



Employees' Retirement System of the City of Baltimore

**Actuarial Valuation Report
as of June 30, 2022**

Produced by Cheiron

November 2022

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November 7, 2022

Board of Trustees
Employees' Retirement System
of the City of Baltimore
7 East Redwood Street, 12th Floor
Baltimore, Maryland 21202-3470

Dear Members of the Board:

We are pleased to submit the June 30, 2022 Actuarial Valuation of the Employees' Retirement System of the City of Baltimore (the System). This report contains information on the System's assets and liabilities, as well as discloses employer contribution levels. Financial disclosures are provided in a separate Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 reports.

The purpose of this report is to present the annual actuarial valuation of the Employees' Retirement System of the City of Baltimore. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

This report was prepared solely for the Employees' Retirement System of the City of Baltimore for the purposes described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

This report and its contents have been prepared in accordance with generally accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Sincerely,
Cheiron



Anu Patel, FSA, MAAA, EA
Principal Consulting Actuary



Matt Deveney, FSA, MAAA, EA
Principal Consulting Actuary



EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022

FOREWORD

Cheiron is pleased to provide the annual actuarial valuation report of the **Employees' Retirement System of the City of Baltimore** as of June 30, 2022. The purpose of this report is to:

- 1) **measure and disclose**, as of the valuation date, the financial condition of the System,
- 2) **report** on past and expected financial trends,
- 3) **determine** the recommended contributions for FYE 2024, and
- 4) **provide specific information** and documentation to support the City's funding obligation and information required by the auditors of the System.

An actuarial valuation establishes and analyzes the System assets and liabilities on a consistent basis, and traces the progress of both from one year to the next. It includes measurement of the System's investment performance as well as an analysis of actuarial liability gains and losses. This valuation report is organized as follows:

Section I presents a summary of the valuation and compares this year's results to last year's results.

Section II identifies the primary risks to the System as well as provides background information and assessment of these risks.

Section III contains exhibits relating to the valuation of assets.

Section IV shows the various measures of liabilities and presents an analysis of the experience gains and losses over the past year and the source of changes to the unfunded actuarial accrued liability.

Section V develops the City contribution rate.

The appendices to this report contain a summary of the System's membership at the valuation date, a summary of the major provisions of the System, and the actuarial methods and assumptions used in the valuation.

In preparing our report, we relied on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23 Data Quality.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

FOREWORD

This report was prepared using census data and financial information as of the valuation date, June 30, 2022. Events following that date are not, and should not be, reflected in this report. Actual experience, both demographic and economic, will be reflected in subsequent valuations as experience emerges.

The actuarial assumptions reflect our understanding of the likely future experience of the System and represent our best estimate, in cooperation with the Board's views, for the future experience of the System. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

The employers' annual contributions to this System are determined as the sum of the net normal cost, reflecting a provision for administrative expenses, and an amortization of the System's unfunded actuarial liability. The employer contribution rate will change when benefits are modified or assumptions are changed. The rate also changes in response to actuarial gains and losses on either the assets or the liabilities of the System. This report was prepared using census data and financial information as of June 30, 2022 as provided to us by the System and does not reflect any subsequent changes in the membership or assets.

EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022

SECTION I – SUMMARY

The key results of the June 30, 2022 actuarial valuation are as follows:

- Investments earned -3.65% on a market value basis. The expected rate of return is defined by the definition of *Regular Interest* in the City Code, which for the prior year were 6.50% for participant liability in pay status and 7.00% for all other liabilities. For comparing the actual return, we determined a liability weighted expected return (taking the regular interest times a ratio of the respective present value of benefits for active and deferred vested participants versus participants in pay status over the total present value of benefits of the entire System) which resulted in a blended expected discount rate in the prior year of 6.71%.
- Due to smoothing of the prior investment gains and losses, the actuarial asset value return was 6.79%, producing a net loss of \$7.7 million to the System this year when measured against the expected asset return rate of 7.00%.
- The Unfunded Actuarial Liability (UAL), which represents the Actuarial Liability minus Actuarial Assets, decreased from \$594.74 million on June 30, 2021 to \$523.54 million on June 30, 2022. This decrease is partly attributable to the demographic experience gain of \$24.3 million as a result of higher than expected mortality among inactive members and lower than expected pay increases. Details of the gains and losses are presented in detail in Section IV of this report.
- The System's funded ratio, which is the ratio of actuarial asset value to actuarial liability, increased from 77.1% last year to 79.9% this year.
- The total recommended contribution decreased from \$94,788,090 for FYE 2023 to \$89,287,690 for FYE 2024. This represents a decrease in cost as a percent of payroll from 20.82% to 20.32% for FYE 2024. The expected employee contribution rate for active Plan C and Plan D members used to offset the City's cost is 5% of pay.
- The funding policy previously adopted by the Board provides for the unfunded actuarial liability to be amortized over a fixed period of 20 years targeting 100% funding by the fiscal year ending 2032. For the June 30, 2019 valuation, the Board adopted a one-time, one-year extension of the amortization period. As of the current valuation, the remaining amortization period is 10 years.
- Employees hired or rehired after July 1, 2014 are covered under the Class D membership if they elect the "hybrid" plan option at time of employment. As of June 30, 2022 there are 2,935 Class D members out of total active membership of 7,725, representing 38.0% of the total active members in the System.
- Under the plan provisions for Hybrid Class D members, if the funded status of this Class of members falls below 85% then up to half the City contributions to the Retirement Savings Plan (which would be an additional 1.5% of pay) will be diverted to this Plan. The current Plan D funded status is 93.7% as shown in Section V this report.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION I – SUMMARY

The tables below provide details on the development of the FYE 2024 contribution results, unfunded actuarial liabilities, and statistics on Plan membership. The total lump sum costs determined as payable at the beginning of the fiscal year reflect the offset of expected member contributions.

Table I-1 Valuation Summary				
	2021 Valuation Applies to FYE 2023		2022 Valuation Applies to FYE 2024	
	Amount	% of Pay	Amount	% of Pay
1 Contributions				
Total Normal Cost (with expenses)	\$ 33,593,160	7.38%	\$ 32,407,784	7.38%
Expected Employee Contributions FYE 2019/2020 ¹	<u>(19,788,897)</u>	-4.35%	<u>(19,265,979)</u>	-4.39%
Employer Normal Cost	\$ 13,804,263	3.03%	\$ 13,141,805	2.99%
Amortization of Unfunded Actuarial Liability	\$ 74,124,488	16.28%	\$ 69,663,780	15.86%
Interest to Beginning of Next FY	<u>\$ 6,859,339</u>	1.51%	<u>\$ 6,482,105</u>	1.48%
Total Lump Sum Cost	\$ 94,788,090	20.82%	\$ 89,287,690	20.32%
Total Covered Payroll	\$ 455,219,365		\$ 439,326,244	
2 Unfunded Liabilities				
Actuarial Liability				
Active	\$ 963,939,222		\$ 924,933,718	
Retirees and Dependents	1,560,647,213		1,602,929,409	
Terminated Vested	<u>68,833,756</u>		<u>72,657,615</u>	
Total	\$ 2,593,420,191		\$ 2,600,520,742	
Less: Actuarial Value of Assets	\$ 1,998,676,321		\$ 2,076,981,256	
Unfunded Actuarial Liability	\$ 594,743,870		\$ 523,539,486	
Funded Ratio based on Actuarial Value of Assets		77.1%		79.9%
Funded Ratio based on Market Value of Assets		81.2%		75.9%

¹ Expected Employee Contributions are 5% of pay for Plan C and Plan D members

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION I – SUMMARY

The following tables summarize changes in plan membership over the past year.

Table I-2 Active Membership Summary						
	Active Members			Payroll		%
	2021	2022	% Increase	2021	2022	Increase
Class A	8	6	-25.00%	\$ 376,915	\$ 293,211	-22.21%
Class C	5,329	4,784	-10.23%	303,801,135	279,406,778	-8.03%
Class D	<u>2,995</u>	<u>2,935</u>	-2.00%	<u>151,041,315</u>	<u>159,626,255</u>	5.68%
Total	8,332	7,725	-7.29%	\$ 455,219,365	\$ 439,326,244	-3.49%
Average				\$ 54,635	\$ 56,871	4.09%

Table I-3 Inactive Membership Summary						
	Number of Retirees			Average Annual Benefit Amount		
	2021	2022	% Increase	2021	2022	% Increase
Receiving Benefits						
Normal Service Retirement	6,041	6,129	1.5%	\$ 20,034	\$ 20,697	3.3%
Discontinued Service	758	727	-4.1%	23,963	24,533	2.4%
Ordinary Disability	774	739	-4.5%	10,243	10,479	2.3%
Accidental Disability	51	51	0.0%	24,817	24,692	-0.5%
Social Security Equalization	7	6	-14.3%	7,227	8,492	17.5%
Beneficiaries of Above	1,451	1,437	-1.0%	8,940	9,121	2.0%
Ordinary Death	106	110	3.8%	14,431	14,986	3.8%
Special Death	<u>6</u>	<u>8</u>	33.3%	<u>21,344</u>	<u>23,310</u>	9.2%
Total	9,194	9,207	0.1%	\$ 17,736	\$ 18,321	3.3%
Deferred Benefits						
Terminated Vested*	1,046	1,089	4.1%	\$ 9,981	\$ 10,311	3.3%

*Benefit amounts for 9 vested participants were not provided; we assumed a monthly benefit of \$900.

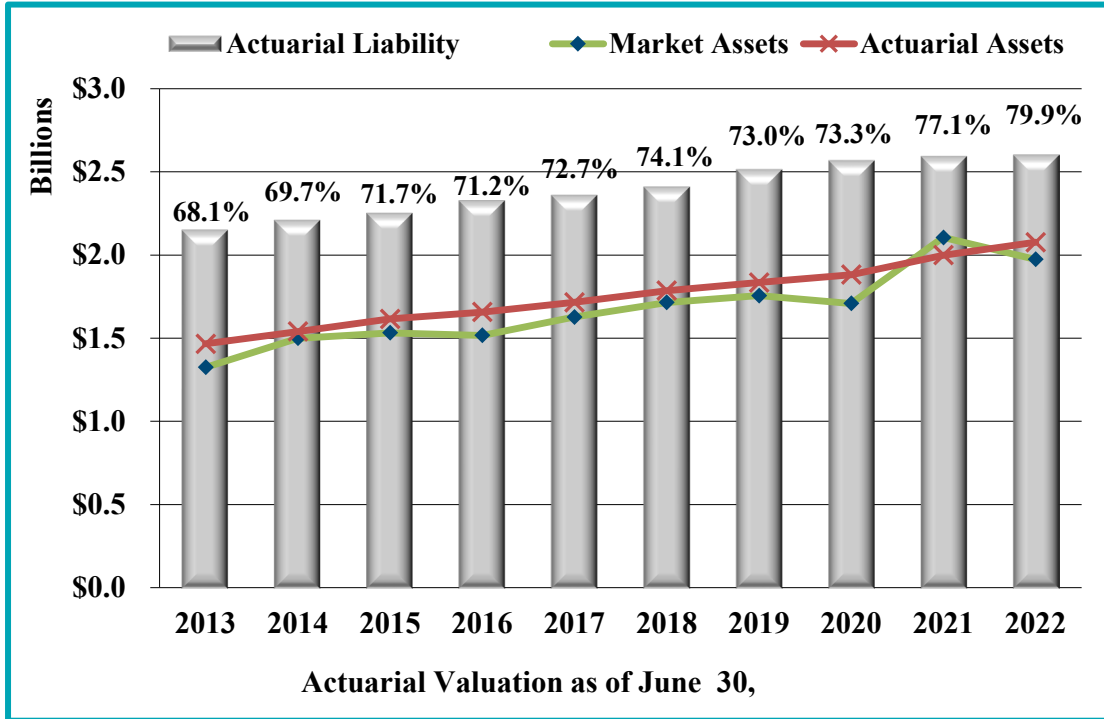
**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION I – SUMMARY

Historical Trends

It is important to take a step back from these latest results and view them in the context of the System's recent history. Below, we present a series of charts which display key factors in the valuations of the last 10 years.

Assets and Liabilities



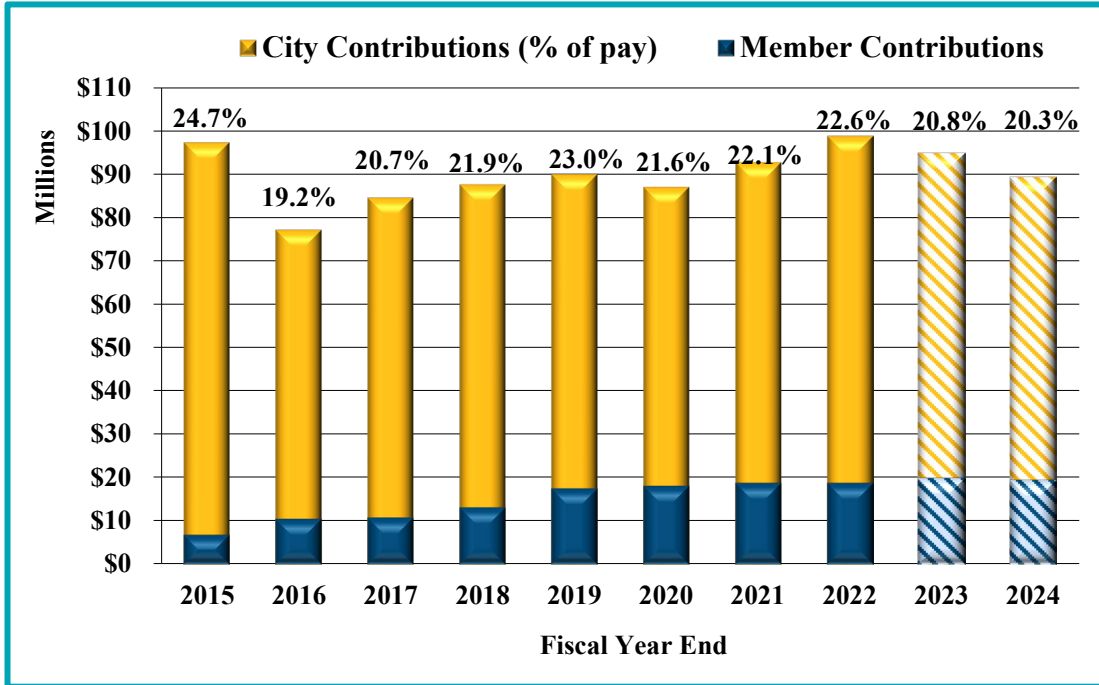
The chart above shows historical trends since 2013 for the market and actuarial value of assets compared to the actuarial liability. The actuarial asset value reflects the market value plus one-fifth of the aggregate investment earnings above or below the expected return. We also show the progress of the Retirement System's funded ratios (ratio of actuarial assets over actuarial liabilities) provided along the top of each bar. In 2019, the funded ratio decreased from 74.1% to 73.0% primarily due to the change in discount rate and changes in assumptions resulting from the experience study. In 2021, the funded ratio increased due to investment gains. In 2022, the funded ratio increased despite the investment losses, because of the large demographic gains and investment gains from the prior year that helped offset the large investment losses in the current year. The funded ratio increased from 77.1% to 79.9% due to the experience gains partially offset by investment losses.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION I – SUMMARY

Contribution Rates

This graph shows the historical trends for the actuarially calculated contributions (including City and member contributions) and net City contribution rate as a percent of payroll, shown above each bar. Because there is a one-year lag in the determination of the City contributions, we show the actual contributions made through FYE 2022 and estimated amounts for FYE 2023 and FYE 2024.



The percentages above the bars show the City contribution rate net of member contributions as a percent of pay. The higher level costs in 2015 are a reflection of an increasing unfunded actuarial liability in part due to historical investment losses and the City’s rate prior to the adoption of member contributions. The City contribution rate drops for FYE 2016 mainly due to the one-time credit applied for contributions already made by the City in excess of the required amounts due to the member contribution offset. Beginning with FYE 2014 member contributions started at 1% of pay increasing by 1% each year, if salary also increased at least 2% in each of those years. During FYE 2017 because the 2% salary increase did not occur, member contributions remained at 3% instead of the scheduled increase to 4%. Therefore, the expected member contributions remained at 4% of pay during FYE 2018, increasing to 5% of pay for FYE 2019 and thereafter. The FYE 2021 costs reflect the changes in assumptions and the one-year extension for the amortization period. The FYE 2023 and 2014 costs dropped, both in dollar amounts and as a percent of pay due decreases in the unfunded liability resulting from the investment and demographic experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

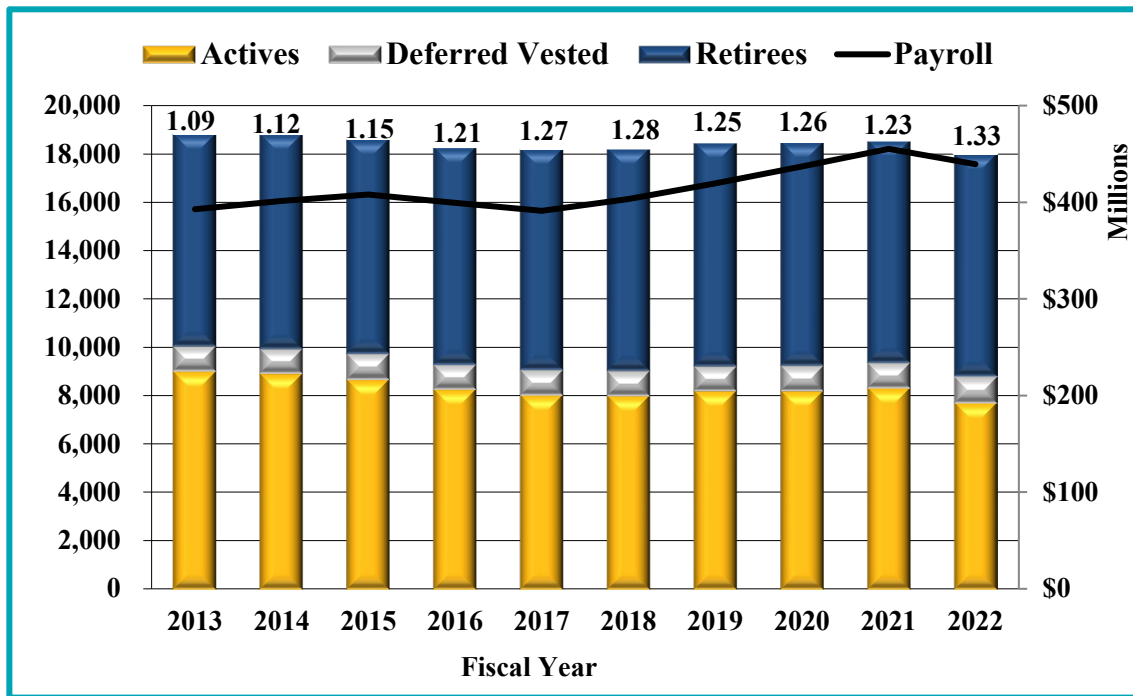
SECTION I – SUMMARY

Participant Trends

The chart below shows the membership counts of the System at successive valuations. The numbers which appear above each bar represent the ratio of the number of inactive members to active members at each valuation date. The number of inactive per each active had been overall steadily increasing since 2013 through 2022, with the exception of decreases in 2019 and 2021.

The black line represents the total covered payroll over the period, and it corresponds with the scale on the right. Payroll had remained fairly level from 2013 to 2015, declined in 2016 and 2017. Payroll has steadily increased from 2018 to 2021 but decreased in 2022. Generally, the declining trend in active members was due to the introduction of Plan D which had a one year wait period for membership and an option to opt out of the Hybrid Plan D to participate in a defined contribution plan. The number of active members had been decreasing each year since 2013, then increasing from 2018 through 2021 but decreased in 2022. The decrease in active members for FYE 2022 was mainly due to lower number of new entrants as well as higher retirements and terminations compared to prior years.

The ratio of inactive to active participants (support ratio) as of the current valuation is 1.33, up from 1.23 in the prior year. This increase reflects a decline in active members. The implications of this ratio are that while the unfunded liability represents the System overall, the cost of paying it off is measured as a percent of active participant payroll. Therefore, the costs as a percent of payroll is more volatile for a plan with a ratio of inactive to active participants greater than 1.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION I – SUMMARY

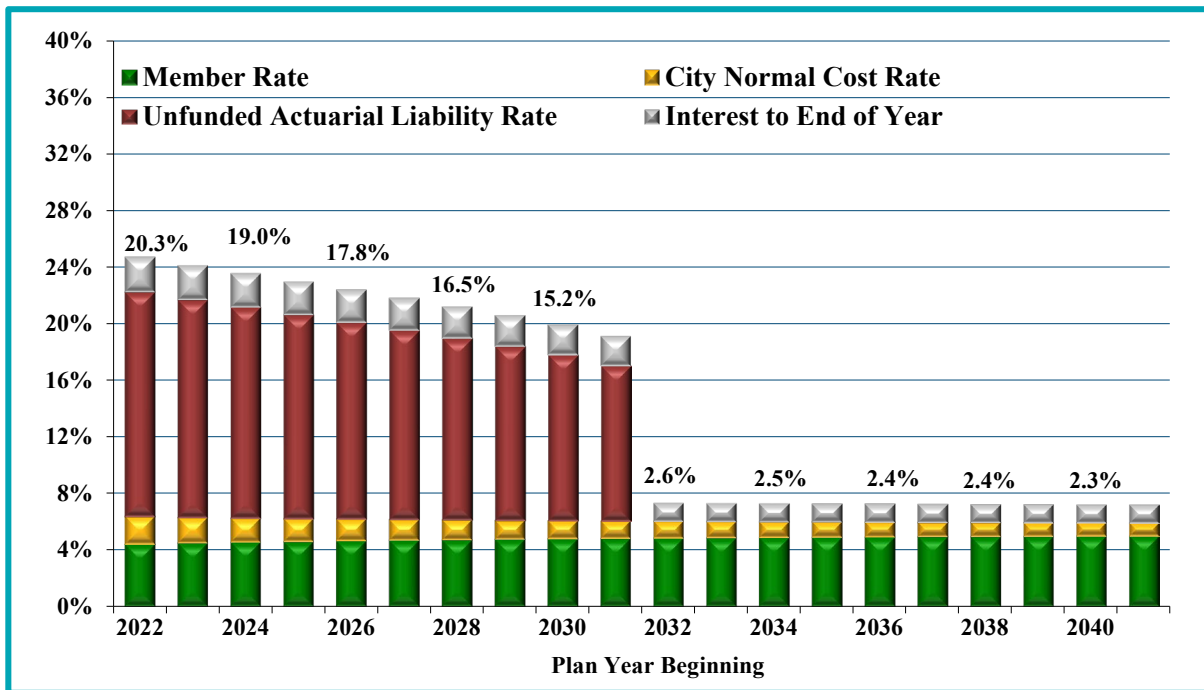
Projections

Base Line Projections

The following chart shows the expected progress of the System's funded status over the next 20 years measured in terms of the City's contribution rate and the funded ratio assuming the long-term return rate of 7.00% and all other actuarial assumptions are met. Future new hires are expected to participate in Class D and will earn a lower benefit accrual rate and contribute at 5.0% of pay.

The projections assume there will be no future gains or losses on the liability. These projections are also based on assuming all of the valuation assumptions are exactly met, including the long-term rate of return and covered payroll increasing by 3.40% per year.

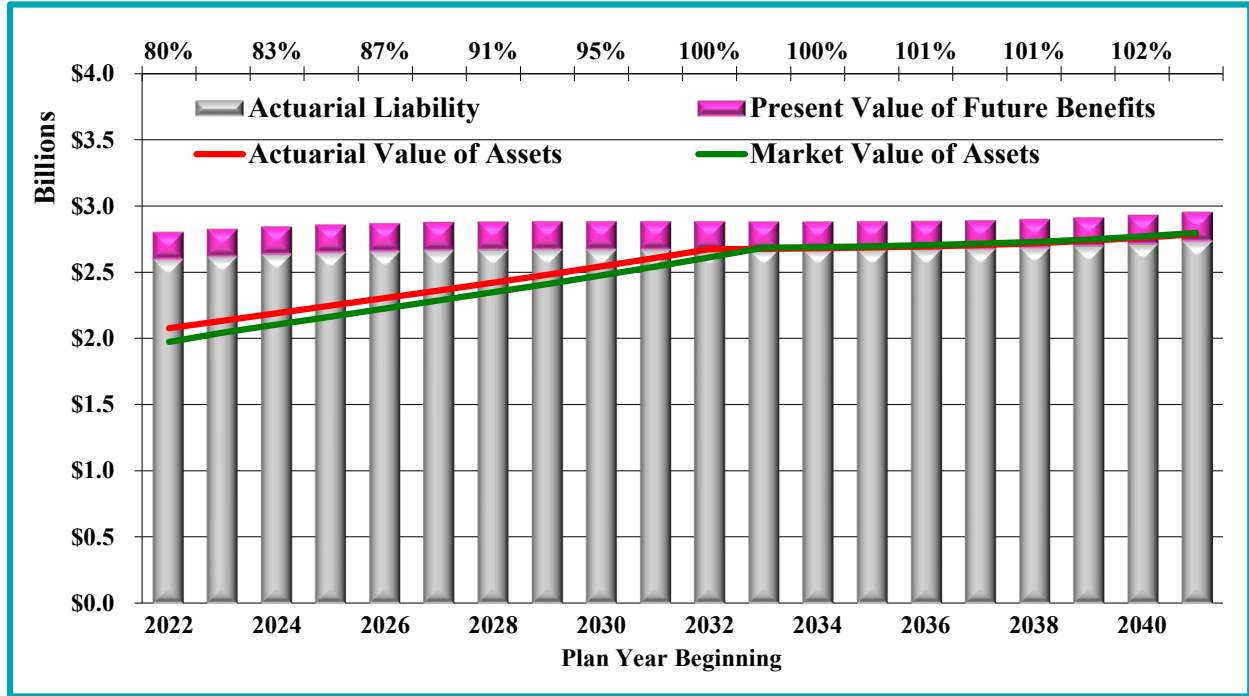
The chart shows the expected member contribution rate, the normal cost rate, the rate of pay of amortization of the unfunded actuarial liability (UAL rate), and the net City's total contribution rate (numbers on the top of the bars). The City's total cost as a percent of payroll is projected to decrease over the projection period as a function of 1) the funding policy which pays the unfunded liability over a fixed period resulting in level dollar amortization payments, and 2) an increasing proportion of Plan D active membership with a lower normal cost rate. The cost eventually drops to around 2.6% in 2032 when the unfunded liability is projected to be fully paid off and the majority of remaining active members are expected to be covered as Class D members. The 5.0% contribution rate for Class D members is expected to cover most of the normal cost rate, the cost of the annual benefit accrual with the balance of the cost to cover the cost of administrative expenses. Therefore, the City's net cost will trend toward 2.3% as Class C members retire.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION I – SUMMARY

The next chart compares Assets and Liabilities and shows that if all actuarial assumptions are exactly met, the System's funded ratio shown along the top of the graph (actuarial asset value as a ratio of actuarial liability) is projected to improve gradually from the current level of 80% to 100% funding in 10 years by 2032.



This pattern of funded status improvement is a function of the funding policy to amortize the UAL over a fixed 21-year period including the one-year extension adopted for the June 30, 2019 valuation. The financial experience of the System will not conform exactly to the assumptions every year. As a result, in addition to the baseline projection, we provided additional stress testing in the future in Section II of this report.

SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Introduction

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the System, provide some background information about those risks, and provide an assessment of those risks.

Identification of Risks

As we have discussed with the Board, the fundamental risk to the System is that the contributions needed to pay the benefits become unaffordable. While we believe it is unlikely that the System by itself would become unaffordable, the contributions needed to support the Plan may differ significantly from expectations. While there are a number of factors that could lead to contribution amounts becoming unaffordable, we believe the primary risks are:

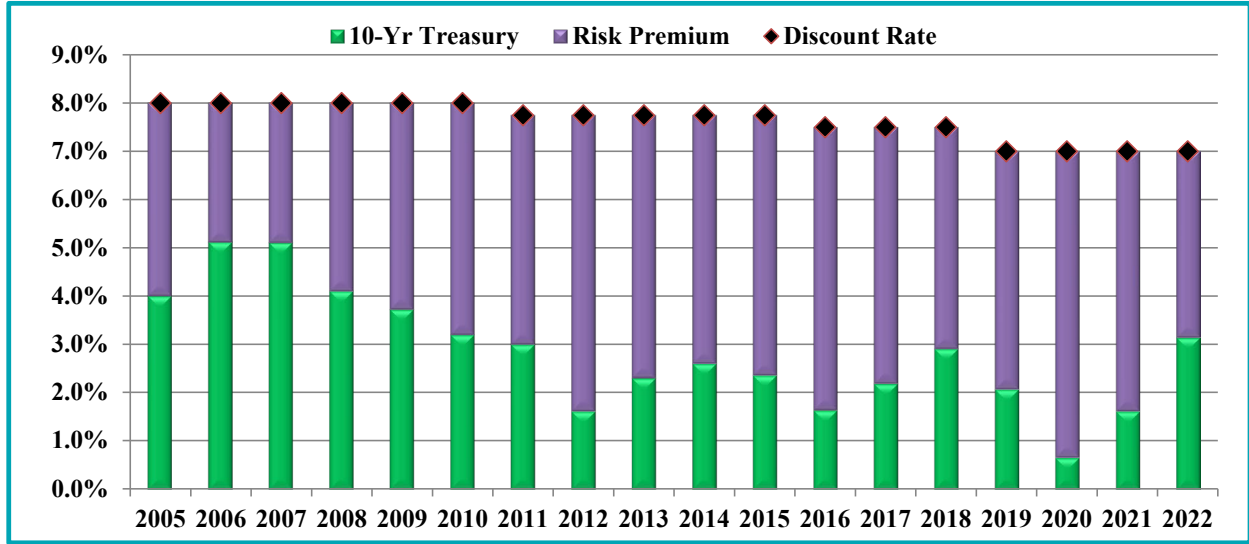
- Investment risk,
- Interest rate risk,
- Longevity and other demographic risks; and
- Assumption change risk.

Investment Risk is the potential for investment returns to deviate from what is expected. When actual investment returns are lower than the investment return assumption used in the actuarial valuation, the unfunded actuarial liability will increase from what was expected and will require higher contributions than otherwise anticipated. But when actual returns exceed the assumption, the resulting unfunded liability measurements and actuarially determined contributions will be lower than anticipated. The potential volatility of future investment returns is determined by the System's asset allocation and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsor or other contribution base.

Interest Rate Risk is the potential for interest rates to be different than expected. For public plans, short term fluctuations in interest rates have little or no effect as the system's liability is usually measured based on the expected return on assets. Longer-term trends in interest rates however can have a powerful effect. The chart below shows the yield on a 10-year Treasury security compared to the System's assumed rate of return. The difference is a simple measure of the amount of investment risk taken. As interest rates have declined, plans face a choice: maintain the same level of risk and reduce the expected rate of return; maintain the same expected rate of return and take on more investment risk; or some combination of the two strategies. The System has reduced their discount rate for active and terminated vested participants from 8.00% to 7.00% over the period shown.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION II – IDENTIFICATION AND ASSESMENT OF RISK



Longevity and Other Demographic Risks are the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time as the actual experience deviates from expected. In addition, the extensive number of assumptions related to longevity and other demographic experience often result in offsetting factors contributing to the System’s overall liability experience. As such, these risks are often dwarfed by other risks, particularly those due to investment returns.

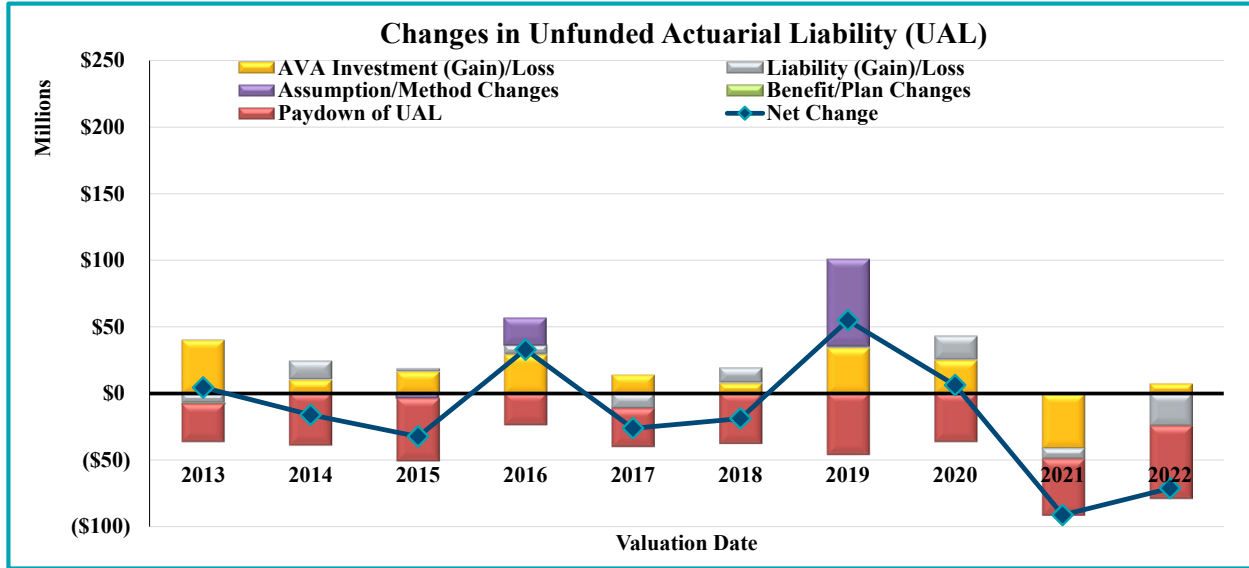
Assumption Change Risk is the potential for the environment to change such that future valuation assumptions are different from the current assumptions. For example, declines in interest rates over time may result in a change in the assumed rates of return used in the valuation. A healthier workforce may result in changes in employee behavior such that retirement rates are adjusted to reflect employees working longer. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable. The historical review section below illustrates that assumption change risk has had a measurable impact when assumptions were updated as a result of experience studies and lowering of the discount rate.

In understanding the impact of some of these risks, it is useful to look at past experience deviations. These deviations are commonly referred to as actuarial gains and losses. The chart below shows the components of changes in the Unfunded Actuarial Liability (UAL) for the System over the last ten years, including AVA investment gains and losses, liability gains and losses, assumption and method changes, and the paying down of the UAL. Amounts below the horizontal axis are gains, or decreases to the UAL, while amounts above the axis are losses, or increases to the UAL. The net UAL change is shown by the dark blue line. Table II-1 below the chart summarizes the changes in the UAL over the last ten years.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Historical Changes in UAL 2013-2022



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Discount Rate	7.75%	7.75%	7.75%	7.50%	7.50%	7.50%	7.00%	7.00%	7.00%	7.00%	
Source											
AVA Investment (G)/L	\$ 40.1	\$ 10.3	\$ 16.5	\$ 29.2	\$ 14.2	\$ 7.9	\$ 34.2	\$ 25.1	\$ (40.6)	\$ 7.7	\$ 144.6
Liability (G)/L	(7.0)	14.0	2.1	6.9	(11.3)	11.3	1.4	17.7	(8.2)	(24.3)	2.6
Assumption/Method Changes	0.0	0.0	(3.8)	20.9	0.0	0.0	65.5	0.0	0.0	0.0	82.6
Benefit/Plan Changes	0.0	(1.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(1.0)
Paydown of UAL ¹	(28.7)	(39.4)	(47.2)	(24.1)	(29.1)	(38.1)	(46.3)	(36.7)	(42.5)	(54.6)	(386.7)
Total UAL Change	4.4	(16.1)	(32.4)	32.9	(26.2)	(18.9)	54.8	6.1	(91.3)	(71.2)	\$ (157.9)

¹ UAL change due to benefit accruals and payments, contributions, timing, and interest.

On a smoothed asset basis, the investment gains and losses (gold bars) from 2013 to 2022 reflect investment losses in every year between 2013 through 2022, with the exception of an investment gain in 2021. Over the ten-year period, investment gains and losses, have added approximately \$144.6 million to the UAL.

On the liability side (gray bars), the System has experienced offsetting gains and losses, increasing the UAL by approximately \$2.6 million over the ten-year period.

Assumption and method changes (purple bars) have increased the UAL by approximately \$82.6 million over the ten-year period. The significant assumption changes have demographic changes from the experience studies in 2016, and 2019. It is important to note that investment return changes reflect a downward revision to the estimate of future investment earnings, and ultimately costs will be determined by actual investment earnings. We are continuing to see investment consultants reduce their capital market assumptions with the continued low-interest rate environment.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Benefit and Plan changes (green bars) have decreased the UAL by approximately \$1.0 million over the ten-year period.

Each year the UAL is expected to decrease as the System contributes towards the UAL, assuming no future investment and liability gains and losses. Net changes due to paying down the UAL (red bars), which reflects benefit accruals and payments, contributions, and timing, have decreased the UAL by approximately \$386.7 million over the last ten years.

SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Plan Maturity Measures

As pension plans become more mature, the primary risks of adverse investments, demographic deviations, plan changes, and assumption change experience become of more significant concern. As a result, it has become increasingly important to examine measures that indicate a pension plan's maturity level. With shrinking workforces, aging Baby Boomers, and retirees living longer, plans pay out more in benefits than they receive in contributions – leading to negative cash flows, excluding investment income.

When plans with negative cash flows suffer investment losses, they need to liquidate enough assets to pay for benefits in excess of contributions. That means these plans will need to earn higher returns to rebuild their assets to the previous levels. Plans with negative cash flows exceeding five percent of assets are especially vulnerable to asset losses.

Before assessing each of these risks, it is important to understand the maturity of this System compared to other plans and how the maturity has changed over time. Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic - the larger the plan is compared to the contribution or revenue base that supports it, the more sensitive the plan will be to risk. The balance of this section discloses and examines two maturity measures: the support ratio and the net cash flow ratio.

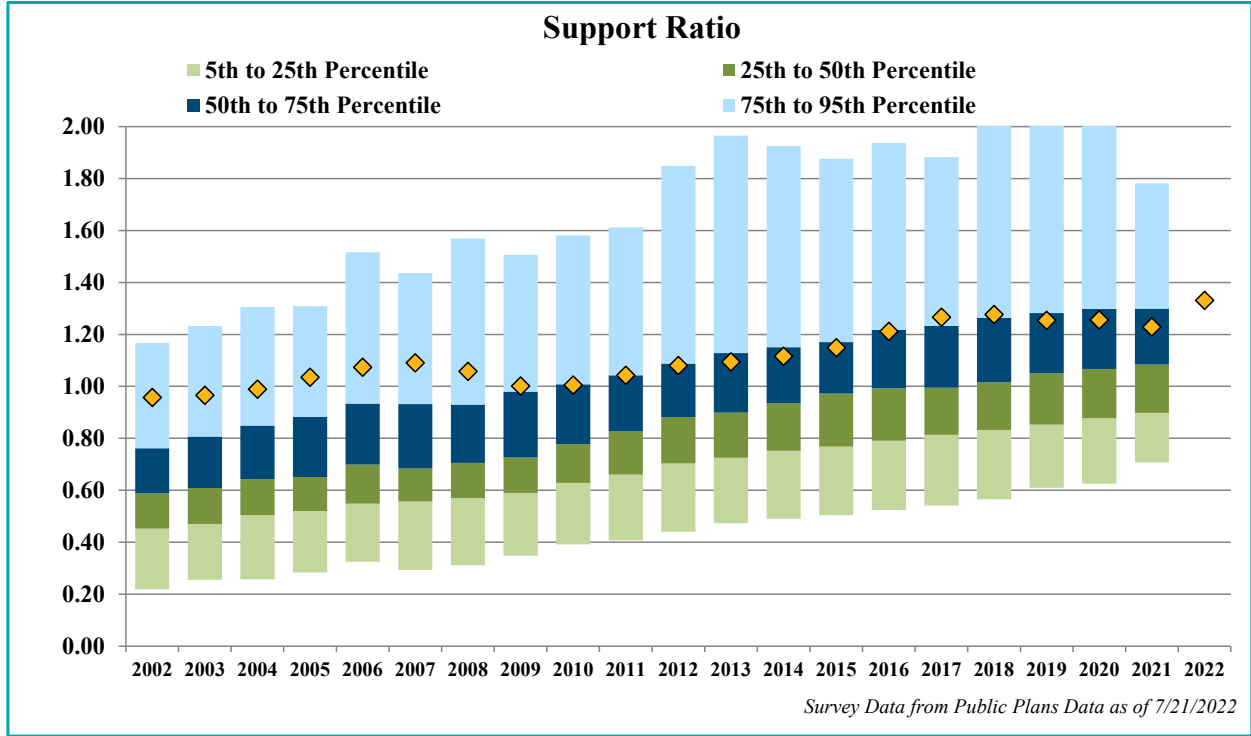
Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or entitled to a deferred benefit) to the number of active members. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives indicate a larger plan relative to its revenue base as well. The greater this ratio, the more likely that the plan will have or develop negative cash flows.

The Boston College's Center for Retirement Research, NASRA and the Center for State and Local Government Excellence maintain the Public Plan Database that contains the majority of state plans as well as many large municipal plans. The following graph shows how the support ratio for the System compares to other Systems in the Public Plan database over time.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION II – IDENTIFICATION AND ASSESMENT OF RISK



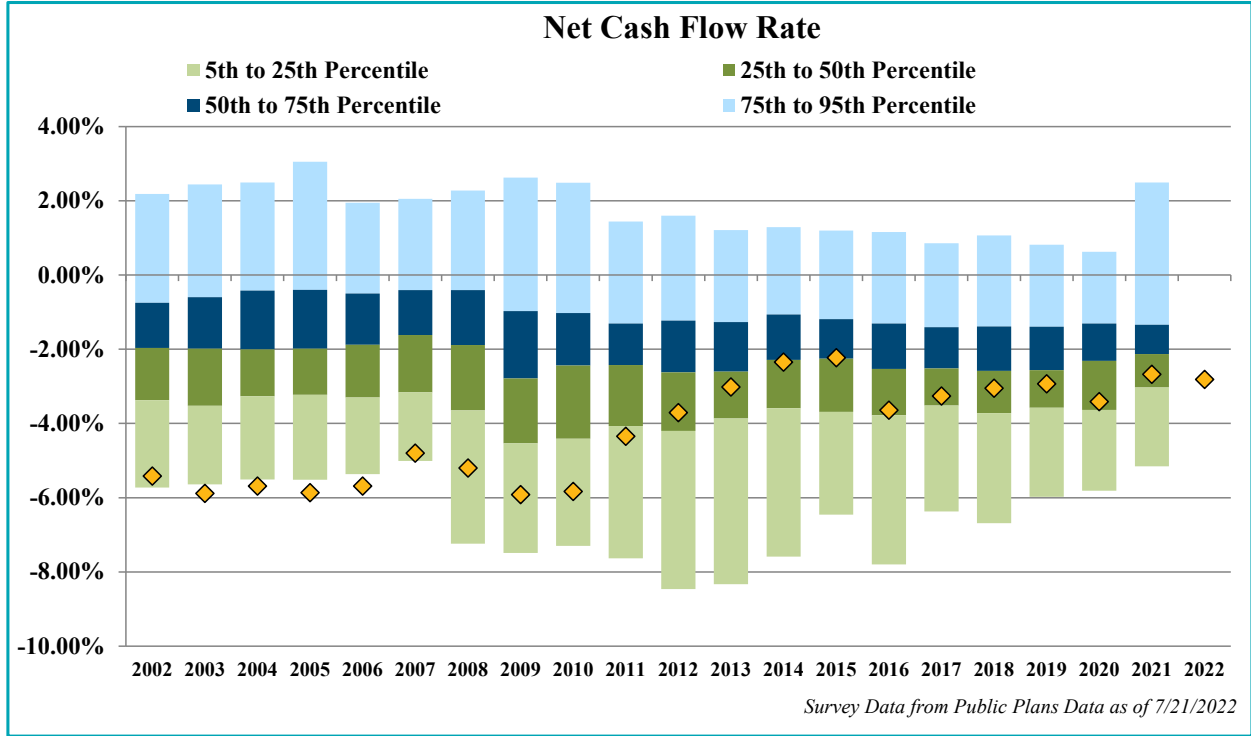
The graph above shows the distribution from the 5th to 95th percentile of support ratios for the plans in the Public Plans Database. The gold diamond shows how the System compares to the other plans. The System was already in a relatively mature status in 2002 being in the 75th to 95th percentile. While the System’s support ratio has gradually increased over time, the support ratios for the plans as a whole have also increased at a faster rate over the period as they mature. For 2022, the System’s support ratio increased due to the decrease in the number of active members.

Net Cash Flow Ratio

Another measure of plan maturity is the ratio of the net cash flow out of the plan – benefits and expenses less contributions – divided by the market value of plan assets. When this ratio is significantly negative, a plan is more vulnerable to market declines. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded. Investment losses in the short-term are compounded by the net withdrawal from the plan leaving a smaller asset base to try to recover from the investment losses. Large negative cash flows can also create liquidity issues.

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The graph above shows the distribution from the 5th to 95th percentile of net cash flow as a percent of assets for the plans in the Public Plans Database. The black diamond shows how the System compares to the other plans. Up until 2007, the System was below the fifth percentile. However, since 2012, the System’s cash flow as a percent of assets has consistently been amongst the 25th to 50th percentile. The increase in this percent is primarily due to increases in the employee and employer contributions, which have helped to improve the outlook of the System. The employer contributions have increased as a result of the change in the funding policy to a closed amortization period and the adoption of more conservative assumptions and methods.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Assessing Future Risk

Assessing the future risk that the expected measurements produced by the actuarial valuations will deviate from the actual values over time is complex and can never be exactly known.

We show the baseline projection of funded status and projected costs on pages 7 and 8 in the Summary section of this report. Baseline projections, while valid, **are not going to occur** as experience never conforms exactly to assumptions every year. As discussed in the plan maturity section, as plans become more mature, it becomes more difficult to recover from market declines. Additionally, the pattern of funded status improvement in the baseline projections is a function of the funding policy to amortize the UAL over a fixed 21-year period including the one-year extension adopted for the June 30, 2019 valuation. As the amortization period shortens, cost volatility is expected to increase. For illustrative purposes we have developed hypothetical scenarios to show the impact deviations from assumed investment returns may have on future funded status and contribution rates. The scenarios are balanced between positive and negative scenarios and are intended to illustrate the importance of both the return itself as well as the timing of such returns.

Under the baseline results in the Summary section, we assumed a 7.00% investment return assumption per year. The graphs on the following pages show the projections under three scenarios: varying returns each year averaging 7.00% over the period, optimistic returns of 9.00% per year and pessimistic returns of 5.00% per year.

For each scenario, the first projection chart compares the market value of assets (MVA) (green line) and the actuarial or smoothed value of assets (AVA) (red line) to the System's actuarial liabilities (AL) (gray bars). In addition, at the top of each chart, we show the System's AVA funded ratio (ratio of AVA to AL). The years shown in the chart signify the valuation date as of June 30 of the labeled year.

The second chart shows the expected member contribution rate, the normal cost rate, amortization of the unfunded actuarial liability (UAL) rate, and the net City's total contribution rate (numbers on the top of the bars).

Scenario 1: Varying Returns averaging 7.00%

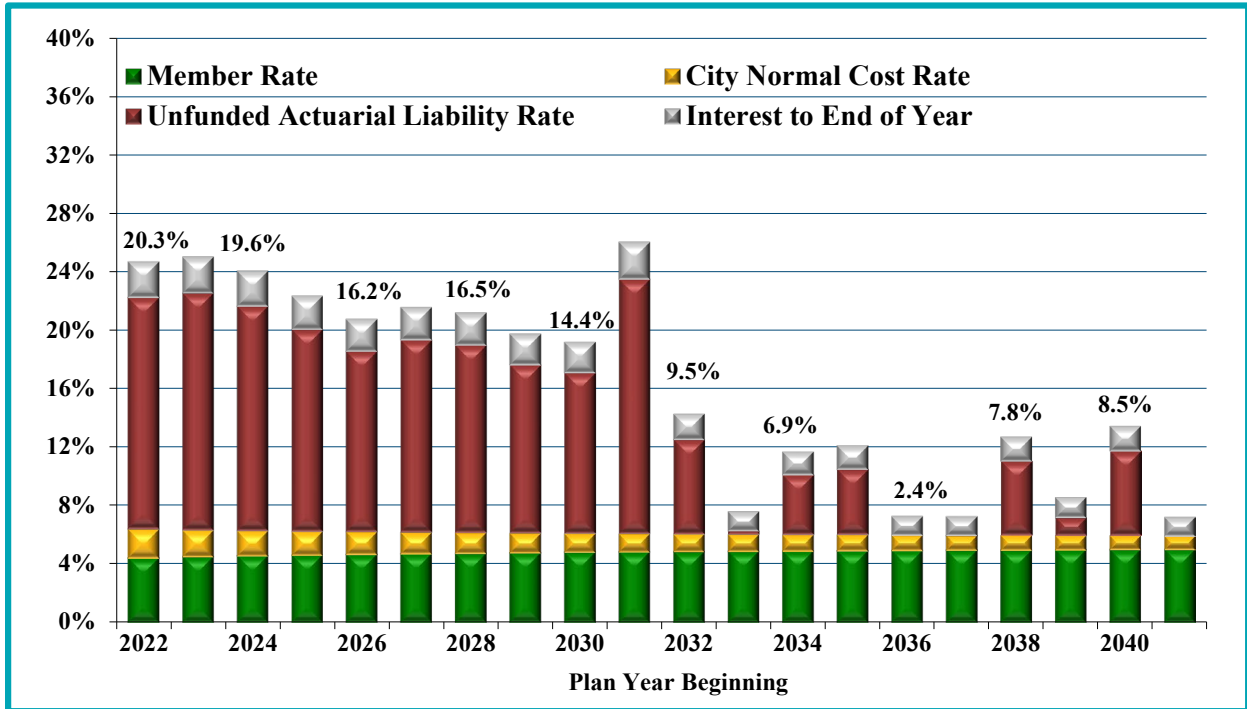
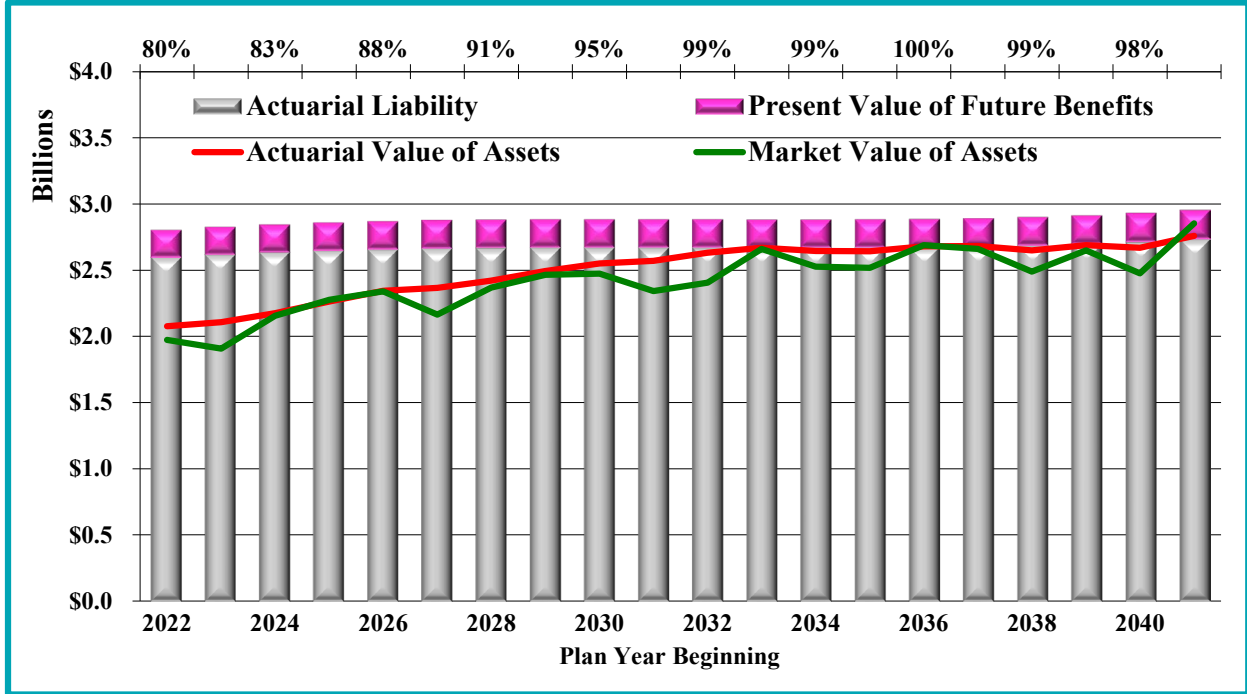
The two graphs based on projected returns that while volatile produce the same average 7.00% return based on the following table.

Year	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>
Return	0.00%	17.50%	9.50%	6.65%	-3.50%	14.50%	8.50%	4.50%	-1.00%	7.50%
Year	<u>2032</u>	<u>2033</u>	<u>2034</u>	<u>2035</u>	<u>2036</u>	<u>2037</u>	<u>2038</u>	<u>2039</u>	<u>2040</u>	<u>2041</u>
Return	13.50%	0.00%	6.75%	13.00%	4.25%	0.00%	13.60%	-2.00%	22.00%	9.00%

This presents a realistic view of the potential volatility of the System and highlights the long-term implications of the funding and funded status risks from market volatility.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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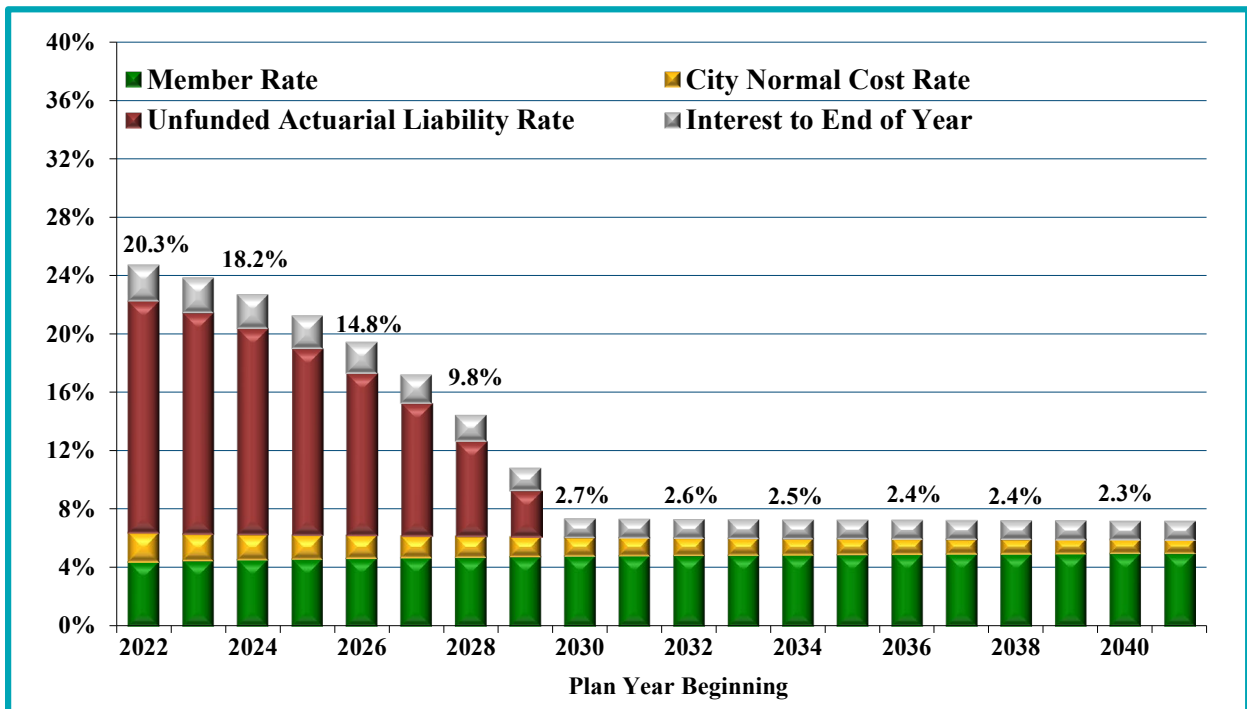
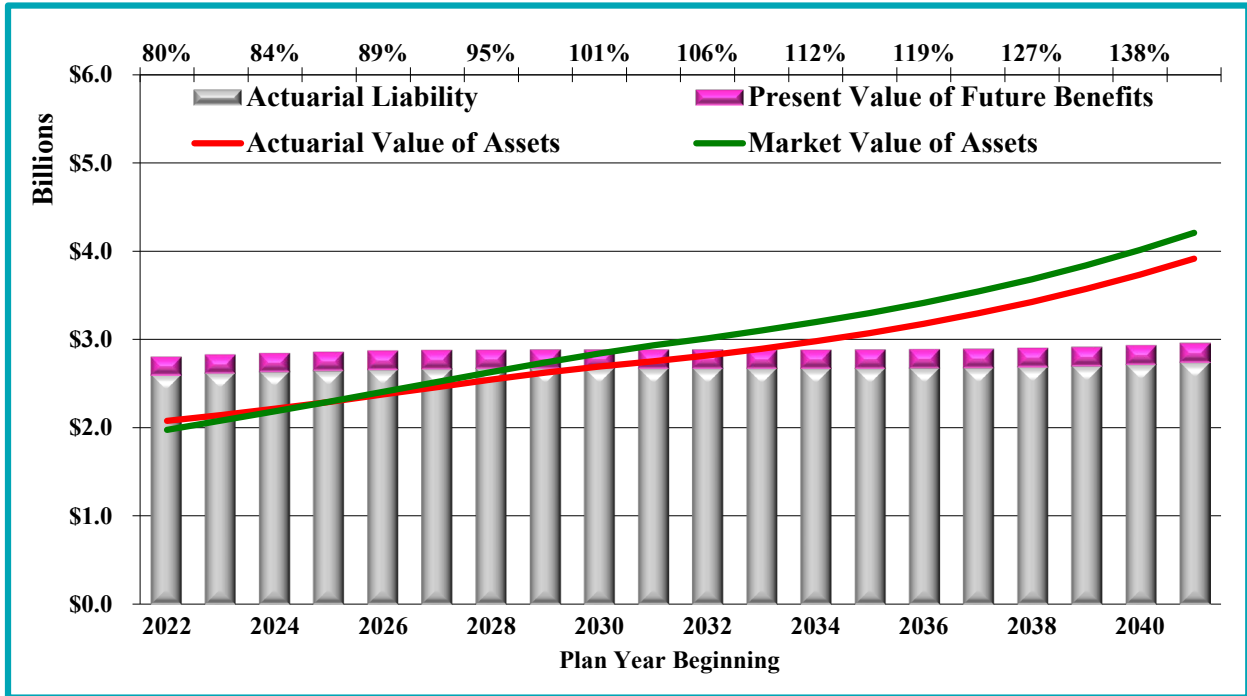
This graph above shows the nature of the fixed amortization period and the potential for cost volatility as the System gets closer to the target date for full funding. In the year 2031 and later, almost all of the unfunded actuarial liability is being recognized in a one-year period. It is anticipated that as that date gets closer, and based on plan experience, additional measures may be considered to address cost volatility. However, for the balance of the years leading up to 2031, the costs are declining despite the return volatility illustrated. This is a function of the asset smoothing of the investment gains.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Scenario 2: Optimistic Returns of 9.00%

If the System earns 2.00% greater than the assumed rate of return in each year of the projection, the AVA funded ratio is projected to increase to 100% by the 2030 valuation, two years earlier than in the baseline projection. The contributions decline steadily due to investment gains.

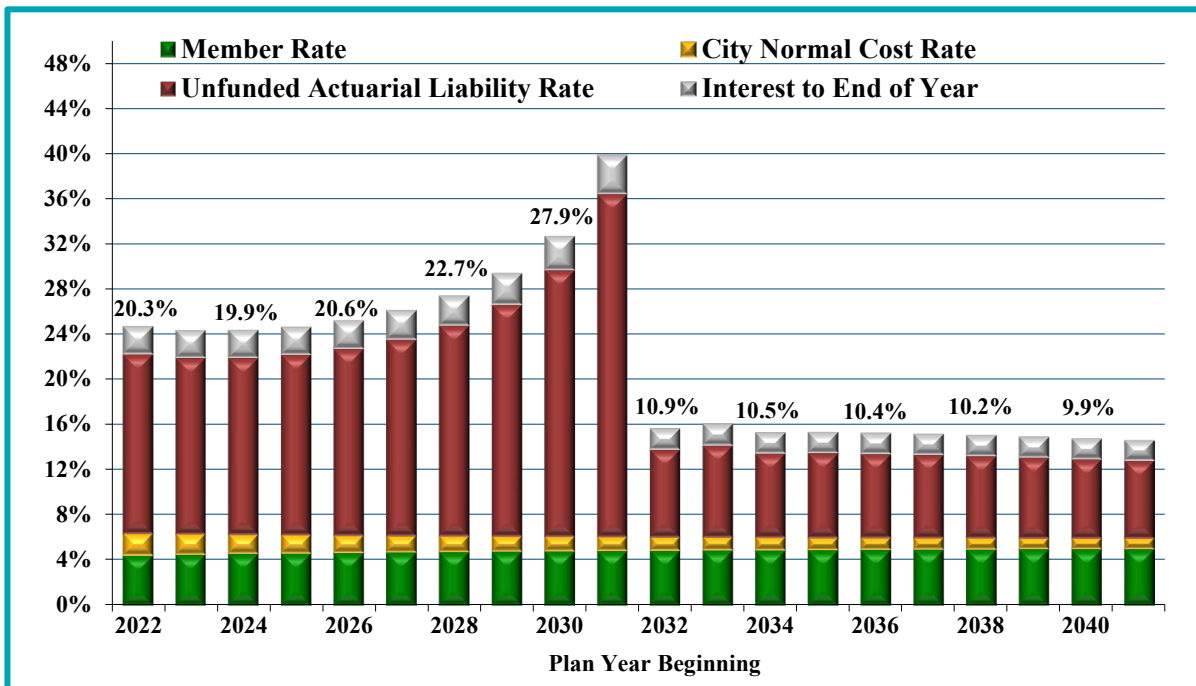
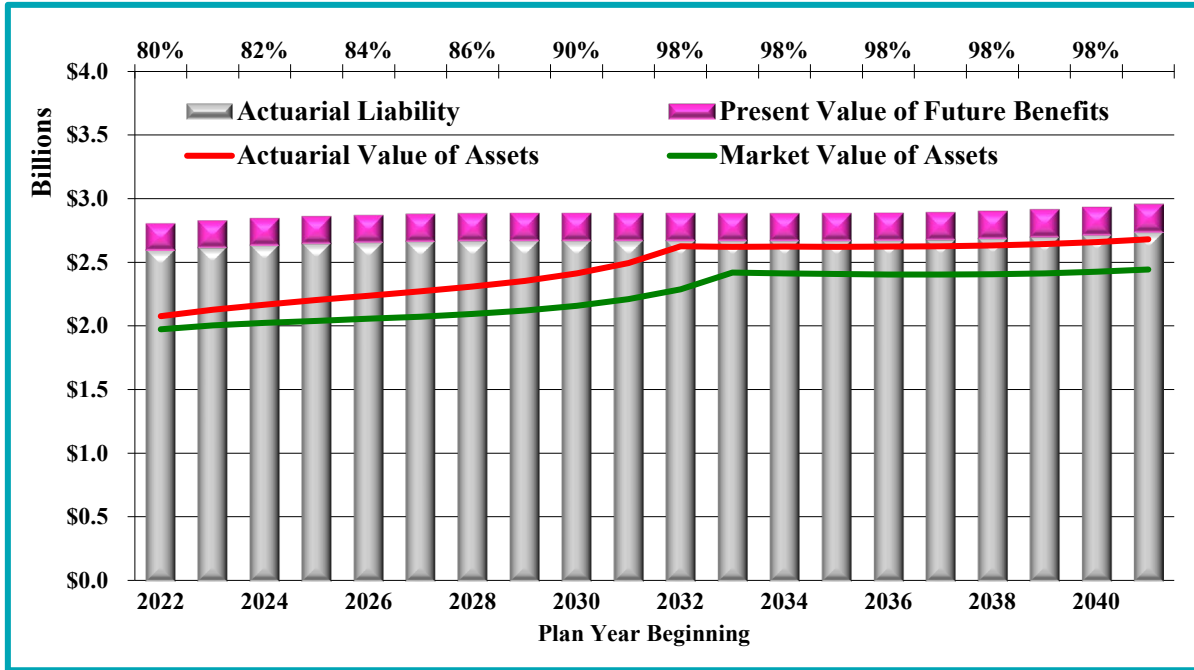


**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION II – IDENTIFICATION AND ASSESMENT OF RISK

Scenario 3: Pessimistic Returns of 5.00%

If the System earns 2.00% less than the assumed rate of return in each year of the projection, the AVA funded ratio is projected to increase to only 98% by 2032 when 100% is reached in the baseline projection. In addition, the employer contribution rate drop to 19.9% in FY 2024 and then will steadily increase to about 35% by FY 2031 before dropping to approximately 10% thereafter.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
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SECTION III – ASSETS

Assets play a key role in the financial operation of the System and in the decisions that the Board of Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely have an impact on benefit levels, employer contributions, and the ultimate security of members' benefits.

In this section, we present detailed information on the System's assets including:

- Disclosure of the System's assets as of June 30, 2022,
- Statement of the changes in market values during the year,
- Development of the actuarial value of assets, and
- A comparison of the year's investment performance to the return assumption.

Disclosure

The market values of assets represent “snap-shot” or “cash-out” values, which provide the principal basis for measuring financial performance from one year to the next. However, market values can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not suitable for budgeting annual contributions.

The actuarial values of assets are market values that have been smoothed; they are used for evaluating the System's ongoing ability to meet its obligations. Current smoothing method employed by this System spreads investment gains and losses over a five year period.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION III – ASSETS

The assets below are based on unaudited financial data furnished by the Retirement System's Office. The change in market value of assets during the valuation year ending June 30, 2022 is summarized below.

Table III-1	
Assets of the Plan as of June 30, 2022	
	<u>Total Market Value</u>
Fund Balance on June 30, 2021	\$ 2,105,524,981
Contributions	
Member	\$ 18,493,368
City/State	\$ 98,640,176
Net Investment Income	
Interest, dividends, securities lending income and realized capital gains	\$ 34,586,146
Unrealized gains (losses)	(84,958,475)
Expenses	<u>(25,363,478)</u>
Total Investment Income	\$ (75,735,807)
Administrative expenses	\$ (4,460,410)
Payments of benefit & refunds	\$ (168,159,164)
Fund Balance on June 30, 2022	\$ 1,974,303,144

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION III – ASSETS

The table below shows the calculation of investment gains and losses. On a market value basis, the Plan earned a -3.65% return amounting to total investment loss of \$75,735,807 during FY 2021-2022. Because the liabilities (Present Value of Future Benefits shown as PVFB in the table below) are valued using different discount rates for actives and terminated vested participants versus retirees, we allocate this return over the actuarial liabilities of active and inactive participants separately. The investment loss on a market basis related to the inactive liabilities using the expected return rate of 6.50% was \$210.9 million. The investment loss on a market basis related to the active liabilities using the expected return rate of 7.00% was \$221.3 million. Combining these two losses in relation to the portion of funds in each group, results in a net System asset loss over the assumptions on a market value basis of \$215.4 million.

Table III-2 Development of Investment Gain / (Loss)	
1. Market Value of assets as of June 30, 2021	\$ 2,105,524,981
2. Market Value of assets as of June 30, 2022	\$ 1,974,303,144
3. Earnings during June 30, 2021 to June 30, 2022 (including investment expenses)	\$ (75,735,807)
4. Mean Assets [Half of ((1.) + (2.) - (3.))]	\$ 2,077,781,966
5. Investment return 2021-2022 [(3.) ÷ (4.)]	-3.65%
6. Investment gain / (loss)	
a. Relative to 6.50%: [(5.) - 6.50%] x (4.)	\$ (210,894,870)
b. Relative to 7.00%: [(5.) - 7.00%] x (4.)	\$ (221,283,779)
7. Funds as a portion of market value of assets	
a. Retired PVFB/Total PVFB	0.57103
b. (Total PVFB - Retired PVFB)/Total PVFB	0.42897
c. Total: (a) + (b)	1.00000
8. Total investment gain / (loss)	
a. Retired: (6a.) x (7a.)	\$ (120,428,060)
b. Active: (6b.) x (7b.)	\$ (94,923,302)
c. Total Investment Gain / (Loss): (a) + (b)	\$ (215,351,362)

The investment losses for FYE 2022 are taken together with past experience to determine an actuarial asset value for determining the City's contribution obligations.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION III – ASSETS

The table below shows the development of the unallocated earnings which represent the earnings above and below the valuation interest assumption. The excess earnings are calculated by the “asset averaging method” from Article 22(7) (b) of the Baltimore City Code. This method uses one-fifth of the excess earnings for the year to adjust the actuarial assets in the current year. The other four-fifths of the excess earnings are used to smooth investment experience. The unrecognized deferred earnings decreased from an excess of \$205,488,835 to a deficit of \$7,890,022 a change in net unallocated accumulated earnings of \$213,378,857 as of June 30, 2022. This net deficit is gradually recognized in the future actuarial value of assets and impacts future contributions to the System. However, future investment gains/(losses) may ameliorate/(exacerbate) this recognition.

Table III-3 Development of Unallocated Earnings		
The development of current unallocated excess/(deficit) earnings over the most recent two years is as follows:		
	Valuation Date	
	6/30/2021	6/30/2022
1. Remaining net excess earnings from prior valuation	\$ (82,829,594)	\$ 205,488,835
2. New investment gain/(loss)	<u>339,690,638</u>	<u>(215,351,362)</u>
3. Current net excess earnings [(1) + (2)]	\$ 256,861,044	\$ (9,862,527)
4. One-fifth (credit) charge [(3) x 20%]	<u>(51,372,209)</u>	<u>1,972,505</u>
5. Net unallocated excess/(deficit) earnings [(3) + (4)]	\$ 205,488,835	\$ (7,890,022)

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION III – ASSETS

The table below shows the calculation of the actuarial value of assets. The assets are smoothed using the unallocated earnings calculation.

Table III-4 Actuarial Value of Assets			
The actuarial value of assets used to calculate the unfunded actuarial liability is developed as follows:			
1. Assets in the Fund on June 30, 2022		\$	1,974,303,144
2. Net deferred recognition of unallocated excess/(deficit) earnings		\$	(7,890,022)
3. Present value of prior year's contributions not yet paid		\$	94,788,090
4. Preliminary actuarial value of assets on June 30, 2022 (1) - (2) + (3)		\$	2,076,981,256 *
5. Corridor testing:			
80% of market value assets	\$	1,579,442,515	
120% of market value assets	\$	2,369,163,773	
6. Final actuarial value of assets on June 30, 2022		\$	2,076,981,256
7. Ratio of actuarial asset value to adjusted market asset value			100.4%

* The actuarial value of assets represents 105.2% of the market value which is up from the same measurement last year of 94.9%.

On actuarial asset value, due to the current year's investment gain, the rate of return is less than the expectation with an asset rate of return for the year of 6.79%, which is compared to the expected investment return of 7.00%. As of June 30, 2022, the current year investment losses are primarily being offset by deferred investment gains from the prior year, partially being recognized and further being deferred for recognition in the future.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The following tables present the actuarial liabilities by membership status and employer, and then allocates the assets in proportion to each employer's liabilities, to produce the unfunded actuarial liability by employer. These liabilities are for funding purposes and are not appropriate for measuring the cost of settling Plan liabilities by purchasing annuities or paying lump sums. This unfunded liability is amortized over the remaining years, and that amount is then added to the Net Normal Cost (cost to cover the upcoming year's expected accruals less member contributions) with the administrative expenses to produce the recommended employer contributions.

Table IV-1 Liability By Employee Group				
As of June 30, 2022				
	<u>Dept. of Education</u>	<u>Detention Services</u>	<u>All Others</u>	<u>Total</u>
Number of Participants				
Active	1,637	2	6,086	7,725
Service retired				6,862
Disabled				790
Terminated vested				1,089
Dependents				<u>1,555</u>
Total Participants				18,021
Annual compensation of active participants	\$ 86,639,900	\$ 103,284	\$ 352,583,060	\$ 439,326,244
Average Age	49.52	59.50	50.95	50.65
Average Service	11.28	33.46	13.84	13.30
Development of Unfunded Actuarial Liability				
Actuarial Liability				
Active	\$ 151,068,194	\$ 640,959	\$ 773,224,565	924,933,718
Retirees and dependents				1,602,929,409
Terminated vested				<u>72,657,615</u>
Total liabilities				\$ 2,600,520,742
Actuarial value of assets				
Active	\$ 65,559,186	\$ 278,157	\$ 335,556,888	\$ 401,394,232
Retirees and dependents				1,602,929,409
Terminated vested				<u>72,657,615</u>
Total assets				2,076,981,256
Unfunded actuarial liability *	\$ 85,509,008	\$ 362,802	\$ 437,667,677	\$ 523,539,486

* Unfunded actuarial liability was allocated in proportion to each employee group's actuarial liability for active participants.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The table below presents the change in actuarial liabilities, actuarial assets and unfunded liability during the plan year. In general, the unfunded actuarial liability (UAL) of any retirement system is expected to change at each subsequent valuation for a variety of reasons. In each valuation, we report on those elements of change in the UAL which are of particular significance, potentially affecting the long-term financial outlook of the System. Below, we present key changes in liabilities and assets since the last valuation.

Table IV-2 Development of 2022 Experience (Gain)/Loss						
		<u>Actuarial Liability</u>	<u>Actuarial Value of Assets</u>	<u>Unfunded Actuarial Liability</u>		
1. Value as of June 30, 2021	\$	2,593,420,191	\$	1,998,676,321	\$	594,743,870
a.) Actives and Term Vested at 7.00%	\$	1,032,772,978				
b.) Inactives at 6.50%	\$	1,560,647,213				
2. Additions						
a.) Normal Cost (without expenses)	\$	29,193,160	\$	0	\$	29,193,160
b.) Actual Employer Contributions	\$	0	\$	98,640,176	\$	(98,640,176)
c.) Actual Member Contributions	\$	0	\$	18,493,368	\$	(18,493,368)
3. Decreases						
a.) Benefit Payments	\$	(168,159,164)	\$	(168,159,164)	\$	0
b.) Admin Expenses	\$	0	\$	(4,460,410)	\$	4,460,410
4. Expected Interest						
a.) On 1 for one year	\$	173,736,177	\$	139,907,342	\$	33,828,835
b.) On 2a for one year	\$	2,043,521	\$	0	\$	2,043,521
c.) On 2b for one year*	\$	0	\$	6,904,812	\$	(6,904,812)
d.) On 2c for 1/2 year	\$	0	\$	636,321	\$	(636,321)
e.) On 3a and 3b for 1/2 year	\$	(5,379,138)	\$	(5,939,502)	\$	560,364
5. Expected Value June 30, 2022: (sum 1-4)	\$	2,624,854,747	\$	2,084,699,264	\$	540,155,483
6. Change in methods/assumptions	\$	0	\$	0	\$	0
7. Change in benefits	\$	0	\$	0	\$	0
8. Expected value after changes: (sum 5-7)	\$	2,624,854,747	\$	2,084,699,264	\$	540,155,483
9. Actual Value as of June 30, 2022	\$	2,600,520,742	\$	2,076,981,256	\$	523,539,486
10. Actuarial (Gain)/Loss: (9-8)	\$	(24,334,005)	\$	7,718,008	\$	(16,615,997)
11. Total Increase/(Decrease): (6 + 7 + 10)	\$	(24,334,005)	\$	7,718,008	\$	(16,615,997)

* Assumes contributions made at year end.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

Table IV-3 Development of 2022 Experience Gain/(Loss)	
1. Unfunded Actuarial Liability at June 30, 2021	\$ 594,743,870
2. Additions (normal cost, expenses and contributions)	(83,479,974)
3. Interest accrued*	28,891,587
4. Actuarial Assumption Change	<u>0</u>
5. Expected Unfunded Actuarial Liability at June 30, 2022 (1) + (2) + (3) + (4)	\$ 540,155,483
6. Actual Unfunded Actuarial Liability at June 30, 2022	<u>523,539,486</u>
7. Total Gain/(Loss) at June 30, 2022 (5) - (6)	\$ 16,615,997

* Interest rate depends on active versus inactive.

Table IV-4 Elements of Actuarial Assets - Gain/(Loss)	
1. Change in unallocated earnings	\$ 213,378,857
2. Asset Return	<u>(221,096,865)</u>
3. Total Actuarial Assets - Gain/(Loss) (1) + (2)	\$ (7,718,008)

Table IV-5 Elements of Actuarial Liability - Gain/(Loss)	
1. Age and Service Retirements	\$ (1,216,493)
2. Disability Retirements	580,017
3. Death in Service Benefits	(2,635,938)
4. Withdrawal from Employment	2,602,714
5. Pay Increases	8,234,688
6. Death after Retirement	12,319,373
7. New Entrants	1,672,214
8. Other	<u>2,777,430</u>
9. Total Actuarial Liability - Gain/(Loss) (sum 1-8)	\$ 24,334,005

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION V – CONTRIBUTIONS

The table below presents the components that make up the costs by employer including the normal cost reflective of the value of the benefits earned during the year, employee contributions for members under Class A, Class C, and Class D membership, and the proportional share of the amortization cost to pay off the unfunded actuarial liability, all brought forward with interest for the one-year delay in funding to the next fiscal year beginning. Under the current funding policy, the unfunded actuarial liability is amortized over a fixed period of 20 years starting from fiscal year beginning 2011 with a one-year extension adopted as of June 30, 2019. As of the current valuation, the remaining amortization period is 10 years.

**Table V-1
Contribution Summary by Group**

	As of June 30, 2022				
	<u>Dept. of Education</u>	<u>Detention Services</u>	<u>All Others</u>	<u>Total</u>	<u>% of Pay</u>
Total Normal Cost (including expenses)	\$ 6,294,324	\$ 7,585	\$ 26,105,875	\$ 32,407,784	7.38%
Expected Employee Contributions	<u>(1,648,229)</u>	<u>0</u>	<u>(17,617,750)</u>	<u>(19,265,979)</u>	<u>-4.39%</u>
Net Normal Cost	\$ 4,646,095	\$ 7,585	\$ 8,488,125	\$ 13,141,805	2.99%
10-year amortization of Unfunded Actuarial Liability	<u>\$ 11,378,093</u>	<u>\$ 48,276</u>	<u>\$ 58,237,411</u>	<u>\$ 69,663,780</u>	<u>15.86%</u>
Net plan cost at 7/1/2022	\$ 16,024,188	\$ 55,861	\$ 66,725,536	\$ 82,805,585	18.85%
Interest to 7/1/2023	<u>1,180,357</u>	<u>3,910</u>	<u>5,297,838</u>	<u>6,482,105</u>	<u>1.48%</u>
Net plan cost at 7/1/2023	\$ 17,204,545	\$ 59,771	\$ 72,023,374	\$ 89,287,690	20.32%

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

SECTION V – CONTRIBUTIONS

In accordance with Section 5.3 (C) of Article 22 of the City Code, the City's contribution rate to the Retirement Savings Plan (Savings Plan) is 3% for Hybrid Plan D members. However, if the Class D funded status falls below 85%, half of the 3.0% (or 1.5%) of the City contributions to the Savings Plan will be diverted to funding the Retirement System.

In the table below we track and provide the funded status for Class D members. The funded ratio is defined as the ratio of the adjusted market value basis of assets attributable to Class D members of the June 30th preceding the actuarial valuation over the Employees Retirement System liabilities attributable to Class D members on that date. To determine this value in time for the implementation of the appropriate City contribution rate, before the beginning of the fiscal year, we roll forward the liabilities for Class D members and the estimated adjusted asset value from the beginning of the prior year to provide a June 30, 2022 measurement.

Table V - 2 Development of 2022 Expected Funded Status for Plan D				
	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	
1. Value as of June 30, 2021	\$ 29,353,332	\$ 29,485,290	\$ (131,958)	
a.) Actives and Term Vested at 7.00%	\$ 29,309,256			
b.) Inactives at 6.50%	\$ 44,076			
2. Additions				
a.) Normal Cost	\$ 8,833,100	\$ 0	\$ 8,833,100	
b.) Expected Employer Contributions	\$ 0	\$ 3,314,228	\$ (3,314,228)	
c.) Expected Member Contributions	\$ 0	\$ 7,552,066	\$ (7,552,066)	
3. Decreases				
a.) Expected Benefit Payments	\$ (1,829,019)	\$ (1,829,019)	\$ 0	
b.) Expected Admin Expenses	\$ 0	\$ (710,984)	\$ 710,984	
4. Interest				
a.) On 1 for one year	\$ 2,054,513	\$ (1,076,213)	\$ 3,130,726	
b.) On 2a for one year	\$ 618,317	\$ 0	\$ 618,317	
c.) On 2b for one year*	\$ 0	\$ (120,969)	\$ 120,969	
d.) On 2c for 1/2 year	\$ 0	\$ (139,106)	\$ 139,106	
e.) On 3a and 3b for 1/2 year	\$ (58,507)	\$ 46,786	\$ (105,293)	
5. Expected Value June 30, 2022: (sum 1-4)	\$ 38,971,736	\$ 36,522,078	\$ 2,449,658	
6. Funded Status			93.7%	

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

The data for this valuation was provided electronically in Excel by the Retirement System Office. Cheiron did not audit any of the data; however, the data was reviewed to ensure that it complies with generally accepted actuarial standards. The data for active and inactive participants is as of June 30, 2022. Where data elements may be missing such as dates of hire, dates of birth, and benefit accrual level, we make assumptions to fill-in the blanks. The assumed values (if applicable) are included in Appendix B.

The following pages contain a summary of the data provided.

- Reconciliation of participants as of June 30, 2022
- Active members split by plan and group
- Age/service and age/salary/service distribution for active members as of June 30, 2022
- Counts and average benefit amount by age for retirees, beneficiaries and disabled members as of June 30, 2022

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

DATA RECONCILIATION FROM JANUARY 1, 2021, TO JANUARY 1, 2022

		Actives	Terminated Vested	Disabled	Retired	Beneficiaries	Total
1.	Participants, January 1, 2021 valuation	8,332	1,046	825	6,806	1,563	18,572
2.	Additions						
	a. New entrants / pickup	504					504
	b. Returned to work	52					52
	c. Reporting Delay					20	20
	d. Total	556				20	576
3.	Reductions						
	a. Terminated - not vested	(655)					(655)
	b. Non-Participating					(2)	(2)
	c. Lump sum	(1)	(1)				(2)
	d. Benefits Expired					(8)	(8)
	e. Deaths without beneficiary	(31)	(22)	(35)	(251)	(97)	(436)
	f. Total	(687)	(23)	(35)	(251)	(107)	(1,103)
4.	Changes in status						
	a. Terminated - vested	(116)	116				
	b. Returned to work	4	(4)				
	c. Retired	(336)	(41)		377		
	d. Disabled	(4)	(2)	6			
	e. Died with beneficiary	(5)		(7)	(73)	85	
	f. Data corrections	(19)	(3)	1	3	(6)	(24)
	g. Total	(476)	66		307	79	(24)
5.	Participants, January 1, 2022 valuation	7,725	1,089	790	6,862	1,555	18,021

ACTIVE MEMBERSHIP AS OF JUNE 30, 2022 BY PLAN AND GROUP

	<u>Dept. of Education</u>	<u>Detention Services</u>	<u>All Others</u>	<u>Total Actives</u>	<u>% of Total</u>
Class A active members	2	0	4	6	0.1%
Class C active members	930	2	3,852	4,784	61.9%
Class D active members	705	0	2,230	2,935	38.0%
Total	1,637	2	6,086	7,725	100.0%

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

AGE/SERVICE DISTRIBUTION OF ACTIVE PARTICIPANTS										
ACTIVE PARTICIPANTS AS OF JUNE 30, 2022										
AGE	COMPLETED YEARS OF CREDITED SERVICE									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	
Under 25	58	0	0	0	0	0	0	0	0	58
25-29	251	22	0	0	0	0	0	0	0	273
30-34	405	153	21	0	0	0	0	0	0	579
35-39	344	179	139	53	3	0	0	0	0	718
40-44	319	215	181	134	30	0	0	0	0	879
45-49	246	174	150	165	125	25	0	0	0	885
50-54	230	156	196	184	160	93	45	1	0	1,065
55-59	165	147	172	197	175	116	122	60	0	1,154
60-64	147	127	159	176	152	118	128	108	53	1,168
65-69	50	70	76	90	100	61	65	50	78	640
70 & Up	28	42	37	44	36	24	27	15	53	306
Total	2,243	1,285	1,131	1,043	781	437	387	234	184	7,725
Average Age = 50.65					Average Service = 13.30					

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

**AGE/SERVICE DISTRIBUTION OF ACTIVE PARTICIPANTS
ACTIVE PARTICIPANTS AS OF JUNE 30, 2022**

AGE	AVERAGE EARNINGS									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	
Under 25	\$ 36,011	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 36,011
25-29	44,866	36,915	0	0	0	0	0	0	0	44,225
30-34	50,923	52,650	50,411	0	0	0	0	0	0	51,361
35-39	56,437	63,808	56,634	48,671	62,490	0	0	0	0	57,765
40-44	59,003	60,422	59,986	61,981	56,753	0	0	0	0	59,930
45-49	61,326	60,593	65,920	60,186	65,454	56,918	0	0	0	62,207
50-54	58,656	55,698	58,085	56,925	58,496	64,837	65,100	75,144	0	58,622
55-59	51,427	56,945	56,681	54,085	58,113	62,932	64,642	62,104	0	57,489
60-64	54,854	51,966	51,692	53,884	48,259	55,878	61,791	65,133	64,411	55,353
65-69	60,159	54,176	49,916	53,665	50,467	54,925	60,069	66,400	65,396	56,479
70 & Up	39,686	46,926	51,440	44,484	56,639	57,513	56,993	66,273	70,784	54,400
Total	\$ 54,149	\$ 57,000	\$ 57,229	\$ 55,815	\$ 56,366	\$ 59,674	\$ 62,451	\$ 64,743	\$ 66,664	\$ 56,871
	Total Earnings = \$ 439,326,244					Average Earnings = \$ 56,871				

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

**SCHEDULE OF BENEFIT RECIPIENTS BY ATTAINED AGE AND TYPE OF RETIREMENT
JUNE 30, 2022 - PRIMARY MEMBERS**

AGE	TYPE OF RETIREMENT					Total
	NR	ER	DS	ODis	ADis	
Under 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	3	0	3
40-44	0	0	0	5	0	5
45-49	0	0	0	16	1	17
50-54	11	0	5	34	1	51
55-59	99	86	13	78	3	279
60-64	275	307	65	170	11	828
65-69	767	471	148	199	9	1,594
70-74	1,141	438	193	116	8	1,896
75-79	803	286	119	52	3	1,263
80-84	456	241	88	37	8	830
85 & Up	474	280	96	29	7	886
Total	4,026	2,109	727	739	51	7,652
Average Annual Benefit	\$ 27,176	\$ 8,294	\$ 24,533	\$ 10,479	\$ 24,692	\$ 20,092

–R - Service Retirement

–R - Early Retirement

–S - Discontinued Service

OD–s - Ordinary Disability

AD–s - Accidental Disability

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX A – PLAN MEMBERSHIP

SCHEDULE OF BENEFIT RECIPIENTS BY ATTAINED AGE AND TYPE OF RETIREMENT JUNE 30, 2022 - BENEFICIARIES								
AGE	TYPE OF RETIREMENT							Total
	NR	ER	DS	ODis	ADis	ODth	ADth	
Under 20	2	1	0	3	0	0	2	8
20-24	0	0	0	1	0	0	1	2
25-29	0	0	0	0	0	0	0	0
30-34	1	0	0	0	0	0	0	1
35-39	0	0	0	1	0	0	0	1
40-44	1	0	0	1	0	0	0	2
45-49	1	2	0	0	0	1	2	6
50-54	4	1	2	9	0	5	0	21
55-59	14	7	1	15	1	7	0	45
60-64	44	22	7	30	0	14	0	117
65-69	86	35	12	38	2	26	0	199
70-74	129	54	18	62	1	19	0	283
75-79	133	40	28	31	3	10	0	245
80-84	119	45	29	31	3	12	3	242
85 & Up	212	92	25	34	4	16	0	383
Total	746	299	122	256	14	110	8	1,555
Average Annual Benefit	\$ 11,638	\$ 4,527	\$ 11,644	\$ 5,725	\$ 13,209	\$ 14,986	\$ 23,310	\$ 9,609

–R - Service Retirement

–R - Early Retirement

–S - Discontinued Service

OD–s - Ordinary Disability

AD–s - Accidental Disability

OD–h - Ordinary Death

AD–h - Accidental Death

EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Entry Age Normal Method

Liabilities and contributions shown in this report are computed using the Entry Age Normal method of funding. Under this method, the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each member's date of hire and assumed retirement.

A description of the calculation follows:

The normal cost is based upon the normal cost rate determined by taking the value, as of entry age into the plan, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary producing a normal cost rate that should remain relatively constant over a participant's career. The normal cost rate is multiplied by current salary to determine each member's normal cost. Finally, the normal cost is reduced by the member contribution to produce the employer normal cost.

The actuarial liability is the difference between the present value of future benefits and the present value of future normal costs. The unfunded actuarial liability is the difference between the actuarial liability and the actuarial value of assets.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions and Methods

Method of Funding:

The Entry Age Normal Funding Method was approved by the Board of Trustees effective 7/1/2012.

The current unfunded actuarial liability is amortized as a level dollar over 20 years with a one-time, one-year extension adopted by the Board for June 30, 2019 valuation. The 20-year period decreases each year from 2011 through 2018, remains at 12 years for 2019 and continues to decrease until 2032, at which time the unfunded liability will be fully paid.

Asset Valuation:

The actuarial value of assets is equal to the market value, adjusted for 20% of the five-year aggregate investment surpluses and deficits. This calculation is done in the following steps:

1. The investment gain or loss for the current year is calculated; this equals the actual investment earnings during the year minus the expected earnings. Expected earnings are calculated using a weighted average of the pre- and post-retirement interest rate assumptions multiplied by the mean market value of assets during the year.
2. The current net excess earnings are computed by adding the investment gain or loss for the current year to the remaining excess earnings for the prior valuation. One-fifth of the excess earnings are recognized in the actuarial value as of the current valuation and four-fifths are deferred to future years.
3. The present value of the prior year's City contributions is added to the net assets to account for the one-year lag between required contributions and when the contributions are actually received. The actuarial value of assets will not be greater than 120% nor less than 80% of the market value of assets as of the valuation date.

Valuation Software:

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate the liabilities, normal costs and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation. This report includes projections of funded ratios and future contributions for the purpose of assisting the Board of Trustees with the management of the Fund. We have used Cheiron's P-Scan model to develop these projections. The model is also used to stress test the impact of volatile asset returns over the projection period.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

All actuarial assumptions are subject to Board of Trustees approval with changes typically addressed following each four-year experience study and following the recommendation of the actuary. The last experience study was performed in 2019 based on 2014 through 2018 experience analysis. The rationale for these assumptions can be found in the experience study report.

Discount Rate: A liability weighted discount rate is expected on the basis that a 7.00% rate is applied in measuring active and terminated vested participant liabilities, and a 6.50% rate is applied for measuring retiree participant liabilities. The weighted discount rate this year is 6.71%.

Investment Return: The investment return assumption is 7.00% net of investment expenses effective June 30, 2019 valuation. This assumption is defined by City Code based on the definition of *Regular Interest*, which has been amended from time to time based on the advice of the actuary and investment consultant and recommendation of the Board of Trustees in the form of an amendment to the City Code from time to time.

Social Security Wage Base: 3.00% per year compounded annually

Inflation: 2.55% (effective 6/30/2019)

Salary Increases: Salary increases are assumed to vary with age. Sample rates are as follows:

Age	Salary
20	0.062
25	0.057
30	0.052
35	0.046
40	0.040
45	0.036
50	0.034
55	0.034
60	0.034
65	0.034
69	0.034

Cost-of-Living Adjustment Assumption: 1.5% for inactives in pay status under age 65 and 2.0% over age 65

Percent Married: Males 90%, females 80%

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Spouse Age: A husband is assumed to be four-years older than his wife.

Remarriage Rates: None

Expenses: Administrative expenses are expected to be equal to the prior years' actual expenses rounded up to the next hundred thousand dollars and added as part of the annual normal cost for the year. For June 30, 2022 the assumed administrative expenses were \$4,500,000.

Investment expenses are assumed to be paid out of investment earnings.

Job Elimination Benefit: A liability load of 1.75% is applied to active retirement benefits to account for the value of this benefit.

New Entrant Assumption: A liability load of 0.5% is applied to active benefits to account for future new entrants who may have previous years of service restored or transferred into the System (effective 6/30/2015).

Inactive Liabilities: A liability reduction of 5.00% is applied to inactive benefits to account for the election rate of joint and survivor forms of payments when compared to actual experience. (effective 6/30/2019).

Withdrawal:

Service	Rate
0	17.00%
1	15.50
2	14.50
3	10.75
4	10.50
5	9.00
6	8.00
7	6.50
8	6.50
9	6.50
10	4.00
11	4.00
12	4.00
13	4.00
14	4.00
15+	2.50

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Disability:

Age	Non-Line-of-Duty Disability	Line-of-Duty Disability (Classes A&B)	Line-of-Duty Disability (Class C)
25	0.00050	0.00004	0.00008
30	0.00060	0.00004	0.00008
35	0.00101	0.00006	0.00013
40	0.00129	0.00002	0.00006
45	0.00283	0.00006	0.00014
50	0.00692	0.00020	0.00040
55	0.00963	0.00022	0.00043
60	0.00947	0.00048	0.00093
65	0.00079	0.00000	0.00000
69	0.00079	0.00000	0.00000

Workers' compensation offset is included in the above rates

Pre-Retirement Mortality:

1. Non-line-of-Duty – Pub-2010 Total General Employee Below-Median mortality tables adjusted by 125% for males and 185% for females with future mortality improvement through 2022 using scale MP-2018 for non-line-of-duty mortality. (effective 6/30/2019).
2. Line-of-Duty - 0.005% at all ages (effective 6/30/1999).

Age	Non-Line-of-Duty Death* Male	Non-Line-of-Duty Death* Female	Line-of-Duty Death*
25	0.000518	0.000226	0.000050
30	0.000674	0.000363	0.000050
35	0.000902	0.000583	0.000050
40	0.001271	0.000908	0.000050
45	0.001832	0.001348	0.000050
50	0.002678	0.001944	0.000050
55	0.003878	0.002850	0.000050
60	0.005721	0.004393	0.000050
65	0.008472	0.007007	0.000050
69	0.011665	0.010285	0.000050

* Rates for individuals who are the age shown as of June 30, 2019

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

***Post-Retirement
Mortality:***

1. Retirees and Beneficiaries - Pub-2010 General Retiree Below-Median Weighted mortality tables adjusted by 115% for males and 125% for females with future mortality improvement through 2022 using SOA's Scale MP-2018.
2. Disabled members – Pub-2010 General Disabled Annuitant mortality tables adjusted by 163% for males and 145% for females with future mortality improvement through 2022 using SOA's Scale MP-2018.

Sample rates (rates first effective 6/30/2019).

Age	Retirees and Beneficiaries*		Disabled Members	
	Male	Female	Male	Female
55	0.010045	0.005765	0.033406	0.024785
60	0.012233	0.006648	0.040073	0.028299
65	0.014949	0.008659	0.04931	0.032604
70	0.023702	0.014508	0.062827	0.040508
75	0.038893	0.025035	0.082293	0.055942
80	0.065591	0.044199	0.115647	0.084194

* Rates for individuals who are the age shown as of June 30, 2019

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Service Retirement:

Early Retirement prior to the later of age 60 and eligibility for Normal Retirement (earlier of age 65 with five years of service and 30 years of service).

Age	Rates of Retirement		
	Less than	30 yrs	More than
45 -49	0.00	0.00	0.05
50-54	0.00	0.10	0.05
55	0.05	0.10	0.05
56-58	0.05	0.10	0.05
59	0.05	0.10	0.07
60	0.05	0.10	0.07
61	0.07	0.15	0.15
62	0.15	0.15	0.25
63	0.10	0.15	0.15
64	0.10	0.15	0.15
65	0.20	0.15	0.25
66	0.25	0.20	0.25
67	0.20	0.20	0.15
68	0.15	0.20	0.15
69	0.20	0.20	0.15
70	1.00	1.00	1.00

Normal Retirement is assumed on or after the later of age 60 and eligibility for Normal Retirement (earlier of age 65 with five years of service and 30 years of service).

Terminated vested participants are assumed to retire at age 65.

***Joint and Survivor
Forms of Payment:***

The 40% Joint & Survivor form of payment is assumed for all benefits. All benefits with Joint & Survivor Forms of Payment for retirees had their survivor benefits increased by 4% to account for children's benefits.

Data Assumptions:

For participants with a Joint and Survivor benefit who were missing spouse dates of birth, we assumed that the male is four-years older than the female.

For terminated vested participants who were not provided benefit amounts, we assumed a monthly benefit of \$900. This was the prior year average benefit for terminated vested participants, rounded to the nearest hundred.

EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Justification for Assumptions:

The actuarial assumptions were adopted by the Retirement Board, based upon the alternatives presented in the 2018 experience study report conducted on the System's experience from the 2014-2018 valuations. The results of this study were presented in June 2019 and are incorporated into this report by reference. The investment return assumption is defined by the City Code as *Regular Interest* which has been amended from time to time based on the advice of the actuary and investment consultant. The Board has adopted the liability weighted discount rate to reflect the nature of the duration of liabilities supporting active and retired participants in conjunction with the investment consultant's capital market assumptions.

Projection Basis:

This report includes projections of future assets, liabilities, funded status and contributions for the purpose of assisting the Board of Trustees with the management of the System. We have used Cheiron's P-Scan model to develop these projections. The model is also used to stress test the impact of volatile asset returns over the projection period. The projections assume continuation of the plan provisions and actuarial assumptions in effect as of the valuation date and do not reflect the impact of any changes in benefits or actuarial assumptions that may be adopted after the valuation date. While the assumptions individually are reasonable for the underlying valuation that supports the projections, specifically for projection purposes, they are also considered reasonable in the aggregate. We have not identified any material inconsistencies in assumptions or output of our P-scan model that would affect this actuarial valuation.

Changes Since Last Valuation:

The administrative expense assumption was changed from \$4.4 million to \$4.5 million to better reflect actual experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Effective Date

The System was effective January 1, 1926 and has been periodically amended.

Eligibility

Any regular and permanent officer, agent, or employee of the City with the exception of those required to join the Maryland State or any other Retirement System shall become a Class D member of the Employees' Retirement System upon completion of one year of service. The Board of Estimates may authorize prospective membership for any class of part-time employees. There are four classes of members as follows:

1. Class A – Members who were hired before July 1, 1979, and entered membership on or after January 1, 1954, or who elected, prior to April 1, 1954, to contribute at the higher Class A rate. Any Class B member may elect to become a Class A member by bringing his accumulated contributions and interest up to what they would be if he had elected Class A membership on January 1, 1954.
2. Class B – Members as of January 1, 1954 who did not elect Class A membership – there are no remaining active Class B participants as of June 30, 2011.
3. Class C – Members who were hired on or after July 1, 1979 and before July 1, 2014, or any other members who may have elected to transfer during various open transfer periods.
4. Class D – Members who were hired or rehired on or after July 1, 2014. Class D Members have the option to participate in both the Employees' Retirement System and the new Retirement Savings Plan (RSP) as hybrid members or opt out of the System and participate only in the RSP as non-hybrid members. The City contributes 3% of pay to RSP for hybrid members and 4% of pay for non-hybrid members. Members also have the option to make voluntary deferrals to the City's Deferred Compensation Plan, with the City matching 50% of the first 2% of compensation deferred by the member.

Member Contributions

Class A and Class B members currently contribute at the rate of 4% of earnable compensation, and contributions are not required upon attaining age 60 and completing 35 years of service. Class C members (except participants of Detention Services and Department of Education) began making contributions at 1.0% of compensation starting July 1, 2013 increasing 1.0% each year until they reach 5.0% of compensation. As of June 30, 2022, Class C and Class D members make contributions at 5.0% of pay from date of participation. Interest is credited on contributions at a rate of 5.25% per annum for Class A and B members and 3.00% for Class C and Class D members.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Compensation

Earnable compensation is the annual salary authorized for the member, not including overtime, differential pay, environmental pay, hazardous duty pay, pay for conversion of leave or other fringe benefits, or any additional payment. Average Final Compensation is the average of the member's annual earnable compensation on January 1 for the three successive years of service when the member's earnable compensation is the highest or, if the member is in service on January 1 for less than three successive years, than the average during total service.

Covered Compensation

The covered compensation (for Class C only) is the average of the FICA wage base for the 35-year period ending with the calendar year which ends immediately prior to the earlier of: (1) January 1, employment, or (2) January 1, of the calendar year in which the member attains age 65.

Military Service Credit

A. Military Service Prior to Employment:

1. Classes A and B

A maximum of three- years' service credit is granted provided the member has acquired 10 years of service and has reached the age of 60 or has acquired 20 years of service, regardless of age.

2. Classes C and D

A maximum of three-years' service credit is granted provided the member has acquired 10 years of service and has reached the age of 62 or has acquired 20 years of service, regardless of age.

B. Military Service Within Employment:

1. Classes A and B

Upon retirement or death, any member who, because of military duty, had a break in employment shall receive service credit for the period of absence as provided by the Veterans' Reemployment Rights Act.

Retirement Eligibility

A. Service Retirement:

1. Classes A and B – Age 60 with five years of service or 30 years of membership service.

2. Classes C and D – Age 65 with five years of service or 30 years of service, regardless of age. Early retirement allowed at age 55 with five years of service payable at age 65 or reduced for payment before 65.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

APPENDIX C – SUMMARY OF PLAN PROVISIONS

B. Non-Line-of-Duty Disability Retirement:

Five years of membership service and determined by a hearing examiner to be mentally or physically incapacitated for the performance of duty and that incapacity is likely to be permanent.

C. Line-of-Duty Disability Retirement:

Totally and permanently incapacitated for duty as the result of an accident while in performance of duty and certified by a hearing examiner as mentally or physically incapacitated for the performance of duty and that such incapacity is likely to be permanent.

D. Dismemberment Disability Retirement:

1. Classes C and D – Loss of any two or more of hands, feet, sight of eye(s) as a direct result of bodily injury from an accident while in actual performance of duty as determined by a hearing examiner.

Termination of Employment

1. Classes A and B

- a. Eligible for Termination Retirement Allowance, deferred to age 60, upon completion of (1) 15 years of membership service, or (2) five years of service, if removed from a position without fault.
- b. Eligible for a Termination Retirement Allowance, payable immediately, upon completing 20 years of service, if removed from a position without fault.
- c. Eligible for a refund of accumulated contributions if not eligible for any other benefits.

2. Classes C and D

- a. Eligible for a Termination Retirement Allowance, deferred to age 65, upon completion of (1) 10 years of service, or (2) five years of service, if removed from a position without fault.
- b. Eligible for an immediate benefit if removed without fault after 20 years of service.

Retirement Allowances

A. Service Retirement:

1. Classes A and B

The sum of:

- a. An annuity of the actuarial equivalent of a member's accumulated contributions; and
- b. A pension, which together with the annuity shall equal 1.935% (Class A) or 1.785% (Class B) of Average Final Compensation times years of service.

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APPENDIX C – SUMMARY OF PLAN PROVISIONS

2. Class C

A pension of (1) 1.60% of Average Final Compensation, times years of service up to 30 years, plus (2) 0.25% of Average Final Compensation in excess of Covered Compensation, times years of service up to 30 years, plus (3) 1.85% of Average Final Compensation, times years of service in excess of 30 years.

3. Class D

A pension of 1.00% of Average Final Compensation, times years of service. If the member retires at or after age 62 with at least 20 years of service, the member receives an enhanced benefit of 1.10% of Average Final Compensation times years of service.

B. Early Retirement:

1. Classes C and D

If a member is age 55 with five years of service, the member may retire at any time, with a benefit reduced for early commencement. The reduction factor is 1/180 for each of the first 60 months prior to age 65 and 1/360 for each additional month preceding age 65. If the member has 30 years of service at retirement, then there is no reduction factor applied to the benefit.

C. Non-Line-of-Duty Disability Retirement:

1. Classes A and B

A benefit equal to the service retirement benefit if age 60; otherwise, an annuity of the actuarial equivalent of a member's accumulated contributions plus a pension which, together with the annuity, shall equal 1.90% (Class A) or 1.75% (Class B) of Average Final Compensation times years of service.

The member will receive the benefit as calculated above, if the benefit exceeds 25% of the member's Average Final Compensation. Otherwise, the member shall receive 25% of the member's Average Final Compensation.

This benefit is offset by:

- a. Workers' compensation (excluding amounts paid to third parties);
- b. Earnings in excess of base amount (current earnable compensation in same job grade and step adjusted for longevity) with a \$1.00 reduction for each \$2.00 of the first \$5,000 of excess and a \$2.00 reduction for each \$5.00 of additional excess earnings.

2. Classes C and D

The ordinary disability pension shall be equal to the greater of:

- a. The member's accrued service retirement benefit; or
- b. 15% of the member's average final compensation.

This benefit is offset by:

- a. Workers' compensation (excluding amounts paid to third parties);
- b. Unemployment compensation.

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APPENDIX C – SUMMARY OF PLAN PROVISIONS

D. Line-of-Duty Disability Retirement:

An annuity of the actuarial equivalent of a member's accumulated contributions, plus a pension equal to 66-2/3% of Average Final Compensation.

This benefit is offset by:

Same offsets are applied as for non-line of duty disability.

E. Dismemberment Disability Retirement:

1. Classes C and D

A pension, equal to 100% of Average Final Compensation. Same offsets as for Class C Line-of-Duty Disability benefits.

F. Termination Retirement Allowance (Deferred Payment):

Determined the same as for Service Retirement, but based on membership service and Average Final Compensation at the time of termination.

G. Termination Retirement Allowance (Immediate Payment):

Determined the same as if the member had retired with a non-line-of-duty retirement allowance.

H. Job Removal Retirement Benefit (Immediate Payment):

Unreduced retirement benefit based on actual years of service credit is provided to any member who is removed from a permanent position without fault, provided they had 20 years of service.

Option Methods of Receiving Benefit Payments

A. Maximum Service Retirement:

Joint & Survivor form of payment to unmarried spouse or dependent children until the last marries, dies or attains age 18 (age 22 if a full-time student). The percent continued to the spouse is 40%.

B. Cash refund to retiree's beneficiary based on present value of allowance at retirement less payments made.

C. Joint and 100% to Contingent Beneficiary

D. Joint and 50% to Contingent Beneficiary

E. Some other periodic benefit subject to the approval of the Board of Trustees

These options are available for service, termination, non-line-of-duty disability and line-of-duty disability retirement. Any option and/or beneficiary may be changed by the retired member within 30 days after retirement.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Non-Line-of-Duty-Death Benefits

1. Classes A and B

- The member's accumulated contributions will be returned; plus, if one or more years of membership service, 50% of the greater of Average Final Compensation or current annual earnable compensation, or
- If (1) eligible for service retirement, or (2) would have become eligible for service retirement within 90 days, or (3) if retired on account of service, non-line-of-duty disability, or line-of-duty disability and dies within 30 days of retirement, or (4) entitled to a deferred allowance at age 60; and the member's designated beneficiary or his partner(s) is his spouse with whom he has been living for at least five years, such beneficiary may elect an allowance equal to the greater of 40% of the participant's accrued benefit or the amount that would have been paid under the Joint and 100% Contingent Option.

This benefit is offset by workers' compensation (excluding amounts paid to third parties). If no beneficiary and if intestate without heirs, then contributions shall remain part of the System.

2. Classes C and D

- If (1) eligible for service retirement, or (2) would have become eligible for service retirement within 90 days, or (3) if retired on account of service, ordinary disability, or accidental disability and dies within 30 days of retirement, or (4) entitled to a deferred allowance at age 65, or (5) has 20 years of service and dies anytime between effective retirement date at age 65 and no later than 30 days following the attainment of age 65; the member's designated beneficiary shall receive an allowance equal to the greater of 40% of the participant's accrued benefit or the amount that would have been paid under the Joint and 100% Contingent Option, or
- If (1) not eligible under paragraph (1) above, and (2) if one or more years of service, 50% of the greater of Average Final Compensation or current annual earnable compensation, shall be paid as a lump sum.

Line-of-Duty Death Benefits

If a member's death was the result of injuries in the line of duty, a refund of contributions shall be payable, if applicable. In addition, an annual pension of 100% of current earnable compensation (not less than \$10,000 on June 30, 1994) shall be payable to:

- A. The spouse, provided there is no voluntary separation agreement renouncing rights of inheritance during her widowhood;
- B. If no eligible spouse, or if the spouse dies or remarries, the child or children equally until age 18 (age 22 if full-time student(s));

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- C. If no eligible spouse or child surviving, then to the deceased's father and / or mother equally, or to the survivor;
- D. For Classes A and B, any member who retires and dies within 30 days after the effective date of line-of-duty disability retirement shall receive the above benefits if death is the result of injuries in the line of duty.

This benefit is offset by workers' compensation (excluding amounts paid to third parties). If no beneficiary and if intestate without heirs, then contributions shall remain part of the System.

Post-Retirement Benefit Increases

Annual post-retirement benefit increases of a fixed 1.5% for participants in pay status under age 65 and 2.0% for participants in pay status age 65 and over.

Hybrid Employer Contributions

Section 5.3 (C) of Article 22 of the City Code identifies a provision that would impact the City's contribution rate to the Retirement Savings Plan (Savings Plan) of 3% for hybrid members of Plan D. If the Class D funded status falls below 85% half of the 3.0% or 1.5% of the City contributions to the Savings Plan will be diverted to funding the Retirement System. As a result in this report we track and provide specific information of the funded status for Class D members.

The funded ratio is defined as the ratio of the adjusted market value basis of assets attributable to Class D members of the June 30th preceding the actuarial valuation over the Employees Retirement System liabilities attributable to Class D members on that date. To determine this value in time for appropriate implementation of the appropriate City contribution rate before the beginning of the fiscal year we roll forward the liabilities for Class D members and the estimated adjusted asset value. This calculation is summarized in Section IV of this report.