

# **Employees' Retirement System of the City of Baltimore**

## **Actuarial Valuation Report as of June 30, 2023**

**Produced by Cheiron**

**November 2023**

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November 7, 2023

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

Dear Members of the Board:

We are pleased to submit the June 30, 2023 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, 2023**

**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, 2023. 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 2025, 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's 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, 2023**

**FOREWORD**

This report was prepared using census data and financial information as of the valuation date, June 30, 2023. 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, 2023 as provided to us by the System and does not reflect any subsequent changes in the membership or assets.

This report reflects changes to actuarial assumptions resulting from the 2022 experience study conducted on the System's experience from the 2018-2022 valuations. The results of this study were presented in June 2023 and assumption changes effective for the June 30, 2023 valuation were approved by the Board.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**SECTION I – SUMMARY**

The key results of the June 30, 2023 actuarial valuation are as follows:

- Investments earned 6.23% 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 6.72%. There was an investment loss of \$9.5 million resulting from the investment return of 6.23% which was lower than the expected return of 6.72%,
- Due to smoothing of the prior investment gains and losses, the actuarial asset value return was 5.94%, producing a net loss of \$25.1 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, increased from \$523.54 million on June 30, 2022 to \$532.62 million on June 30, 2023. This increase is attributable to the asset loss, the adoption of the assumption changes which increased liabilities by \$8.1 million, and the demographic experience loss of \$36.1 million resulting primarily from higher than expected pay increases among active members. 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 79.9% last year to 80.0% this year.
- The total recommended contribution increased from \$89,287,690 for FYE 2024 to \$98,471,636 for FYE 2025. This represents an increase in cost as a percent of payroll from 20.32% to 21.47% for FYE 2025. 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 9 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, 2023 there are 3,161 Class D members out of total active membership of 7,534, representing 42.0% 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 98.6% as shown in Section V this report.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**SECTION I – SUMMARY**

The tables below provide details on the development of the FYE 2025 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				
	<b>2022 Valuation</b>		<b>2023 Valuation</b>	
	<b><u>Applies to FYE 2024</u></b>		<b><u>Applies to FYE 2025</u></b>	
	<b>Amount</b>	<b>% of Pay</b>	<b>Amount</b>	<b>% of Pay</b>
<b>1 Contributions</b>				
Total Normal Cost (with expenses)	\$ 32,407,784	7.38%	\$ 35,254,432	7.69%
Expected Employee Contributions <sup>1</sup>	<u>(19,265,979)</u>	-4.39%	<u>(20,301,768)</u>	-4.43%
Employer Normal Cost	\$ 13,141,805	2.99%	\$ 14,952,664	3.26%
Amortization of Unfunded Actuarial Liability	\$ 69,663,780	15.86%	\$ 76,401,594	16.66%
Interest to Beginning of Next FY	<u>6,482,105</u>	1.48%	<u>7,117,378</u>	1.55%
Total Lump Sum Cost	\$ 89,287,690	20.32%	\$ 98,471,636	21.47%
Total Covered Payroll	\$ 439,326,244		\$ 458,637,682	
<b>2 Unfunded Liabilities</b>				
Actuarial Liability				
Active	\$ 924,933,718		\$ 954,130,896	
Retirees and Dependents	1,602,929,409		1,633,201,230	
Terminated Vested	<u>72,657,615</u>		<u>82,387,223</u>	
Total	\$ 2,600,520,742		\$ 2,669,719,349	
Less: Actuarial Value of Assets	\$ 2,076,981,256		\$ 2,137,101,031	
Unfunded Actuarial Liability	\$ 523,539,486		\$ 532,618,318	
Funded Ratio based on Actuarial Value of Assets		79.9%		80.0%
Funded Ratio based on Market Value of Assets		75.9%		76.2%

<sup>1</sup> 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, 2023**

**SECTION I – SUMMARY**

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

Table I-2 Active Membership Summary						
	Active Members			Payroll		%
	2022	2023	% Increase	2022	2023	Increase
Class A	6	4	-33.33%	\$ 293,211	\$ 224,848	-23.32%
Class C	4,784	4,369	-8.67%	279,406,778	274,171,031	-1.87%
Class D	2,935	3,161	7.70%	159,626,255	184,241,803	15.42%
Total	7,725	7,534	-2.47%	\$ 439,326,244	\$ 458,637,682	4.40%
Average				\$ 56,871	\$ 60,876	7.04%

Table I-3 Inactive Membership Summary						
	Number of Retirees			Average Annual Benefit Amount		
	2022	2023	% Increase	2022	2023	% Increase
<b>Receiving Benefits</b>						
Normal Service Retirement*	6,129	6,169	0.7%	\$ 20,697	\$ 21,274	2.8%
Discontinued Service	727	702	-3.4%	24,533	25,213	2.8%
Ordinary Disability	739	716	-3.1%	10,479	10,670	1.8%
Accidental Disability	51	45	-11.8%	24,692	26,115	5.8%
Social Security Equalization	6	4	-33.3%	8,492	3,711	-56.3%
Beneficiaries of Above	1,437	1,438	0.1%	9,121	9,380	2.8%
Ordinary Death	110	105	-4.5%	14,986	15,911	6.2%
Special Death	8	6	-25.0%	23,310	21,910	-6.0%
<b>Total</b>	<b>9,207</b>	<b>9,185</b>	<b>-0.2%</b>	<b>\$ 18,321</b>	<b>\$ 18,842</b>	<b>2.8%</b>
<b>Deferred Benefits</b>						
Terminated Vested**	1,089	1,192	9.5%	\$ 10,311	\$ 10,885	5.6%

\*Benefit amounts for 2 retired participants were not provided; we assumed a monthly benefit of \$1,800.

\*\*Benefit amounts for 69 vested participants were not provided; we assumed a monthly benefit of \$900.



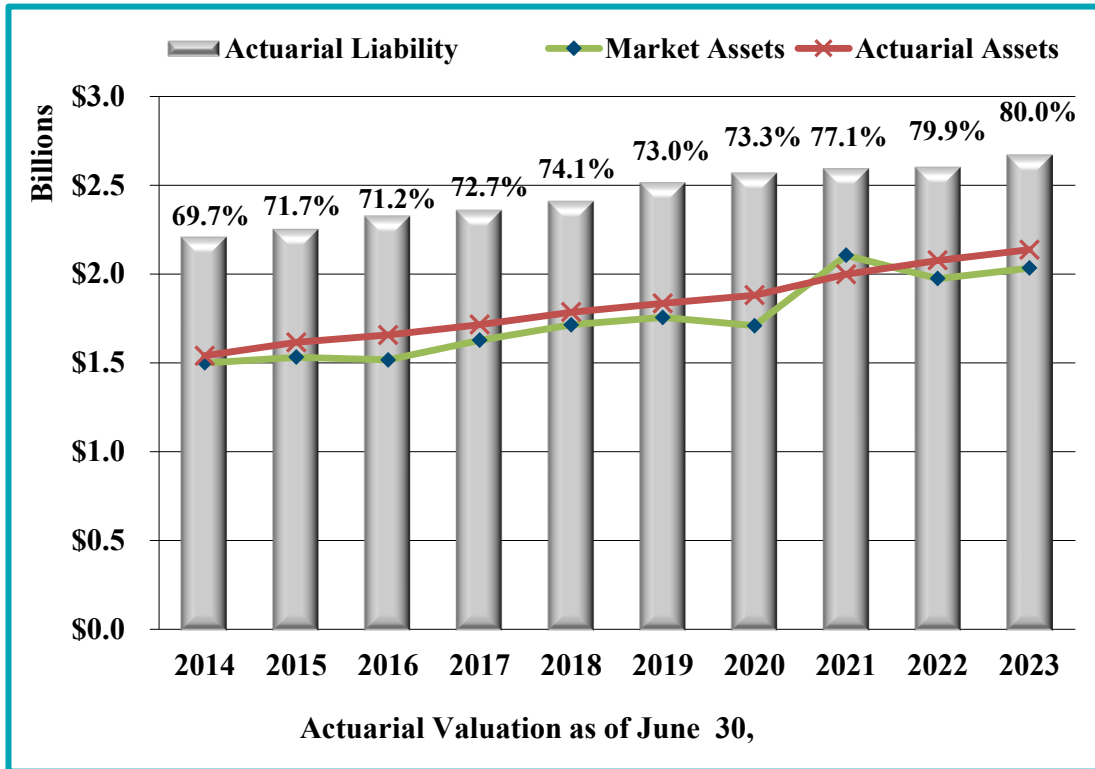
**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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



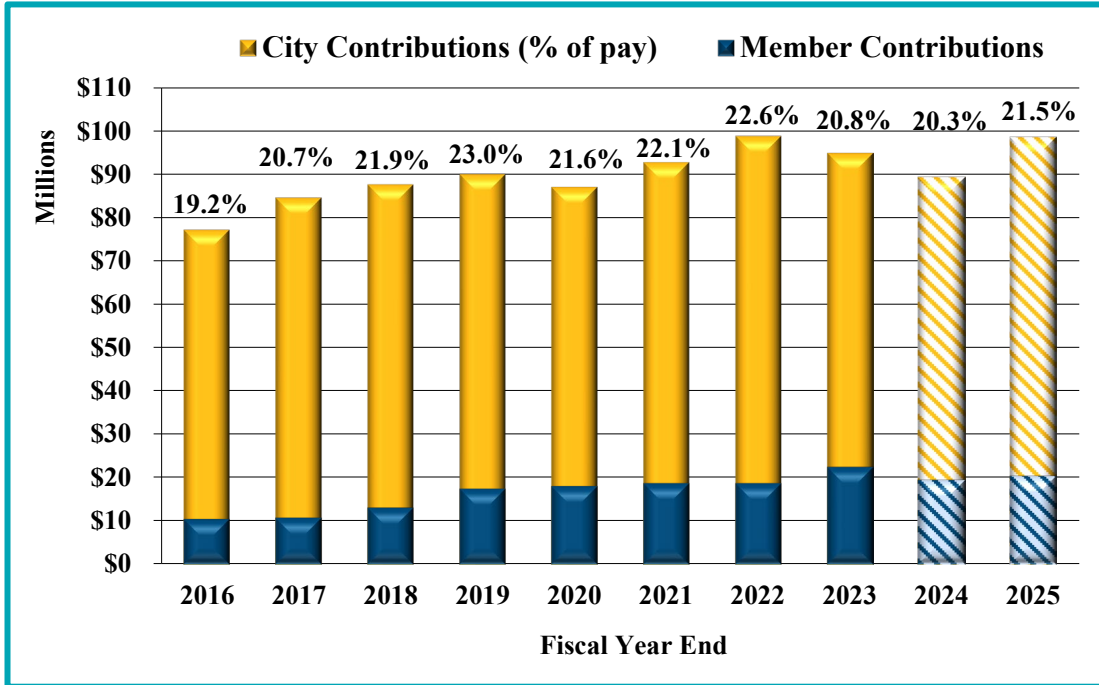
The chart above shows historical trends since 2014 for the market and actuarial value of assets compared to the actuarial liability. The actuarial asset value reflects the market value plus one-fifth of the aggregate investment earnings above or below the expected return. We also show the progress of 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 2023, the funded ratio increased from 79.9% to 80.0% despite the investment losses, because of the large investment gains from the prior years that helped offset the investment and demographic losses in the current year.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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 2023 and estimated amounts for FYE 2024 and FYE 2025.



The percentages above the bars show the City contribution rate net of member contributions as a percent of pay. The City contribution rate decreased 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 2024 costs dropped, both in dollar amounts and as a percent of pay due to decreases in the unfunded liability resulting from the investment and demographic experience. In contrast, the FYE 2025 costs increased as a result of the assumption changes adopted as part of the experience study and the demographic and investment losses.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

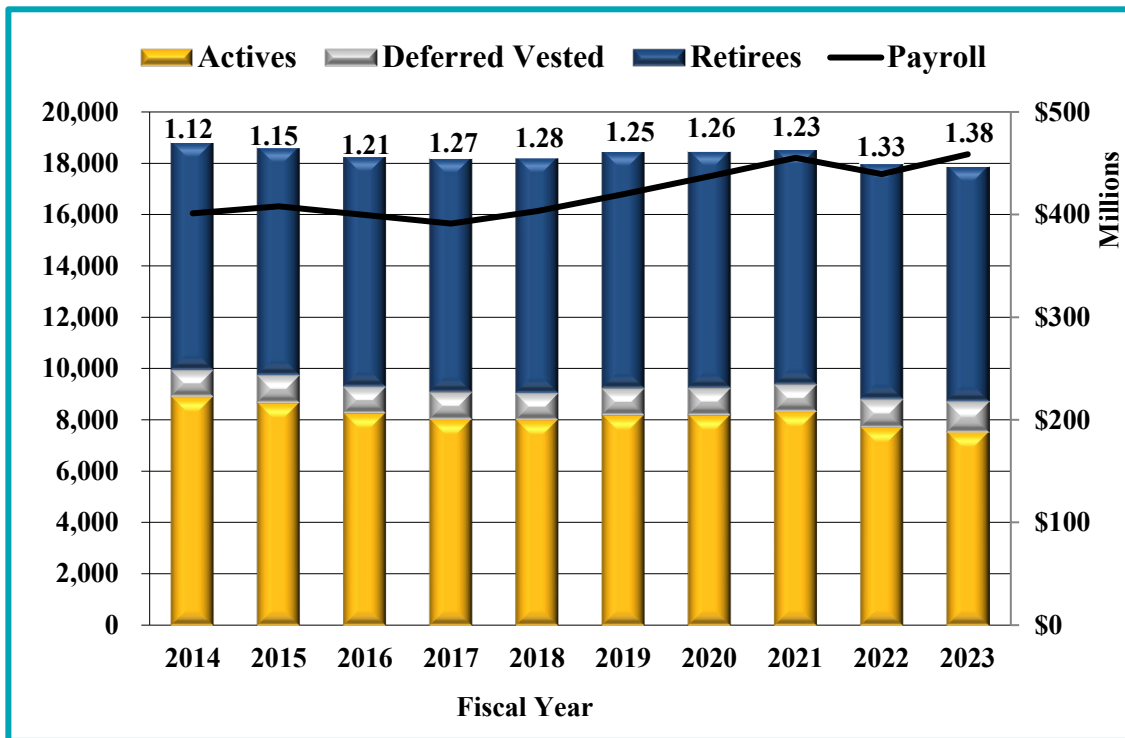
**SECTION I – SUMMARY**

Participant Trends

The chart below shows the membership counts of the System at successive valuations. The numbers which appear above each bar represent the Support Ratio (the ratio of inactive members to active members) at each valuation date. The Support Ratio has increased since 2014 through 2023, with the exception of decreases in 2019 and 2021.

The Support Ratio as of the current valuation is 1.38, up from 1.33 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.

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 2014 to 2015, declined in 2016 and 2017. Payroll has steadily increased from 2018 to 2023 with the exception of a decrease 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 2014, then increasing from 2018 through 2021 but decreasing in 2022 and 2023. The decrease in active members for FYE 2023 was mainly due to lower number of new entrants compared to prior years.



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

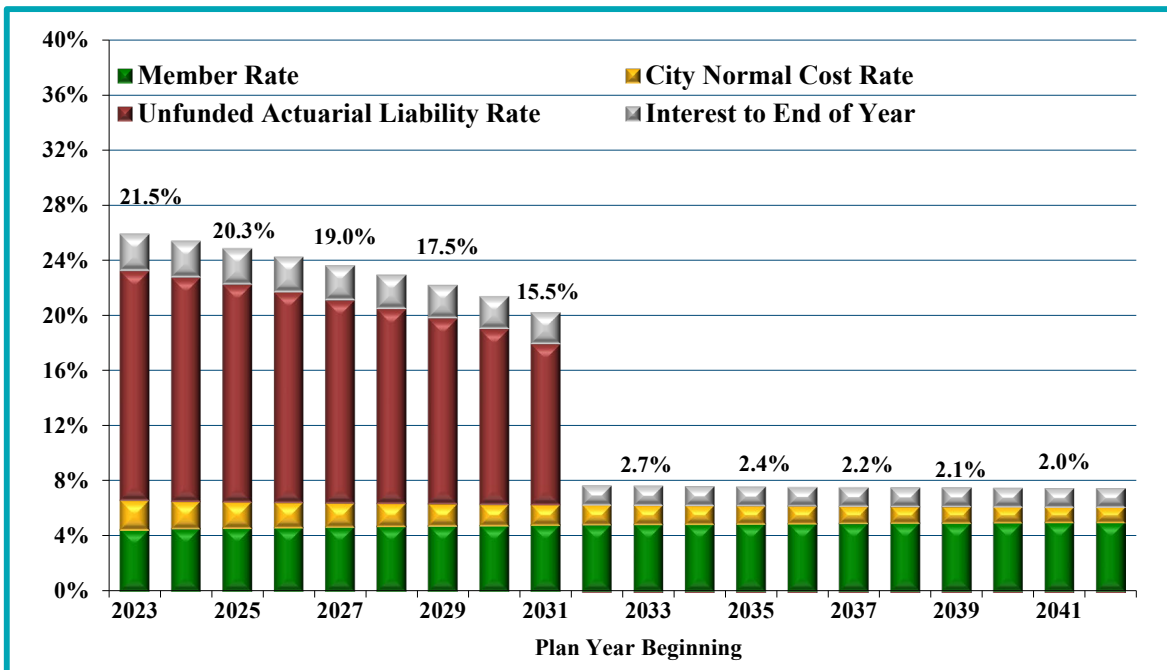
**Projections**

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 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.

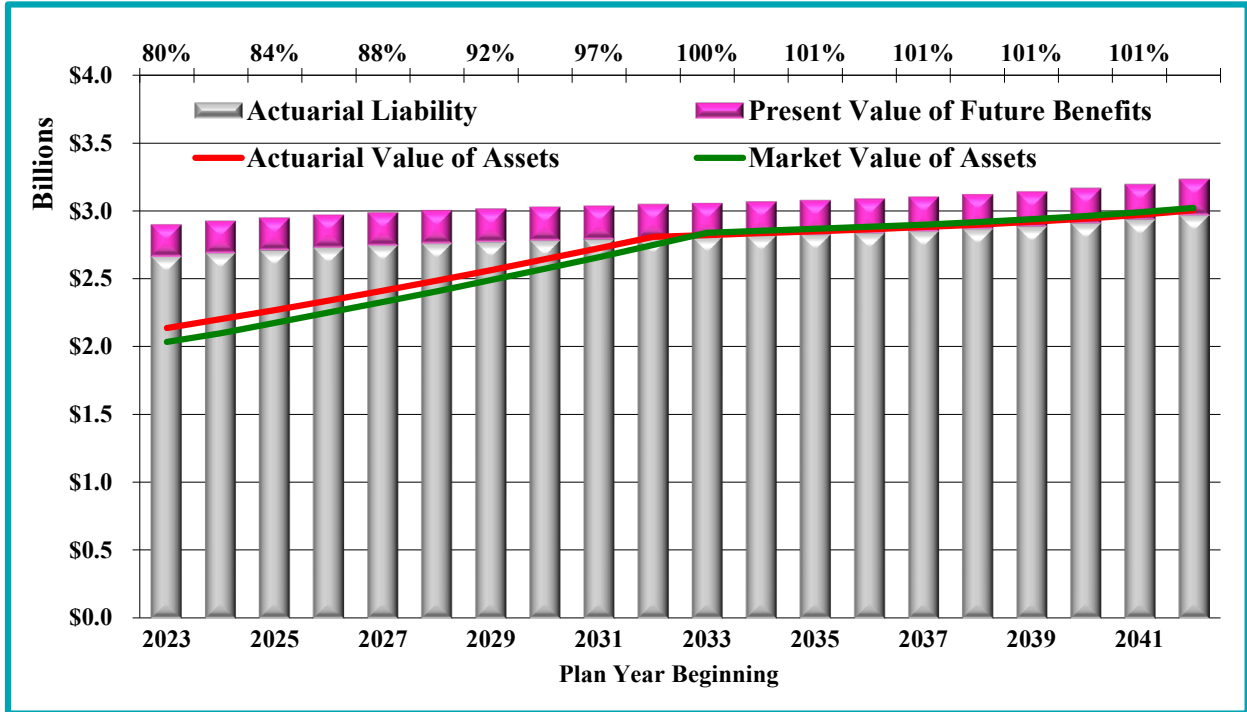
The chart shows the expected member contribution rate, the normal cost rate, the rate of pay of amortization of the unfunded actuarial liability (UAL rate), and the net City's total contribution rate (numbers on the top of the bars). The City's total cost as a percent of payroll is projected to decrease 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 2.8% 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 2.0% 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 9 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:

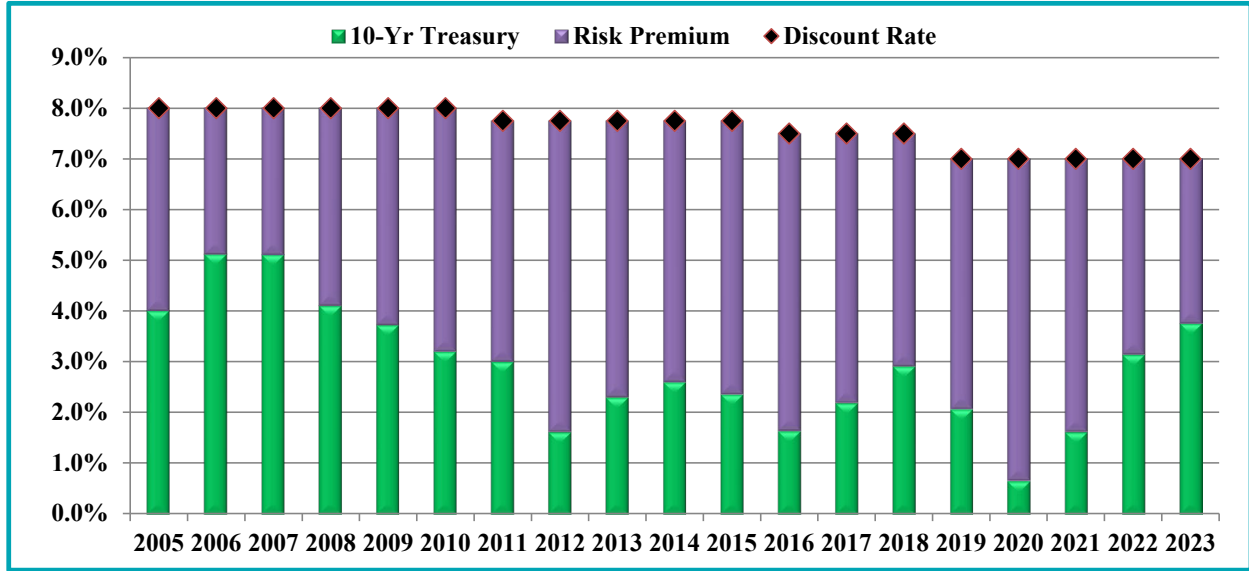
- Investment risk,
- Interest rate risk,
- Longevity and other demographic risks; and
- Assumption change risk.

*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.

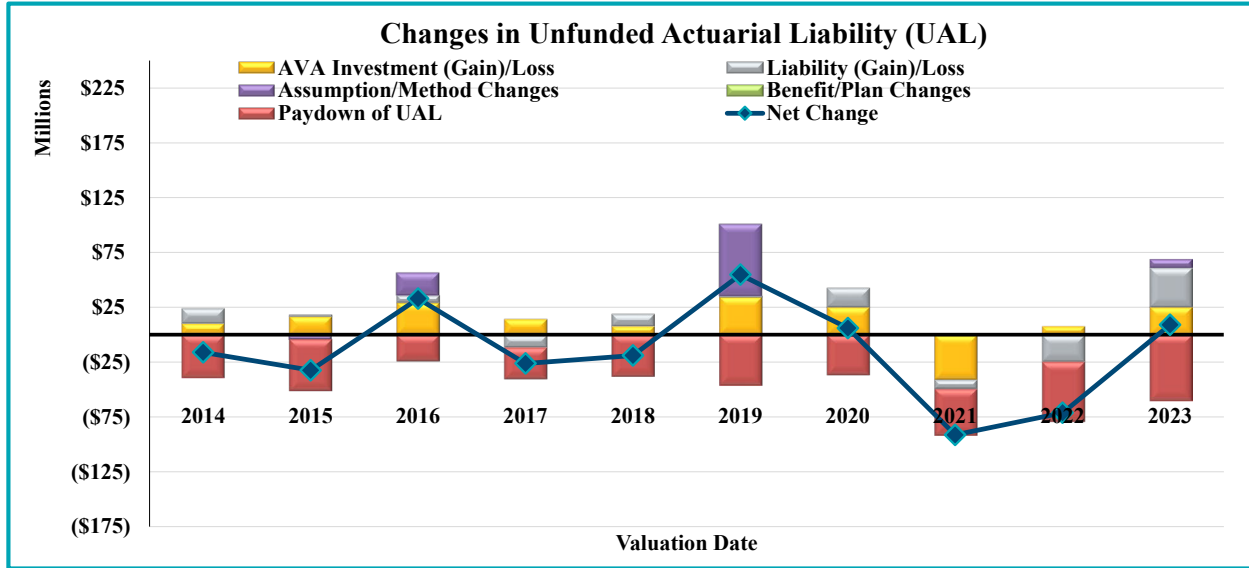
*Assumption Change Risk* is the potential for the environment to change such that future valuation assumptions are different from the current assumptions. For example, declines in interest rates over time may result in a change in the assumed rates of return used in the valuation. A healthier workforce 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  
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**SECTION II – IDENTIFICATION AND ASSESMENT OF RISK**

**Historical Changes in UAL 2013-2022**



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
<b>Discount Rate</b>	7.75%	7.75%	7.50%	7.50%	7.50%	7.00%	7.00%	7.00%	7.00%	7.00%	
<b>Source</b>											
AVA Investment (G)/L	\$ 10.3	\$ 16.5	\$ 29.2	\$ 14.2	\$ 7.9	\$ 34.2	\$ 25.1	\$ (40.6)	\$ 7.7	\$ 25.1	\$ 129.6
Liability (G)/L	14.0	2.1	6.9	(11.3)	11.3	1.4	17.7	(8.2)	(24.3)	36.1	45.7
Assumption/Method Changes	0.0	(3.8)	20.9	0.0	0.0	65.5	0.0	0.0	0.0	8.1	90.7
Benefit/Plan Changes	(1.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(1.0)
Paydown of UAL <sup>1</sup>	(39.4)	(47.2)	(24.1)	(29.1)	(38.1)	(46.3)	(36.7)	(42.5)	(54.6)	(60.2)	(418.2)
<b>Total UAL Change</b>	<b>(16.1)</b>	<b>(32.4)</b>	<b>32.9</b>	<b>(26.2)</b>	<b>(18.9)</b>	<b>54.8</b>	<b>6.1</b>	<b>(91.3)</b>	<b>(71.2)</b>	<b>9.1</b>	<b>\$ (153.2)</b>

<sup>1</sup> 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 2014 to 2023 reflect investment losses in every year between 2014 through 2023, with the exception of an investment gain in 2021. Over the ten-year period, investment gains and losses have added approximately \$129.6 million to the UAL.

On the liability side (gray bars), the System has experienced gains and losses, increasing the UAL by approximately \$45.7 million over the ten-year period.

Assumption and method changes (purple bars) have increased the UAL by approximately \$90.7 million over the ten-year period. The significant assumption changes have demographic changes from the experience studies in 2016, 2019 and 2023.

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



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

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 \$418.2 million over the last ten years.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**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.

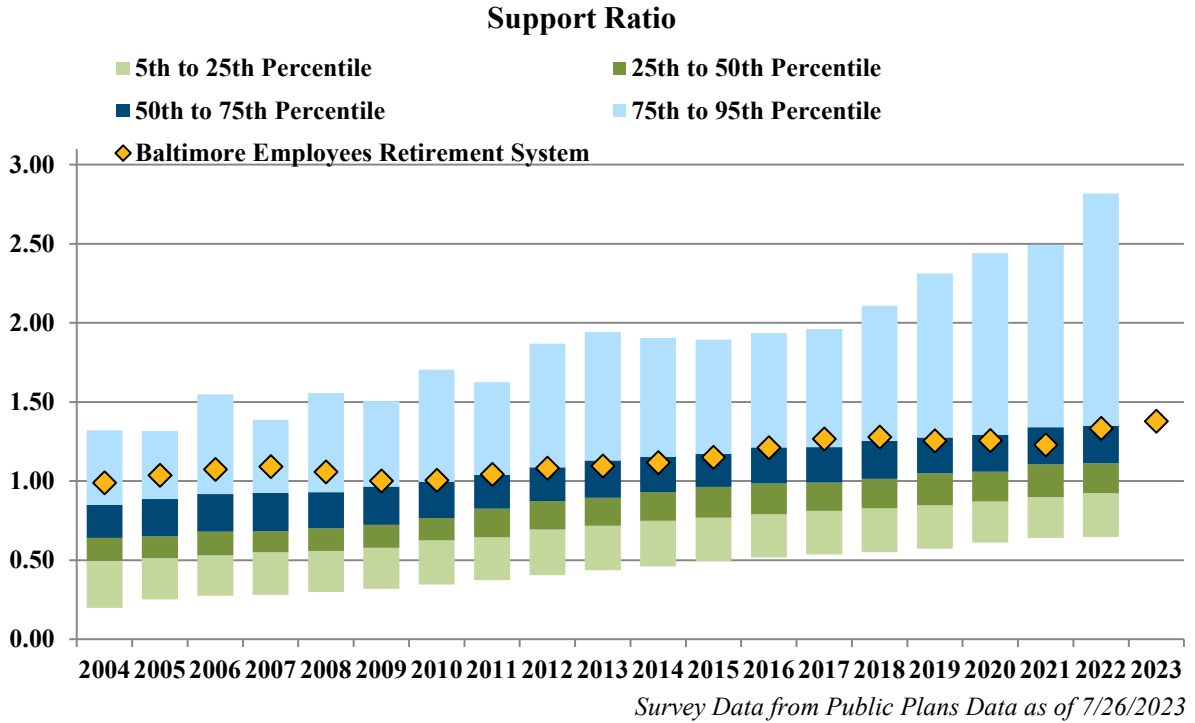
Inactives per Active (Support Ratio)

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.

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**SECTION II – IDENTIFICATION AND ASSESMENT OF RISK**



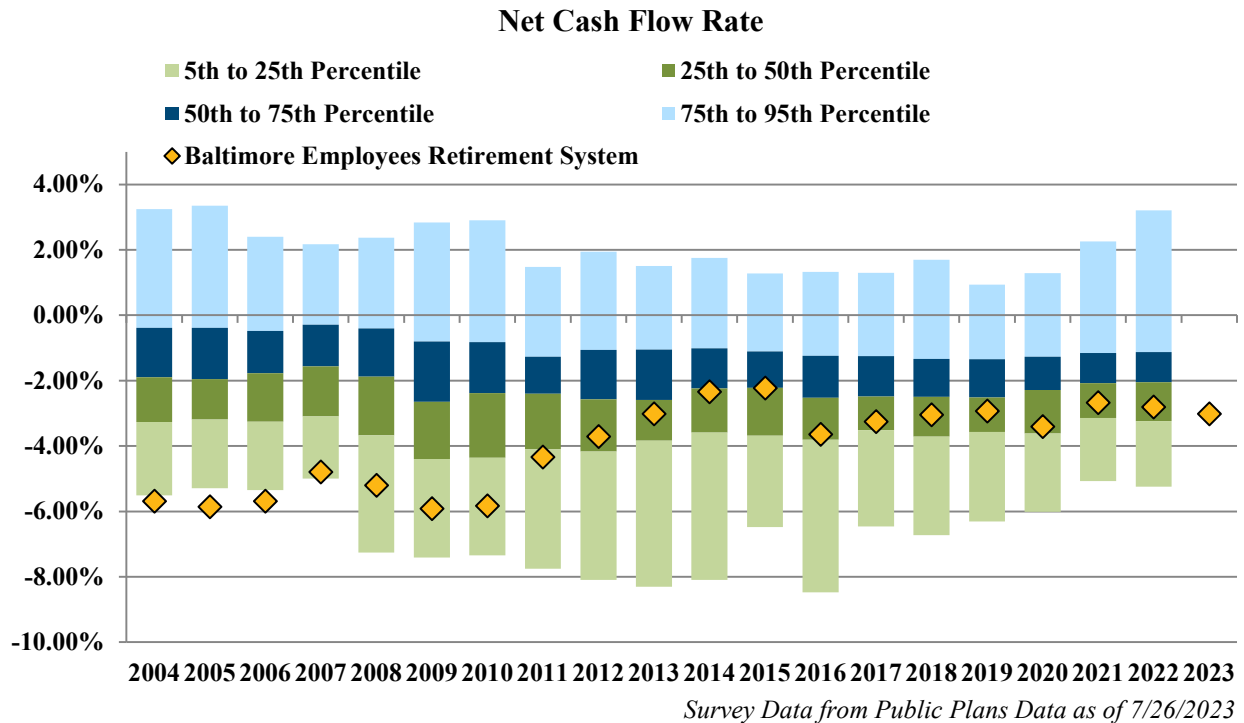
The graph above shows the distribution from the 5<sup>th</sup> to 95<sup>th</sup> percentile of support ratios for the plans in the Public Plans Database. The gold diamond shows how the System compares to the other plans. The System was already in a relatively mature status in 2004 being in the 75<sup>th</sup> to 95<sup>th</sup> 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 2023, the System’s support ratio increased due to the decrease in the number of active members.

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

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.



The graph above shows the distribution from the 5<sup>th</sup> to 95<sup>th</sup> 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 25<sup>th</sup> to 50<sup>th</sup> 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 because 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%**

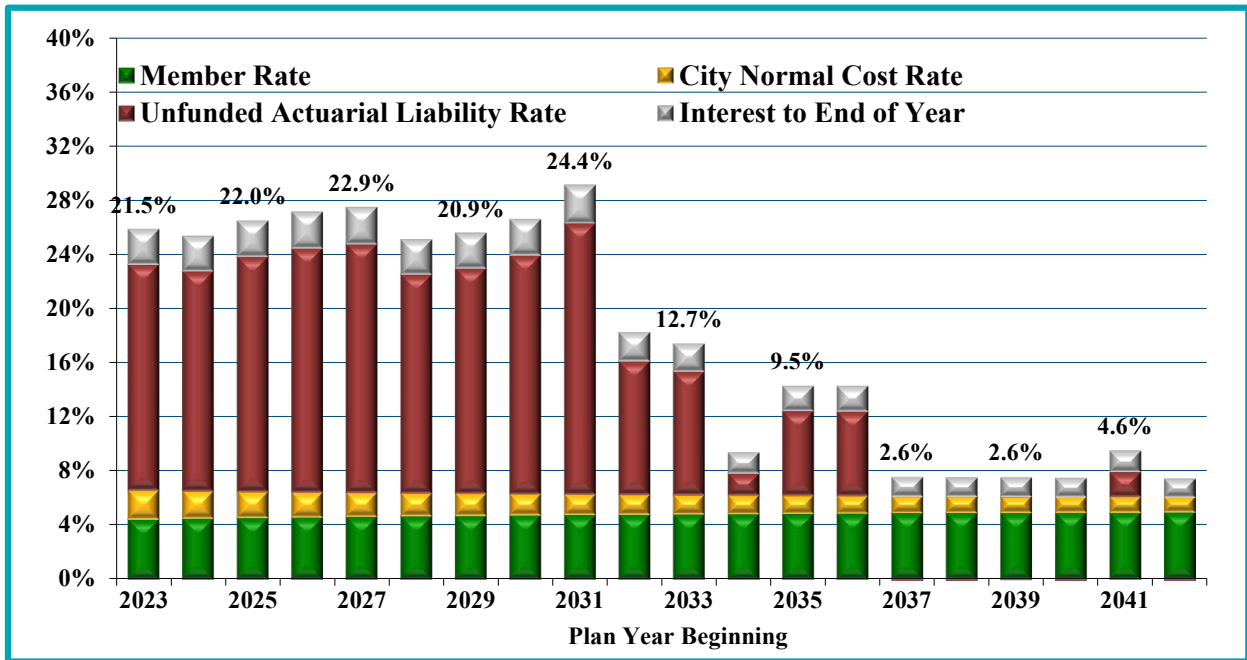
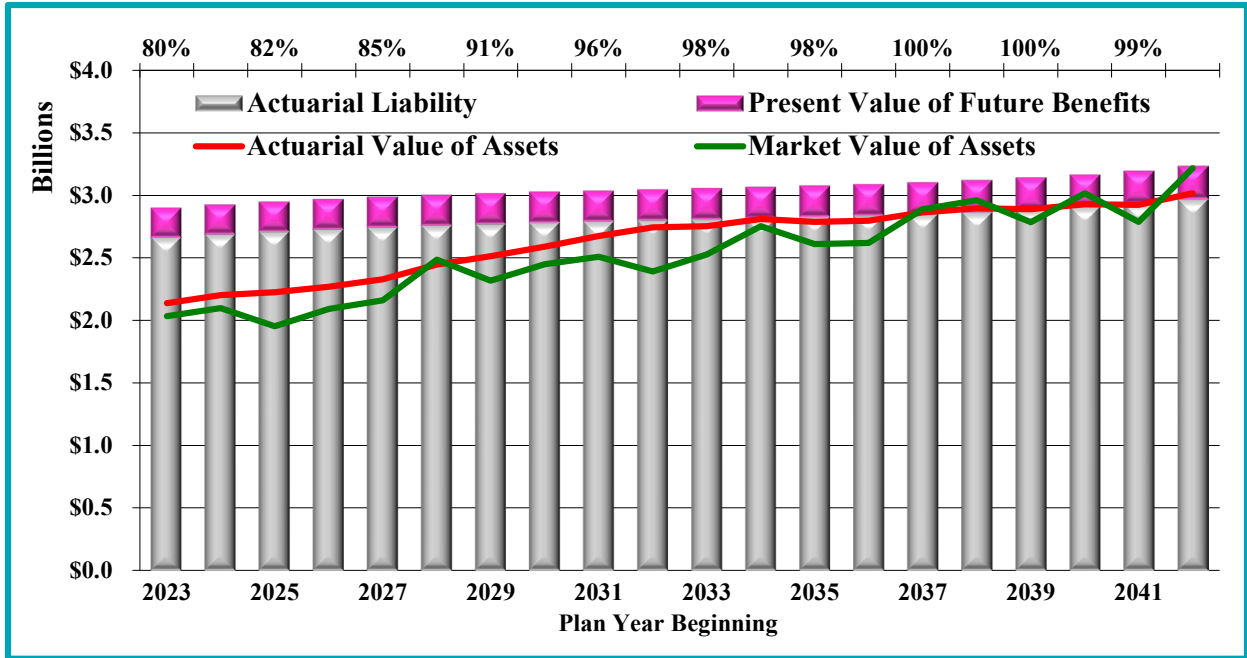
The two graphs based on projected returns that while volatile produce the same average 7.00% return based on the following table.

<b>Year</b>	<b><u>2023</u></b>	<b><u>2024</u></b>	<b><u>2025</u></b>	<b><u>2026</u></b>	<b><u>2027</u></b>	<b><u>2028</u></b>	<b><u>2029</u></b>	<b><u>2030</u></b>	<b><u>2031</u></b>	<b><u>2032</u></b>
<b>Return</b>	7.00%	-3.50%	11.00%	6.65%	18.00%	-4.00%	9.00%	5.50%	-2.00%	7.50%
<b>Year</b>	<b><u>2033</u></b>	<b><u>2034</u></b>	<b><u>2035</u></b>	<b><u>2036</u></b>	<b><u>2037</u></b>	<b><u>2038</u></b>	<b><u>2039</u></b>	<b><u>2040</u></b>	<b><u>2041</u></b>	<b><u>2042</u></b>
<b>Return</b>	13.50%	-1.00%	6.90%	15.50%	7.00%	0.00%	15.00%	-2.00%	22.00%	13.00%

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.

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**SECTION II – IDENTIFICATION AND ASSESMENT OF RISK**



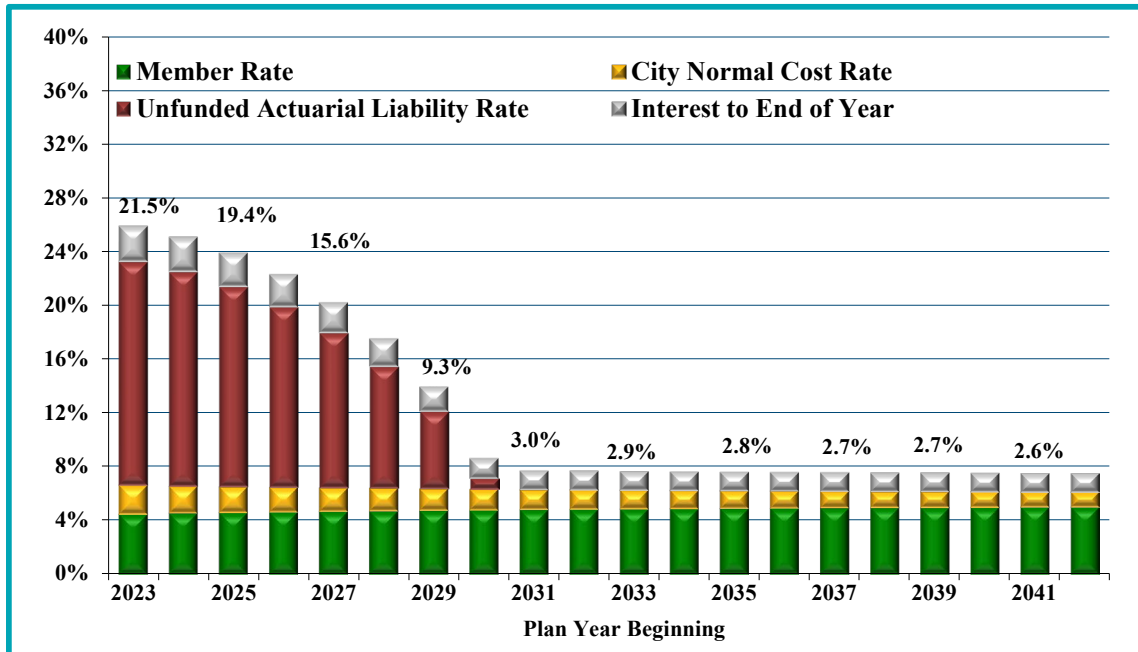
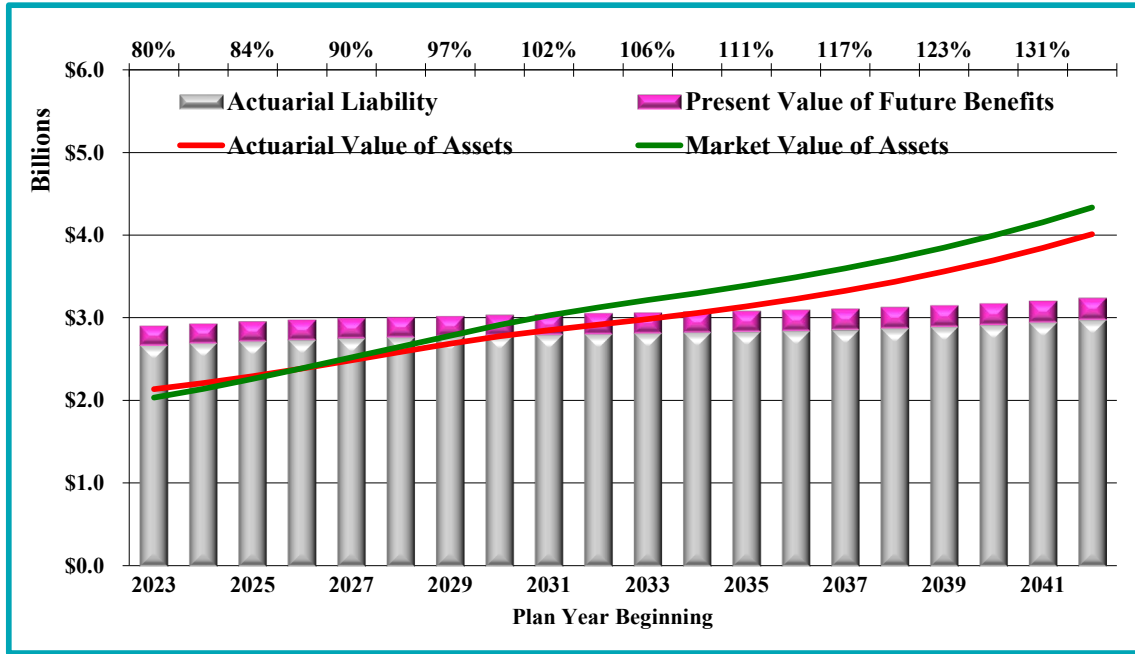
This graph above shows the nature of the fixed amortization period and the potential for cost volatility as the System gets closer to the target date for full funding. In the year 2031 and later, almost all of the unfunded actuarial liability is being recognized in a one-year period. It is anticipated 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.

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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.

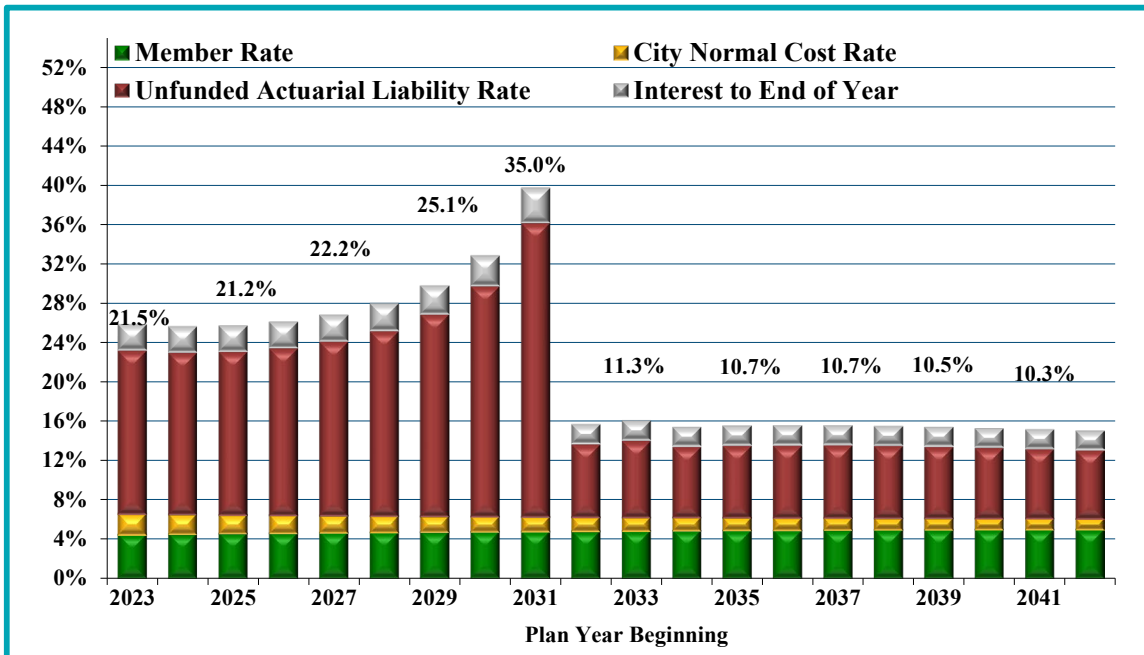
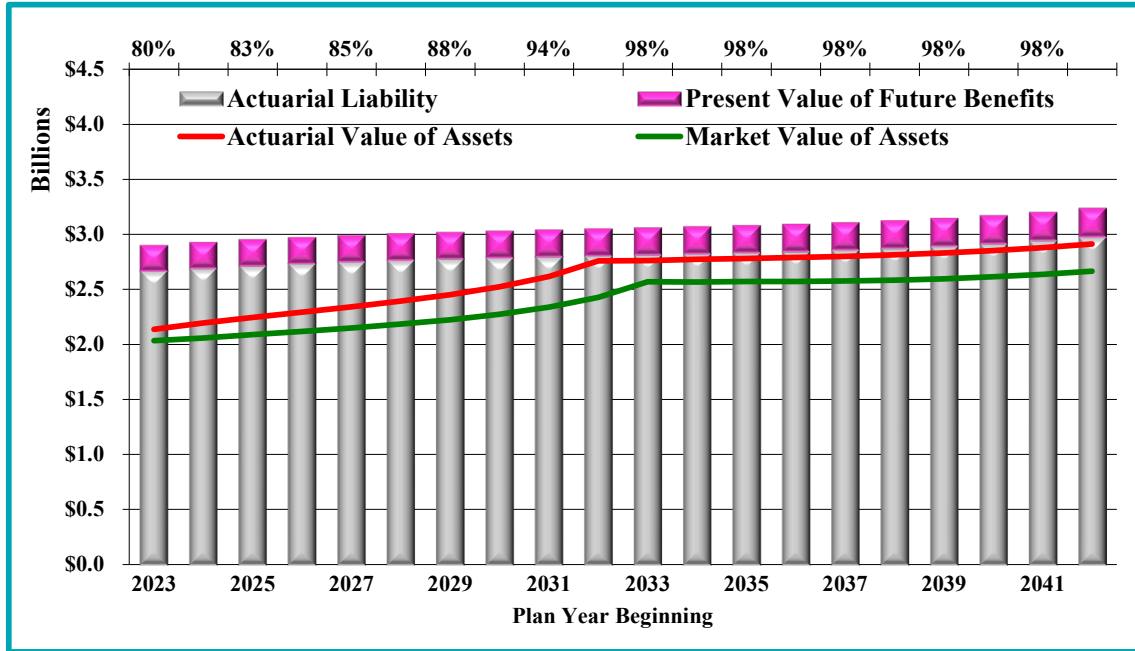


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**SECTION II – IDENTIFICATION AND ASSESMENT OF RISK**

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 drops to 19.4% in FY 2025 and then will steadily increase to about 35% by FY 2031 before dropping to approximately 10% thereafter.





**SECTION II – IDENTIFICATION AND ASSESMENT OF RISK**

**Low-Default-Risk Obligation Measure (LDROM)**

Effective February 15, 2023, the Actuarial Standards of Practice N0. 4 (ASOP 4) requires the disclosure of this liability called the Low-Default-Risk Obligation Measure (LDROM). The System invests in a diversified portfolio to achieve the best possible return at an acceptable level of risk. The lowest investment risk portfolio for a pension plan would be composed entirely of low-default-risk fixed income securities whose cash flows match the cash flows needs of the System. However, such a portfolio would have a lower expected rate of return (4.92% as of June 30, 2023) than the diversified portfolio (6.72%). As of June 30, 2023, the LDROM is \$3.19 billion<sup>1</sup> compared to the Actuarial Liability of \$2.67 billion for the System. The \$519 million difference can be viewed as the expected savings from taking on the investment risk of the diversified portfolio. Alternatively, it can be viewed as the potential cost of eliminating the investment risk of the non-fixed income allocations of the diversified portfolio.

If the System were to invest in the LDROM portfolio, the funded ratios would decrease, and assets would fall below the LDROM actuarial liability. The security of the System's pension benefits relies on the current assets, future investment earnings, and the ability and willingness of the City to make future contributions. If the System were to invest in the LDROM portfolio, it would reduce future investment earnings and potentially increase future City contributions.

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<sup>1</sup> Assumes a 4.92% discount rate, which is based on the June 30, 2023 FTSE Pension Liability Index using plan benefit projections and all other assumptions and methods as used to calculate the Actuarial Liability.

**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, 2023,
- 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  
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**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, 2023 is summarized below.

<b>Table III-1</b>	
<b>Assets of the Plan as of June 30, 2023</b>	
	<b><u>Total Market Value</u></b>
Fund Balance on June 30, 2022	\$ 1,974,303,144
Contributions	
Member	\$ 22,144,404
City/State	<u>94,788,090</u>
<b>Total Contributions</b>	<b>\$ 116,932,494</b>
Net Investment Income	
Interest, dividends, securities lending income and realized capital gains	\$ 54,233,299
Unrealized gains (losses)	86,086,878
Expenses	<u>(19,320,334)</u>
<b>Total Investment Income</b>	<b>\$ 120,999,843</b>
Administrative expenses	\$ (5,068,850)
Payments of benefit & refunds	\$ (173,269,177)
Fund Balance on June 30, 2023	\$ 2,033,897,454

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**SECTION III – ASSETS**

The table below shows the calculation of investment gains and losses. On a market value basis, the Plan earned a 6.23% return amounting to total investment loss of \$120,999,843 during FY 2022-2023. 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 \$5.2 million. The investment loss on a market basis related to the active liabilities using the expected return rate of 7.00% was \$15.0 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 \$9.5 million.

<b>Table III-2 Development of Investment Gain / (Loss)</b>	
1. Market Value of assets as of June 30, 2022	\$ 1,974,303,144
2. Market Value of assets as of June 30, 2023	\$ 2,033,897,454
3. Earnings during June 30, 2022 to June 30, 2023 (including investment expenses)	\$ 120,999,843
4. Mean Assets [Half of ((1.) + (2.) - (3.))]	\$ 1,943,600,378
5. Investment return 2022-2023 [(3.) ÷ (4.)]	6.23%
6. Investment gain / (loss)	
a. Relative to 6.50%: [(5.) - 6.50%] x (4.)	\$ (5,247,721)
b. Relative to 7.00%: [(5.) - 7.00%] x (4.)	\$ (14,965,723)
7. Funds as a portion of market value of assets	
a. Retired PVFB/Total PVFB	0.56194
b. (Total PVFB - Retired PVFB)/Total PVFB	0.43806
c. Total: (a) + (b)	1.00000
8. Total investment gain / (loss)	
a. Retired: (6a.) x (7a.)	\$ (2,948,879)
b. Active: (6b.) x (7b.)	\$ (6,555,958)
<b>c. Total Investment Gain / (Loss): (a) + (b)</b>	<b>\$ (9,504,837)</b>

The investment losses for FYE 2023 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, 2023**

**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 deficit of \$7,890,022 to a deficit of \$13,915,887 a change in net unallocated accumulated earnings of \$6,025,865 as of June 30, 2023. 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.

<b>Table III-3 Development of Unallocated Earnings</b>		
The development of current unallocated excess/(deficit) earnings over the most recent two years is as follows:		
	<b>Valuation Date</b>	
	<b>6/30/2022</b>	<b>6/30/2023</b>
1. Remaining net excess earnings from prior valuation	\$ 205,488,835	\$ (7,890,022)
2. New investment gain/(loss)	<u>(215,351,362)</u>	<u>(9,504,837)</u>
3. Current net excess earnings [(1) + (2)]	\$ (9,862,527)	\$ (17,394,859)
4. One-fifth (credit) charge [(3) x 20%]	<u>1,972,505</u>	<u>3,478,972</u>
5. Net unallocated excess/(deficit) earnings [(3) + (4)]	\$ (7,890,022)	\$ (13,915,887)

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

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

<b>Table III-4 Actuarial Value of Assets</b>			
The actuarial value of assets used to calculate the unfunded actuarial liability is developed as follows:			
1. Assets in the Fund on June 30, 2023		\$	2,033,897,454
2. Net deferred recognition of unallocated excess/(deficit) earnings		\$	(13,915,887)
3. Present value of prior year's contributions not yet paid		\$	89,287,690
4. Preliminary actuarial value of assets on June 30, 2023 (1) - (2) + (3)		\$	2,137,101,031 *
5. Corridor testing:			
80% of market value assets	\$		1,627,117,963
120% of market value assets	\$		2,440,676,945
6. Final actuarial value of assets on June 30, 2023		\$	2,137,101,031
7. Ratio of actuarial asset value to adjusted market asset value			100.7%

\* The actuarial value of assets represents 105.1% of the market value which is down from the same measurement last year of 105.2%.

On actuarial asset value, due to the current year's investment loss, the rate of return is less than the expectation with an asset rate of return for the year of 5.94%, which is compared to the expected investment return of 7.00%. As of June 30, 2023, the current year investment losses are primarily being offset by deferred investment gains from two years prior, partially being recognized and further being deferred for recognition in the future.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**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.

<b>Table IV-1 Liability By Employee Group</b>				
<b>As of June 30, 2023</b>				
	<b><u>Dept. of Education</u></b>	<b><u>Detention Services</u></b>	<b><u>All Others</u></b>	<b><u>Total</u></b>
<b>Number of Participants</b>				
Active	1,589	2	5,943	7,534
Service retired				6,875
Disabled				761
Terminated vested				1,192
Dependents				<u>1,549</u>
Total Participants				17,911
Annual compensation of active participants	\$ 89,977,302	\$ 103,284	\$ 368,557,096	\$ 458,637,682
Average Age	50.21	60.50	50.97	50.81
Average Service	11.53	34.46	13.72	13.26
<b>Development of Unfunded Actuarial Liability</b>				
Actuarial Liability				
Active	\$ 160,368,541	\$ 648,006	\$ 793,114,349	954,130,896
Retirees and dependents				1,633,201,230
Terminated vested				<u>82,387,223</u>
Total liabilities				\$ 2,669,719,349
Actuarial value of assets				
Active	\$ 70,847,048	\$ 286,274	\$ 350,379,256	\$ 421,512,578
Retirees and dependents				1,633,201,230
Terminated vested				<u>82,387,223</u>
Total assets				2,137,101,031
Unfunded actuarial liability *	\$ 89,521,493	\$ 361,732	\$ 442,735,093	\$ 532,618,318

\* 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  
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**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.

<b>Table IV-2 Development of 2023 Experience (Gain)/Loss</b>				
		<b>Actuarial Liability</b>	<b>Actuarial Value of Assets</b>	<b>Unfunded Actuarial Liability</b>
1. Value as of June 30, 2022	\$	2,600,520,742	\$ 2,076,981,256	\$ 523,539,486
a.) Actives and Term Vested at 7.00%	\$	997,591,333		
b.) Inactives at 6.50%	\$	1,602,929,409		
2. Additions				
a.) Normal Cost (without expenses)	\$	27,907,784	\$ 0	\$ 27,907,784
b.) Actual Employer Contributions	\$	0	\$ 94,788,090	\$ (94,788,090)
c.) Actual Member Contributions	\$	0	\$ 22,144,404	\$ (22,144,404)
3. Decreases				
a.) Benefit Payments	\$	(173,269,177)	\$ (173,269,177)	\$ 0
b.) Admin Expenses	\$	0	\$ (5,068,850)	\$ 5,068,850
4. Expected Interest				
a.) On 1 for one year	\$	174,021,805	\$ 145,388,688	\$ 28,633,117
b.) On 2a for one year	\$	1,953,545	\$ 0	\$ 1,953,545
c.) On 2b for one year*	\$	0	\$ 6,635,166	\$ (6,635,166)
d.) On 2c for 1/2 year	\$	0	\$ 761,946	\$ (761,946)
e.) On 3a and 3b for 1/2 year	\$	(5,542,599)	\$ (6,136,263)	\$ 593,664
5. Expected Value June 30, 2023: (sum 1-4)	\$	2,625,592,100	\$ 2,162,225,260	\$ 463,366,840
6. Change in methods/assumptions	\$	8,054,963	\$ 0	\$ 8,054,963
7. Change in benefits	\$	0	\$ 0	\$ 0
8. Expected value after changes: (sum 5-7)	\$	2,633,647,063	\$ 2,162,225,260	\$ 471,421,803
9. Actual Value as of June 30, 2023	\$	2,669,719,349	\$ 2,137,101,031	\$ 532,618,318
10. Actuarial (Gain)/Loss: (9-8)	\$	36,072,286	\$ 25,124,229	\$ 61,196,515
11. Total Increase/(Decrease): (6 + 7 + 10)	\$	44,127,249	\$ 25,124,229	\$ 69,251,478

\* Assumes contributions made at year end.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)**

<b>Table IV-3 Development of 2023 Experience Gain/(Loss)</b>	
1. Unfunded Actuarial Liability at June 30, 2022	\$ 523,539,486
2. Additions (normal cost, expenses and contributions)	(83,955,860)
3. Interest accrued*	23,783,214
4. Actuarial Assumption Change	<u>8,054,963</u>
5. Expected Unfunded Actuarial Liability at June 30, 2023 (1) + (2) + (3) + (4)	\$ 471,421,803
6. Actual Unfunded Actuarial Liability at June 30, 2023	<u>532,618,318</u>
7. Total Gain/(Loss) at June 30, 2023 (5) - (6)	\$ (61,196,515)

\* Interest rate depends on active versus inactive.

<b>Table IV-4 Elements of Actuarial Assets - Gain/(Loss)</b>	
1. Change in unallocated earnings	\$ 6,025,865
2. Asset Return	<u>(31,150,094)</u>
3. Total Actuarial Assets - Gain/(Loss) (1) + (2)	\$ (25,124,229)

<b>Table IV-5 Elements of Actuarial Liability - Gain/(Loss)</b>	
1. Age and Service Retirements	(4,153,788)
2. Disability Retirements	543,276
3. Death in Service Benefits	(2,475,939)
4. Withdrawal from Employment	(1,556,894)
5. Pay Increases	(33,683,401)
6. Death after Retirement	2,819,214
7. New Entrants	2,052,343
8. Other	<u>382,903</u>
9. Total Actuarial Liability - Gain/(Loss) (sum 1-8)	\$ (36,072,286)
10. Assumption Changes - Gain/(Loss)	<u>(8,054,963)</u>
11. Total Actuarial Liability Changes (sum 9-10)	\$ (44,127,249)

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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 9 years.

<b>Table V-1 Contribution Summary by Group</b>					
<b>As of June 30, 2023</b>					
	<b><u>Dept. of Education</u></b>	<b><u>Detention Services</u></b>	<b><u>All Others</u></b>	<b><u>Total</u></b>	<b><u>% of Pay</u></b>
Total Normal Cost (including expenses)	\$ 6,851,517	\$ 8,117	\$ 28,394,798	\$ 35,254,432	7.69%
Expected Employee Contributions	<u>(1,881,790)</u>	<u>0</u>	<u>(18,419,978)</u>	<u>(20,301,768)</u>	<u>-4.43%</u>
Net Normal Cost	\$ 4,969,727	\$ 8,117	\$ 9,974,820	\$ 14,952,664	3.26%
Amortization of Unfunded Actuarial Liability	<u>\$ 12,841,437</u>	<u>\$ 51,889</u>	<u>\$ 63,508,268</u>	<u>\$ 76,401,594</u>	<u>16.66%</u>
Net plan cost at 7/1/2023	\$ 17,811,164	\$ 60,006	\$ 73,483,088	\$ 91,354,258	19.92%
Interest to 7/1/2024	<u>1,313,758</u>	<u>4,200</u>	<u>5,799,420</u>	<u>7,117,378</u>	<u>1.55%</u>
Net plan cost at 7/1/2024	\$ 19,124,922	\$ 64,206	\$ 79,282,508	\$ 98,471,636	21.47%

The employer net plan cost shown above in Table V-1 is a reasonable actuarially determined contribution in accordance with Actuarial Standard of Practice (ASOP) No. 4. The actuarial methods have been selected to balance benefit security, intergenerational equity, and stability of actuarially determined contributions. The selection of the actuarial methods has taken into account the demographics of plan members, the funding goals and objectives of the Board, and the need to accumulate assets to make benefit payments when due. The actuarial methods and assumptions are shown in Appendix B of this report.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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, 2023 measurement.

<b>Table V - 2</b>				
<b>Development of 2023 Expected Funded Status for Plan D</b>				
	<b>Actuarial Liability</b>	<b>Actuarial Value of Assets</b>	<b>Unfunded Actuarial Liability</b>	
1. Value as of June 30, 2022	\$ 38,548,627	\$ 36,729,752	\$ 1,818,875	
a.) Actives and Term Vested at 7.00%	\$ 37,925,391			
b.) Inactives at 6.50%	\$ 623,236			
2. Additions				
a.) Normal Cost	\$ 9,359,913	\$ 0	\$ 9,359,913	
b.) Expected Employer Contributions	\$ 0	\$ 3,847,528	\$ (3,847,528)	
c.) Expected Member Contributions	\$ 0	\$ 7,981,313	\$ (7,981,313)	
3. Decreases				
a.) Expected Benefit Payments	\$ (2,158,997)	\$ (2,158,997)	\$ 0	
b.) Expected Admin Expenses	\$ 0	\$ (736,890)	\$ 736,890	
4. Interest				
a.) On 1 for one year	\$ 2,695,288	\$ 2,288,264	\$ 407,024	
b.) On 2a for one year	\$ 655,194	\$ 0	\$ 655,194	
c.) On 2b for one year*	\$ 0	\$ 239,701	\$ (239,701)	
d.) On 2c for 1/2 year	\$ 0	\$ 244,862	\$ (244,862)	
e.) On 3a and 3b for 1/2 year	\$ (69,063)	\$ (88,844)	\$ 19,781	
5. Expected Value June 30, 2023: (sum 1-4)	\$ 49,030,962	\$ 48,346,689	\$ 684,273	
6. Funded Status			98.6%	

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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, 2023. 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, 2023
- Active members split by plan and group
- Age/service and age/salary/service distribution for active members as of June 30, 2023
- Counts and average benefit amount by age for retirees, beneficiaries and disabled members as of June 30, 2023

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**APPENDIX A – PLAN MEMBERSHIP**

**DATA RECONCILIATION FROM JUNE 30, 2022, TO JUNE 30, 2023**

		Actives	Terminated Vested	Disabled	Retired	Beneficiaries	Total
1.	Participants, June 30, 2022 valuation	7,725	1,089	790	6,862	1,555	18,021
2.	Additions						
	a. New entrants / pickup	72					72
	b. Returned to work	32					
	c. Reporting Delay					11	11
	d. Total	104				11	115
3.	Reductions						
	a. Terminated - not vested	(376)					(376)
	b. Non-Participating						
	c. Lump sum	(3)	(1)				(4)
	d. Benefits Expired					(1)	
	e. Deaths without beneficiary	(26)	(13)	(34)	(241)	(98)	(412)
	f. Total	(405)	(14)	(34)	(241)	(99)	(793)
4.	Changes in status						
	a. Terminated - vested	(176)	176				
	b. Returned to work	1	(1)				
	c. Retired	(269)	(58)		327		
	d. Disabled	(9)		9			
	e. Died with beneficiary	(3)		(6)	(74)	83	
	f. Data corrections	566		2	1	(1)	568
	g. Total	110	117	5	254	82	568
5.	Participants, June 30, 2023 valuation	7,534	1,192	761	6,875	1,549	17,911

**ACTIVE MEMBERSHIP AS OF JUNE 30, 2023 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	2	4	0.1%
Class C active members	849	2	3,518	4,369	58.0%
Class D active members	738	0	2,423	3,161	42.0%
<b>Total</b>	<b>1,589</b>	<b>2</b>	<b>5,943</b>	<b>7,534</b>	<b>100.0%</b>



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**APPENDIX A – PLAN MEMBERSHIP**

**AGE/SERVICE DISTRIBUTION OF ACTIVE PARTICIPANTS  
ACTIVE PARTICIPANTS AS OF JUNE 30, 2023**

AGE	AVERAGE EARNINGS									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	
Under 25	\$ 37,354	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 37,354
25-29	48,804	43,369	0	0	0	0	0	0	0	48,174
30-34	55,816	55,295	54,057	0	0	0	0	0	0	55,613
35-39	60,758	63,162	65,042	54,614	108,415	0	0	0	0	61,585
40-44	66,024	62,711	68,238	62,564	58,312	0	0	0	0	64,742
45-49	62,527	64,647	71,237	63,169	69,568	64,864	0	0	0	65,536
50-54	65,578	58,417	66,828	61,680	63,604	67,830	70,179	88,368	0	63,870
55-59	54,874	58,094	62,954	56,483	59,994	67,613	67,925	65,457	0	60,482
60-64	59,627	54,980	57,358	57,483	53,744	61,446	63,340	72,746	68,481	59,780
65-69	55,598	63,589	50,642	56,535	55,091	60,045	67,087	67,167	69,182	60,162
70 & Up	39,545	51,959	61,449	47,490	57,323	59,134	59,472	64,754	72,815	57,150
Total	\$ 58,433	\$ 59,625	\$ 64,194	\$ 58,719	\$ 60,335	\$ 64,047	\$ 65,833	\$ 68,952	\$ 70,072	\$ 60,876
Total Earnings = \$ 458,637,682					Average Earnings = \$ 60,876					

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**APPENDIX A – PLAN MEMBERSHIP**

**SCHEDULE OF BENEFIT RECIPIENTS BY ATTAINED AGE AND TYPE OF RETIREMENT  
JUNE 30, 2023 - 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	4	0	4
40-44	0	0	0	5	0	5
45-49	1	0	0	16	1	18
50-54	12	0	5	30	1	48
55-59	105	114	12	74	3	308
60-64	287	307	54	156	9	813
65-69	823	474	142	196	9	1,644
70-74	1,137	426	182	120	7	1,872
75-79	798	286	132	54	3	1,273
80-84	474	227	81	32	7	821
85 & Up	448	254	94	29	5	830
<b>Total</b>	<b>4,085</b>	<b>2,088</b>	<b>702</b>	<b>716</b>	<b>45</b>	<b>7,636</b>
Average Annual Benefit	\$ 27,849	\$ 8,377	\$ 25,213	\$ 10,670	\$ 26,115	\$ 20,661

–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  
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**APPENDIX A – PLAN MEMBERSHIP**

SCHEDULE OF BENEFIT RECIPIENTS BY ATTAINED AGE AND TYPE OF RETIREMENT JUNE 30, 2023 - BENEFICIARIES								
AGE	TYPE OF RETIREMENT							Total
	NR	ER	DS	ODis	ADis	ODth	ADth	
Under 20	2	1	0	4	0	0	2	9
20-24	2	0	0	0	0	0	1	3
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	0	2	5
50-54	3	0	2	9	0	5	0	19
55-59	11	8	1	14	1	8	0	43
60-64	46	27	6	30	1	14	0	124
65-69	88	40	13	37	2	27	0	207
70-74	133	54	17	62	0	18	0	284
75-79	140	39	30	27	3	10	0	249
80-84	130	50	28	33	2	11	1	255
85 & Up	192	79	24	35	5	12	0	347
<b>Total</b>	<b>750</b>	<b>300</b>	<b>121</b>	<b>253</b>	<b>14</b>	<b>105</b>	<b>6</b>	<b>1,549</b>
Average Annual Benefit	\$ 11,888	\$ 4,750	\$ 12,006	\$ 5,954	\$ 13,478	\$ 15,911	\$ 21,910	\$ 9,871

- NR - Service Retirement
- ER - Early Retirement
- DS - Discontinued Service
- ODis - Ordinary Disability
- ADis - Accidental Disability
- ODth - Ordinary Death
- ADth - Accidental Death

EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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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, 2023**

**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 2023 based on 2018 through 2022 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 6.72%.

**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	0.059
25	0.065
30	0.057
35	0.050
40	0.045
45	0.042
50	0.040
55	0.037
60	0.036
65	0.033

**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%

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

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

***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, 2023 the assumed administrative expenses were \$5,100,000.

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	16.50%
1	15.00
2	13.50
3	10.50
4	9.00
5	9.00
6	8.50
7	8.00
8	6.25
9	5.25
10	5.25
11	5.50
12	4.00
13	4.00
14	4.00
15+	2.75

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

***Disability:***

Age	Non-Line-of-Duty Disability	Line-of-Duty Disability
25	0.00040	0.00005
30	0.00050	0.00004
35	0.00090	0.00011
40	0.00075	0.00003
45	0.00189	0.00016
50	0.00409	0.00016
55	0.00578	0.00042
60	0.00662	0.00068
65	0.00216	0.00033
69	0.00068	0.00007

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 130% for males and 140% for females with future mortality improvement through 2026 using SOA's Scale MP-2021 for non-line-of-duty mortality. (effective 6/30/2023).
2. Line-of-Duty - 0.005% at all ages (effective 6/30/1999).

Age	Non-Line-of-Duty Death	Non-Line-of-Duty Death	Line-of-Duty Death
	Male	Female	
25	0.000624	0.000205	0.00005
30	0.000949	0.000369	0.00005
35	0.001361	0.000597	0.00005
40	0.001740	0.000798	0.00005
45	0.002069	0.000985	0.00005
50	0.002681	0.001339	0.00005
55	0.003883	0.002093	0.00005
60	0.006019	0.003333	0.00005
65	0.008705	0.004949	0.00005
69	0.011278	0.006866	0.00005

Rates for individuals who are the age shown as of June 30, 2023

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

***Post-Retirement  
Mortality:***

1. Retirees and Beneficiaries - Pub-2010 General Retiree Below-Median Weighted mortality tables adjusted by 130% for males and 129% for females with future mortality improvement through 2026 using SOA's Scale MP-2021
2. Pub-2010 General Disabled Annuitant mortality tables adjusted by 183% for males and 120% for females with future mortality improvement through 2026 using SOA's Scale MP-2021.

Sample rates (rates first effective 6/30/2023).

Age	Retirees and Beneficiaries		Disabled Members	
	Male	Female	Male	Female
55	0.010932	0.005773	0.036107	0.019903
60	0.013989	0.006878	0.045513	0.023482
65	0.016696	0.00834	0.054696	0.025184
70	0.024587	0.013126	0.064725	0.029392
75	0.039131	0.02276	0.082231	0.040785
80	0.066602	0.041584	0.116626	0.063524

Rates for individuals who are the age shown as of June 30, 2023

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**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 years of svc	30 years of svc	More than 30 years of service
45-49	0.00	0.00	0.05
50	0.00	0.10	0.05
51	0.00	0.10	0.05
52	0.00	0.10	0.10
53	0.00	0.10	0.10
54	0.00	0.20	0.10
55	0.04	0.20	0.05
56	0.04	0.05	0.05
57	0.04	0.05	0.05
58	0.04	0.20	0.05
59	0.04	0.20	0.05
60	0.05	0.20	0.05
61	0.06	0.10	0.10
62	0.10	0.10	0.15
63	0.10	0.10	0.10
64	0.10	0.10	0.15
65	0.15	0.25	0.20
66	0.20	0.25	0.20
67	0.15	0.25	0.15
68	0.15	0.25	0.15
69	0.15	0.25	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.



EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

*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.

For service retirement participants who were not provided benefit amounts, we assumed a monthly benefit of \$1,800. This was the prior year average benefit for service retirement participants, rounded to the nearest hundred.

EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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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 2022 experience study report conducted on the System's experience from the 2018-2022 valuations. The results of this study were presented in June 2023 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 \$4.5 million to \$5.1 million to better reflect actual experience.

Demographic assumptions (termination rates, retirement rates, disability rates, salary scale and mortality rates) were updated to reflect the most recent experience study.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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, 2023, 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, 2023**

**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, 2023**

**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.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
ACTUARIAL VALUATION AS OF JUNE 30, 2023**

**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));



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF BALTIMORE  
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**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

- 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 30<sup>th</sup> 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.