0	0	0.7	25
2014	5	4	4	1.5	0	0.1	0	0.0	0	0	0	0.8	26
2015	0	1	0	0.0	0	0.1	0	0.0	0	1	1	0.9	25
2016	4	4	1	0.0	1	0.1	0	0.0	0	2	2	0.9	25
2017	2	0	0	0.0	0	0.1	0	0.0	0	0	0	0.8	27
2018	2	1	1	0.0	0	0.1	0	0.0	0	0	0	0.8	28
2019	0	1	0	0.0	0	0.1	0	0.0	0	1	1	0.8	27
2020	2	0	0	0.0	0	0.1	0	0.0	0	0	0	0.8	29
2021	2	1	1	0.0	0	0.1	0	0.0	0	0	0	0.8	30
2022	2	5	2	0.4	0	0.1	0	0.0	1	2	3	0.8	27
10 Year Total	22	20	12	5.3	1	0.9	0	0.0	1	6	7	8.1	

A = Actual number E = Expected number based on assumptions outlined in Section C.

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

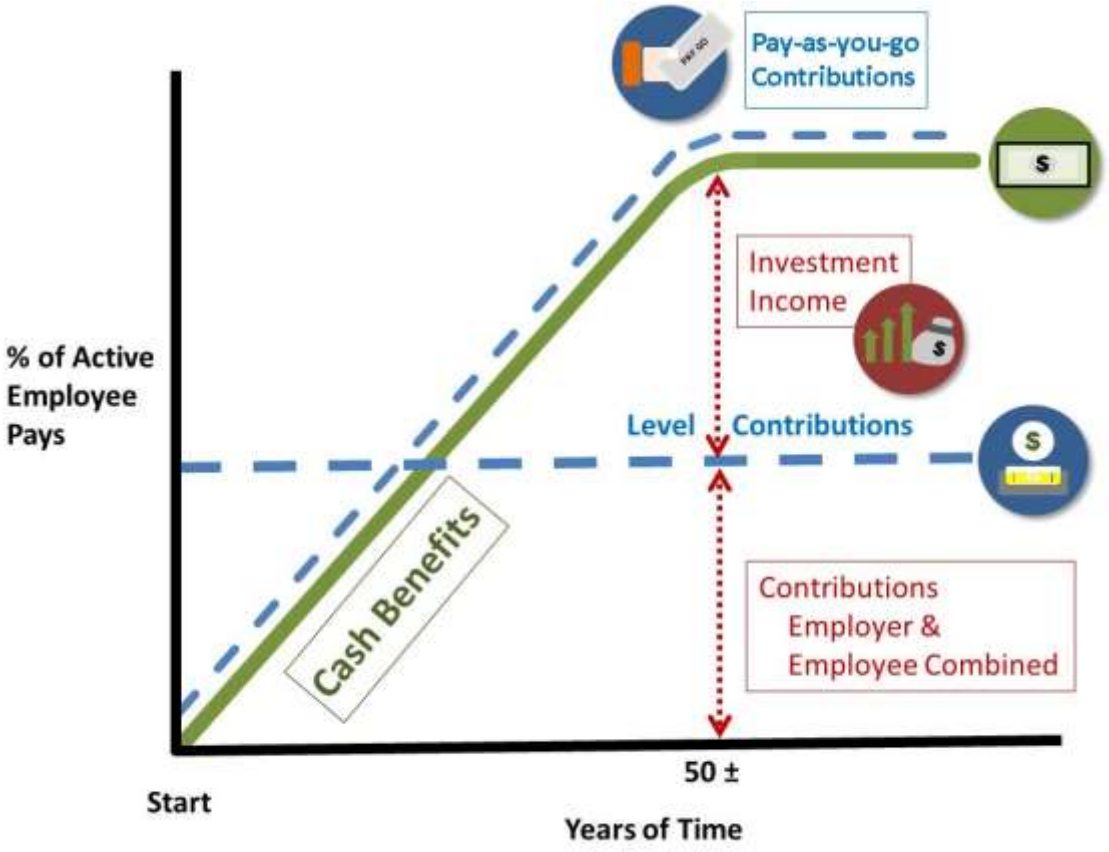
Age Group	Years of Service on Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Salary
25-29	1							1	$ 58,427
30-34	1	4						5	369,535
35-39	1	2	2					5	383,936
40-44		2	1	3	1			7	637,585
45-49		2	1	1				4	339,199
50-54		2			1			3	259,667
55-59	1	1						2	172,537
Totals	**4**	**13**	**4**	**4**	**2**			**27**	**$ 2,220,886**

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

Age:	41.5 years
Service:	10.6 years

SECTION C

ACTUARIAL VALUATION PROCESS, ACTUARIAL ASSUMPTIONS AND METHODS AND DEFINITIONS OF TECHNICAL TERMS



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

The Actuarial Valuation Process

The financing diagram on the previous page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program) which is an ***increasing contribution method***; and the ***level contribution method*** which equalizes contributions between the generations.

The actuarial valuation is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

A. ***Covered Person Data***, furnished by plan administrator:
Retired lives now receiving benefits
Former employees with vested benefits not yet payable
Active employees

B. + ***Asset data*** (cash & investments), furnished by plan administrator

C. + ***Assumptions concerning future financial experience in various risk areas***, which assumptions are established by the Retirement Board after consulting with the actuary

D. + ***The funding method*** for employer contributions (the long-term, planned pattern for employer contributions)

E. + ***Mathematically combining the assumptions, the funding method, and the data***

F. = Determination of:
Plan financial position
and/or New Employer Contribution Rate

Actuarial Methods Used for the Valuation

Normal cost and the allocation of actuarial present values between service rendered before and after the valuation date were determined using an individual entry-age actuarial cost method having the following characteristics:

(1) The annual normal costs for each individual active member, payable from the member's date of entry to the member's projected date of retirement, are sufficient to accumulate the actuarial present value of the member's future service benefit at the time of retirement; and

(2) Each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Amortization of Unfunded Actuarial Accrued Liabilities. The Unfunded Actuarial Accrued Liability (UAAL) was determined using the funding value of assets and actuarial accrued liability calculated as of the valuation date. The UAAL amortization payment (one component of the contribution requirement), is the level percent of pay required to fully amortize the UAAL over a 12-year period beginning on the date contributions determined by this report are scheduled to begin. This UAAL payment reflects any payments expected to be made between the valuation date and the date contributions are scheduled to begin.

Active member payroll was assumed to increase 3.5% a year for the purpose of determining the level percent of pay contributions.

Funding Value of Assets: 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 4-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.

Actuarial Assumptions Used for the Valuation

Investment Return - 7.0% per year, compounded annually (net of investment and administrative expenses). This assumption is used to equate the value of payments due at different points in time and was first used for the June 30, 2018 valuation.

Pay Projections - These assumptions are used to project current pays to those upon which benefits will be based. The base (economic) rates were first used for the June 30, 2018 valuation.

Sample Ages	Annual Rate of Pay Increase for Sample Ages	
	Base (Economic)	Merit and Longevity
20	3.5%	4.0%
25	3.5%	4.0%
30	3.5%	3.6%
35	3.5%	2.1%
40	3.5%	1.2%
45	3.5%	1.2%
50	3.5%	1.2%
55	3.5%	1.1%
60	3.5%	1.0%
Ref:		99

Actuarial Assumptions Used for the Valuation

Rates of Mortality - This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. The tables noted below were first used for the June 30, 2018 valuation.

Descriptions of the tables and sample life expectancies are as follows:

- **Healthy Pre-Retirement:** RP-2014 Employee Mortality Table, adjusted for mortality improvements to 2025 using projection scale MP-2018 from 2006.
- **Healthy Post-Retirement:** RP-2014 Healthy Annuitant Mortality Table, adjusted for mortality improvements to 2025 using projection scale MP-2018 from 2006.
- **Disability Retirement:** RP-2014 Disabled Annuitant Mortality Table, adjusted for mortality improvements to 2025 using projection scale MP-2018 from 2006.

Sample Ages	Future Life Expectancy (Years)*					
	Healthy Pre-Retirement		Healthy Post-Retirement		Disabled Retirement	
	Men	Women	Men	Women	Men	Women
50	34.31	38.61	32.44	34.96	22.79	26.99
55	29.63	33.85	28.14	30.45	20.08	23.60
60	25.09	29.17	23.97	26.07	17.38	20.43
65	20.80	24.59	19.99	21.88	14.78	17.34
70	16.79	20.12	16.21	17.87	12.26	14.24
75	13.08	15.80	12.68	14.09	9.83	11.29
80	9.69	11.70	9.50	10.65	7.57	8.69

** Based on retirements in 2022. Retirements in future years will reflect improvements in life expectancy.*

Actuarial Assumptions Used for the Valuation

Rates of separation from active membership **-** These 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. The rates were first used for the June 30, 1997 valuation.

Sample Ages	Percent Separating within Next Year
25	5.0%
30	4.7%
35	4.3%
40	3.2%
45	1.4%
50	0.9%
55	0.9%
60	0.9%
Ref:	147

Rates of Disability **-** These assumptions represent the probabilities of active members becoming disabled.

Sample Ages	Men	Women
20	0.07%	0.03%
25	0.09%	0.05%
30	0.10%	0.07%
35	0.14%	0.13%
40	0.21%	0.19%
45	0.32%	0.28%
50	0.52%	0.45%
55	0.92%	0.76%
60	1.53%	1.10%
65	1.65%	0.98%
Ref:	33	34

It is assumed that 50% of future disabilities are duty related.

Actuarial Assumptions Used for the Valuation

Rates of Retirement **-** These rates are used to measure the probabilities of an eligible member retiring during the next year.

Retirement Ages	Percents of Eligible Active Members Retiring within Next Year
45-49	35%
50	60%
51	45%
52	35%
53	25%
54	25%
55	25%
56	25%
57	25%
58	45%
59	55%
60	100%
Ref	519

A member was assumed to be eligible for retirement with 25 years of service or after attaining age 60. These rates were first used for the June 30, 1992 valuation.

Active Member Group Size **-** The number of active members was assumed to remain constant. This assumption is unchanged from previous valuations.

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active valuation purposes.
Pay Increase Timing:	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and mortality decrements do not operate during the first 5 years of service. Disability does not operate during retirement eligibility.
Loads:	Age and Service Retirement Present Values were loaded by 12% to account for the additional amount included in the FAC due to unused sick time and unused vacation time.
Option Factors:	Option factors are based upon 7.0% interest and a unisex blend of the RP-2014 Mortality Tables (95% male and 5% female).
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent-of-payroll shown in this report, and the actual payroll payable at the time contributions are made.
Normal Form of Benefit:	A 60% automatic joint and survivor payment is the normal form of benefit for all benefits which commence immediately to married members. For the terminated deferred vested benefits, the assumed normal form of benefit is the straight life form.
Benefit Service:	Exact Fractional service is used to determine the amount of benefit payable.

Definitions of Technical Terms

Accrued Service: Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability: The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as "past service liability."

Actuarial Assumptions: Estimates of future 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 benefits" between future normal costs and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent: One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

Actuarial Gain (Loss): The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

Actuarial Present Value: The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payments.

Actuary: A person who is trained in the applications of probability and compound interest to solve problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.

Amortization: Paying off an interest-discounted amount with periodic payments of interest and (generally) principal -- as opposed to paying off with a lump sum payment.

Definitions of Technical Terms

Credited Projected Benefit: The portion of a member's projected benefit attributable to service before the valuation date - allocated based on the ratio of accrued service to projected total service and based on anticipated future compensation.

Normal Cost: The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as "current service cost."

Unfunded Actuarial Accrued Liabilities: The difference between actuarial accrued liabilities and valuation assets. Sometimes referred to as "unfunded past service liability" or "unfunded supplemental present value."

Most retirement systems have unfunded actuarial accrued liabilities. They arise each time new benefits are added and each time an actuarial loss occurs.

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

Valuation Assets: The value of cash, investments and other property belonging to a pension plan, as used for the purpose of an actuarial valuation.

SECTION D

OTHER FINANCIAL INFORMATION

Schedule of Funding Progress
(Dollar Amounts in Millions)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percent of Covered Payroll [(b)-(a)]/(c)
6/30/12	$16.2	$21.4	$5.2	75.7%	$1.6	325.0%
6/30/13	17.2	21.5	4.3	80.0%	1.6	268.8%
6/30/14	18.3	22.3	4.0	82.1%	1.5	266.7%
6/30/15	18.6	22.8	4.2	81.6%	1.6	262.5%
6/30/16	18.9	23.2	4.3	81.5%	1.7	252.9%
6/30/17	19.1	23.3	4.2	82.0%	1.9	221.1%
6/30/18	19.1	25.2	6.1	75.7%	2.1	290.5%
6/30/19	19.1	25.9	6.8	73.6%	2.1	323.8%
6/30/20	19.5	26.5	7.0	73.6%	2.3	304.3%
6/30/21	21.0	27.2	6.2	77.2%	2.4	258.3%
6/30/22	21.3	28.3	7.0	75.3%	2.2	318.2%

Summary of Actuarial Methods and Assumptions

The information presented below was determined as part of the latest actuarial valuation as follows:

Valuation Date	June 30, 2022
Actuarial Cost Method	Entry-Age
Amortization Method	Level percent-of-pay
Amortization Period	12 years (closed)
Asset Valuation Method	4-year smoothed market 80%/120% corridor

Actuarial Assumptions:

Investment rate of return	7.0%
Projected salary increases*	3.5% - 7.5%
Cost-of-living adjustments	N.A.
Payroll growth	3.5%
Group size growth	0%

**Includes wage inflation at 3.5%.*

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December 16, 2022

Mr. Mark W. Pollock
Finance Director
City of Berkley
3338 Coolidge Highway – City Hall
Berkley, Michigan 48072

Dear Mark:

Enclosed please find a copy of the June 30, 2022 Annual Actuarial Valuation for the City of Berkley Public Safety Retirement System.

Respectfully submitted,

Louise Gates

Louise M. Gates, ASA, FCA, MAAA

Enclosure

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723