Fire and Police Pension Fund, San Antonio

Actuarial Valuation and Review as of January 1, 2023

This report has been prepared at the request of the Board of Trustees to assist in administering the Pension Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Trustees and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

Segal

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June 21, 2023

Board of Trustees
Fire and Police Pension Fund, San Antonio
11603 W. Coker Loop, Suite 201
San Antonio, Texas 78216-3099

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2023. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal 2023.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Pension Fund. The census information and financial information on which our calculations were based was prepared by the staff of the Fund. That assistance is gratefully acknowledged.

Segal does not audit the data provided. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. To the extent we can, however, Segal does review the data for reasonableness and consistency. Based on our review of the data, we have no reason to doubt the substantial accuracy of the information on which we have based this report and we have no reason to believe there are facts or circumstances that would affect the validity of these results.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

The actuarial calculations were directed under the supervision of Malichi S. Waterman. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in this actuarial valuation is complete and accurate. The assumptions used in this actuarial valuation were selected by the Board based upon my analysis and recommendations. In my opinion, the assumptions are reasonable and take into account the experience of the Fund and reasonable expectations.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,
Segal

Malichi Waterman

Malichi S. Waterman, FCA, MAAA, EA
Vice President and Consulting Actuary

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Section 1: Actuarial Valuation Summary

Purpose and basis

This report has been prepared by Segal to present a valuation of the San Antonio Fire and Police Pension Fund as of January 1, 2023. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Fund, as administered by the Board;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of December 31, 2022, provided by the Fund;
- The assets of the Plan as of December 31, 2022, provided by the Fund;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. and
- The funding policy adopted by the Board.

The assumptions and methods used to value the Fund were set by the Board of Trustees, based on recommendations made by Segal following a 4.25-year experience study for the period ended December 31, 2018.

Certain disclosure information required by GASB Statements No 67 for the Pension Fund's financial statements as of December 31, 2022 and by GASB Statement No. 68 for the City's financial statements as of September 30, 2023 is provided in a separate report.

Valuation highlights

1. The Board's Actuarial Funding Policy for the Pension Fund was updated in March 2020. The policy sets a goal of attaining 100% funding by December 31, 2044, or 22 years from this valuation date. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy adopted by the Fund meets this standard. The Board Recommended Contribution (BRC) under the funding policy is comprised of the normal cost plus an amortization of the unfunded actuarial accrued liability on a level percentage of payroll method. The amortization of the unfunded liability for the recommended contribution in this report is based on 20 years, less than the 22-year target.
2. Annual cost-of-living allowances (COLA) were higher than expected this year due to inflation being greater than assumed. The annual CPI increase was 6.50% compared to our assumed COLA increase of 3.00% for retirements prior to October 1, 1999 and 4.90% compared to our assumption of 2.25% for retirements on or after October 1, 1999.
3. The City is expected to continue to contribute 24.64% of pay, and members are expected to contribute 12.32%, for a total of 36.96% of pay. The total normal cost is 23.71% of payroll and is fully covered by the 36.96% contribution rate. Since the actual budgeted contributions are slightly lower than the recommended amount, there is a small deficit this year, and the unfunded liability is effectively being amortized over a period of 20.11 years as a level percent of pay. This is a 6.54-year increase in the effective period from 13.57 in the prior valuation. If all assumptions are met in the future, 100% funding is projected in the 2043 Plan Year, before 2044, and therefore the Fund is in compliance with the provisions of the Board's funding policy. The Fund also continues to meet the requirements of the Texas Pension Review Board (PRB) for actuarial soundness, and no Funding Soundness Restoration Plan is required.
4. The actuarial loss from investment and other experience is $183.5 million, or 4.0% of actuarial accrued liability.
5. The net experience loss from sources other than investment experience was $113.2 million, or 2.5% of the actuarial accrued liability. The demographic losses were associated with a greater than expected cost-of-living allowance, more retirements than expected and mortality experience different than expected.
6. The rate of return on the market value of assets was -10.96% for the year ending December 31, 2022. The return on the actuarial value of assets was 5.39% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.25%. Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various asset classes, we advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.25%.

7. The actuarial value of assets is 109.5% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. The recognition of the market gains/losses of $339.0 million will also have an impact on the future funded ratio. If the net deferred losses were recognized immediately in the actuarial value of assets, the recommended contribution would increase from 37.01% to about 43.77% of payroll.
8. There were no changes in actuarial assumptions, plan provisions or actuarial methods since the last valuation.

Changes from prior valuation

9. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 85.48%, compared to the prior year funded ratio of 88.56%. This ratio is one measure of funding status, and its history is a measure of funding progress. Using the market value of assets, the funded ratio is 78.10%, compared to 95.79% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of the Fund assets to cover the estimated cost of settling the Fund's benefit obligation or the need for or the amount of future contributions.
10. The recommended contribution for the upcoming year is $137,395,187, an increase of $15 million from last year. The contribution as a percentage of payroll increased from 33.78% of payroll to 37.01% of payroll, based on a 20-year level percent-of-payroll amortization of the unfunded actuarial accrued liability.
11. The unfunded actuarial accrued liability is $666,617,002, which is an increase of $170.7 million since the prior valuation.

Risk

12. It is important to note that this actuarial valuation is based on plan assets as of December 31, 2022. The Plan's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the plan year. Moreover, this actuarial valuation does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after December 31, 2022 due to COVID-19. Segal is available to prepare projections of potential outcomes of market conditions and other demographic experience upon request.

13. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Fund's future financial condition, but have included a brief discussion of some risks that may affect the Plan in *Section 2*. A more detailed assessment would provide the Board with a better understanding of the inherent risks and could be important for the Fund because:
    - Relatively small changes in investment performance can produce large swings in the unfunded liabilities.
    - Retired participants account for over 60% of the Fund's liabilities, leaving limited options for reducing costs in the event of adverse experience.
    - Potential changes in the plan of benefits may result in participant choices that vary from those assumed.
    - The Board has not had a detailed risk assessment in recent years.

GASB

14. The disclosure information required for compliance with GASB statements No. 67, *Financial Reporting for Pension Plans* for the fiscal year ended December 31, 2022 and information required for compliance with GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, for the fiscal year ended September 30, 2023, based on a December 31, 2022 measurement date is provided separately.

Summary of key valuation results

		2023	2022
Contributions for plan year beginning January 1:	• Recommended contribution	$137,395,187	$122,392,809
	• Recommended contribution as a percent of payroll	37.01%	33.78%
	• Actual contributions	--	$132,674,881
	• Actual contribution rate	36.96%	36.96%
	• Effective amortization period	20.11 years	13.57 years
Actuarial accrued liability for plan year beginning January 1:	• Retired participants and beneficiaries	$2,783,218,074	$2,535,674,833
	• Inactive vested participants[1]	0	1,078,835
	• Inactive participants due a refund of employee contributions	1,227,352	1,282,806
	• Active participants	1,807,615,236	1,795,293,252
	• Total	4,592,060,662	4,333,329,726
	• Normal cost including administrative expenses and adjusted for timing	88,033,334	85,669,266
Assets for plan year beginning January 1:	• Market value of assets (MVA)	$3,586,483,199	$4,150,928,708
	• Actuarial value of assets (AVA)	3,925,443,660	3,837,389,315
	• Actuarial value of assets as a percentage of market value of assets	109.45%	92.45%
Funded status for plan year beginning January 1:	• Unfunded actuarial accrued liability on market value of assets	$1,005,577,463	$182,401,018
	• Funded percentage on MVA basis	78.10%	95.79%
	• Unfunded actuarial accrued liability on actuarial value of assets	$666,617,002	$495,940,411
	• Funded percentage on AVA basis	85.48%	88.56%
Key assumptions	• Net investment return	7.25%	7.25%
	• Inflation rate	3.00%	3.00%
	• Across-the-board payroll increase	3.00%	3.00%
Demographic data for plan year beginning January 1:	• Number of retired participants and beneficiaries	3,271	3,135
	• Number of inactive vested participants[1]	0	2
	• Number of inactive participants due a refund of employee contributions	19	18
	• Number of active participants	4,188	4,155
	• Total payroll	$350,736,436	$341,117,890
	• Average payroll	83,748	82,098
	• Projected payroll	371,263,456	362,274,741

[1]Participants with 20 or more years of service who are on indefinite suspension are included as inactive vested participants entitled to retirement benefits, rather than inactive participants due a refund on contributions.

Important information about actuarial valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan provisions	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant information	An actuarial valuation for a plan is based on data provided to the actuary by the Fund. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Financial information	Part of the cost of a plan will be paid from existing assets — the balance will need to come from future contributions and investment income. The valuation is based on the asset values as of the valuation date, typically reported by the Fund. A snapshot as of a single date may not be an appropriate value for determining a single year's contribution requirement, especially in volatile markets. Plan sponsors often use an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal starts by developing a forecast of the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of participants in each year, as well as forecasts of the plan's benefits for each of those events. In addition, the benefits forecasted for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The forecasted benefits are then discounted to a present value, typically based on an estimate of the rate of return that will be achieved on the plan's assets. All of these factors are uncertain and unknowable. Thus, there will be a range of reasonable assumptions, and the results may vary materially based on which assumptions are selected within that range. That is, there is no right answer (except with hindsight). It is important for any user of an actuarial valuation to understand and accept this constraint. The actuarial model may use approximations and estimates that will have an immaterial impact on our results. In addition, the actuarial assumptions may change over time, and while this can have a significant impact on the reported results, it does not mean that the previous assumptions or results were unreasonable or wrong.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

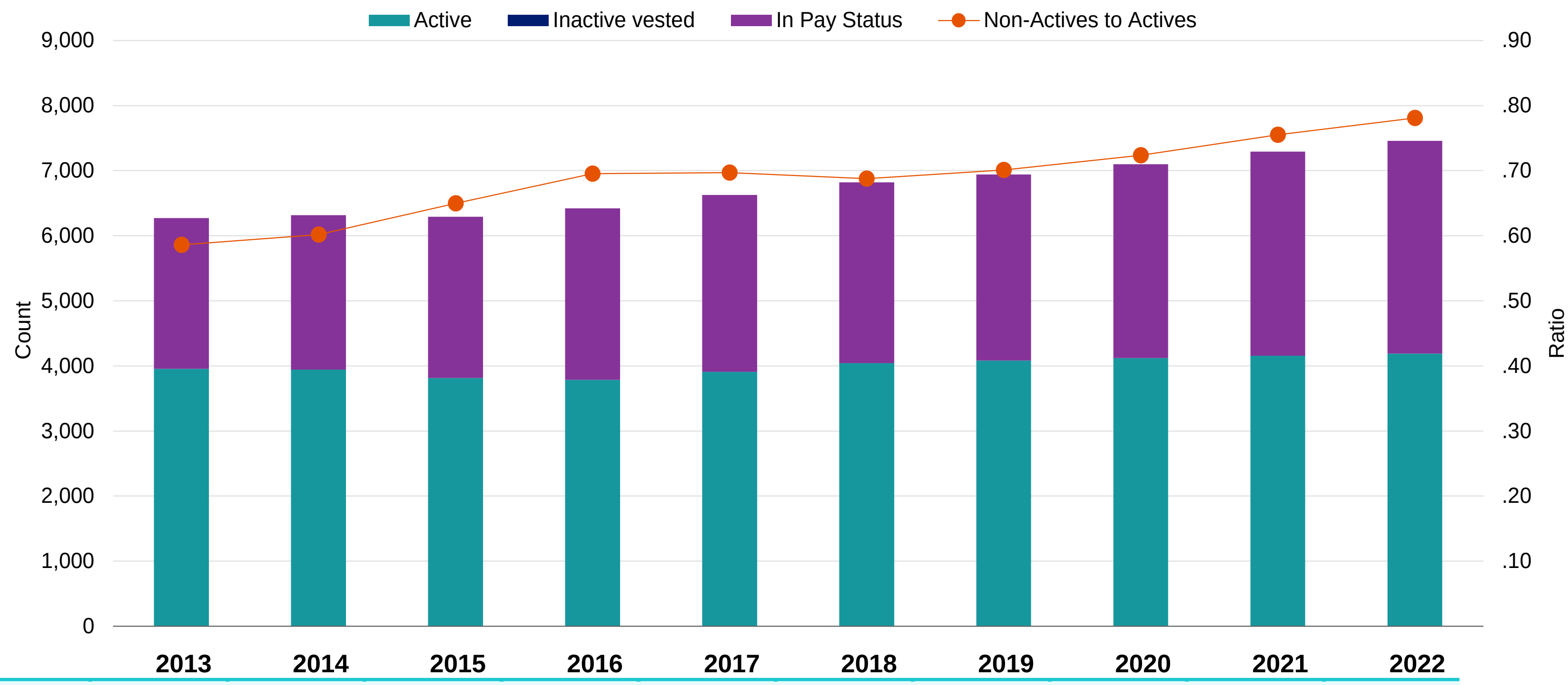
The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
An actuarial valuation is a measurement at a specific date — it is not a prediction of a plan's future financial condition. Accordingly, Segal did not perform an analysis of the potential range of financial measurements, except where otherwise noted.
If the Fund is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan provisions, but they may be subject to alternative interpretations. The State should look to their other advisors for expertise in these areas.
While Segal maintains extensive quality assurance procedures, an actuarial valuation involves complex computer models and numerous inputs. In the event that an inaccuracy is discovered after presentation of Segal's valuation, Segal may revise that valuation or make an appropriate adjustment in the next valuation.
Segal's report shall be deemed to be final and accepted by the Board upon delivery and review. Trustees should notify Segal immediately of any questions or concerns about the final content.

As Segal has no discretionary authority with respect to the management or assets of the Fund, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Fund.

Section 2: Actuarial Valuation Results

Participant information

Participant Population as of December 31, 2013 – 2022[1]



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
In Pay Status	2,317	2,373	2,478	2,634	2,719	2,779	2,858	2,980	3,135	3,271
Inactive Vested[2]	0	0	0	0	3	1	2	0	2	0
Active	3,955	3,944	3,815	3,787	3,906	4,042	4,081	4,119	4,155	4,188
Ratio	0.59	0.60	0.65	0.70	0.70	0.69	0.70	0.72	0.75	0.78

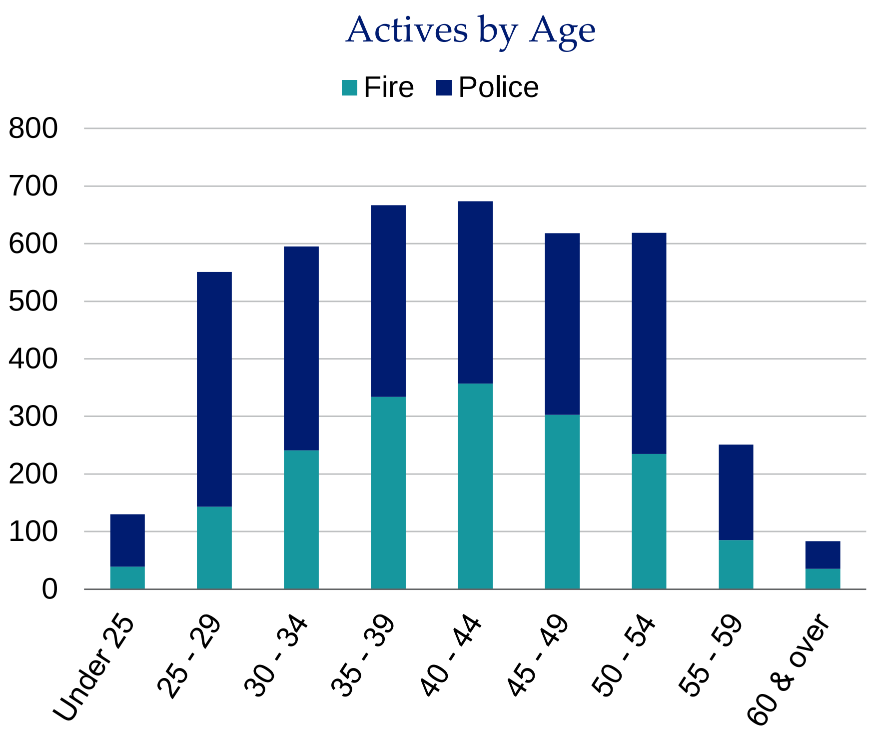
[1]Prior to 2016, valuation cycles reflect 12-month periods ending September 30.

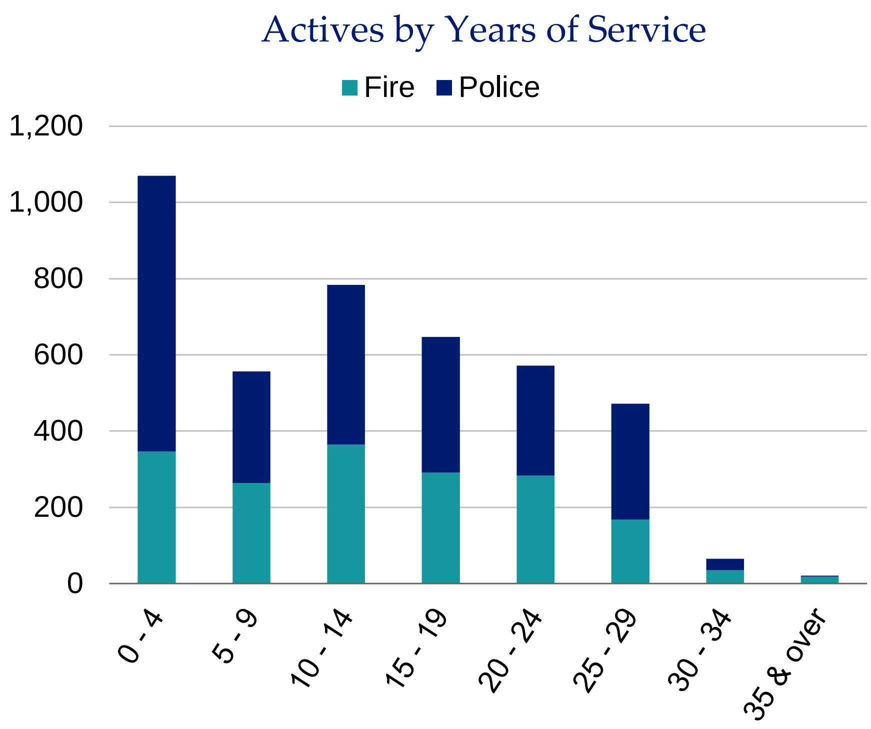
[2]Excludies terminated participants due a refund of employee contributions. Beginning with the 2018 valuation, participants with 20 or more years of service who are on indefinite suspension from employment are included as inactive vested participants entitled to retirement benefits

Active participants

As of December 31,	2022	2021	Change
Active participants	4,188	4,155	0.8%
Average age	41.2	41.4	-0.2 years
Average years of service	13.4	13.6	-0.2 years
Average compensation	$83,748	$82,098	2.0%

Distribution of Active Participants as of December 31, 2022





Inactive participants

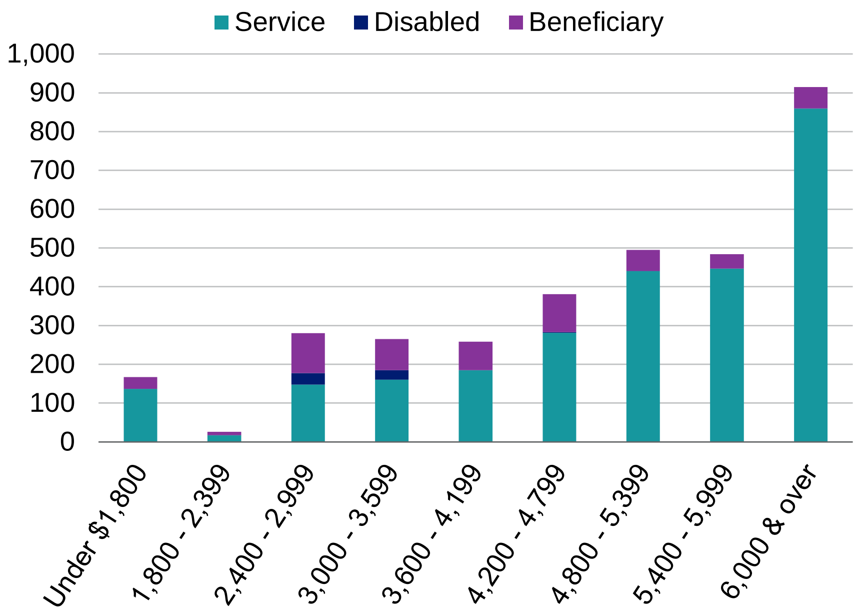
- In this year's valuation, there were no inactive participants with a vested right to a deferred or immediate vested benefit.
- In addition, there were 19 inactive participants entitled to a return of their employee contributions.

Retired participants and beneficiaries

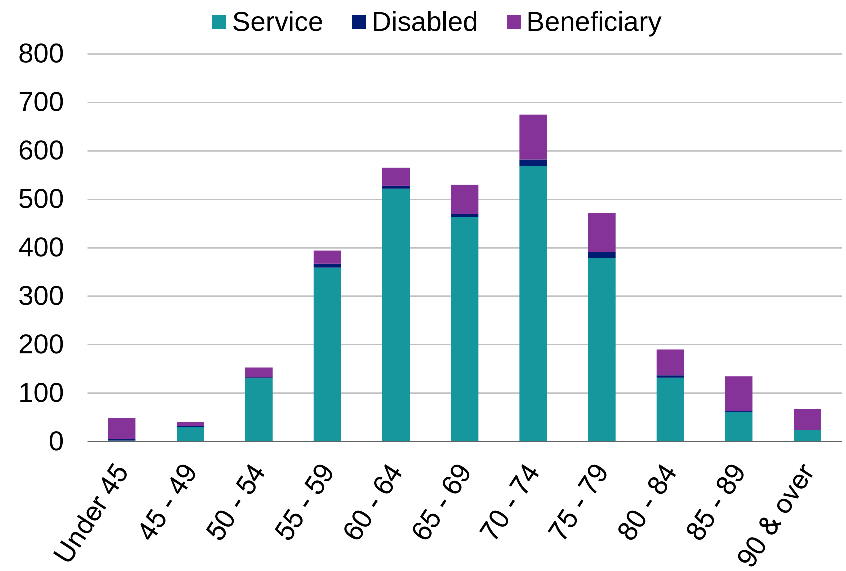
As of December 31,	2022	2021	Change
Retired participants	2,733	2,626	4.1%
Beneficiaries	538	509	5.7%
Average age	68.6	68.5	0.1 year
Average amount	$4,949	$4,660	6.2%
Total monthly amount	$16,187,073	$14,609,509	10.8%

Distribution of Retired Participants and Beneficiaries as of December 31, 2022

By Type and Monthly Amount



By Type and Age



Historical plan population

Participant Data Statistics: 2013 – 2022

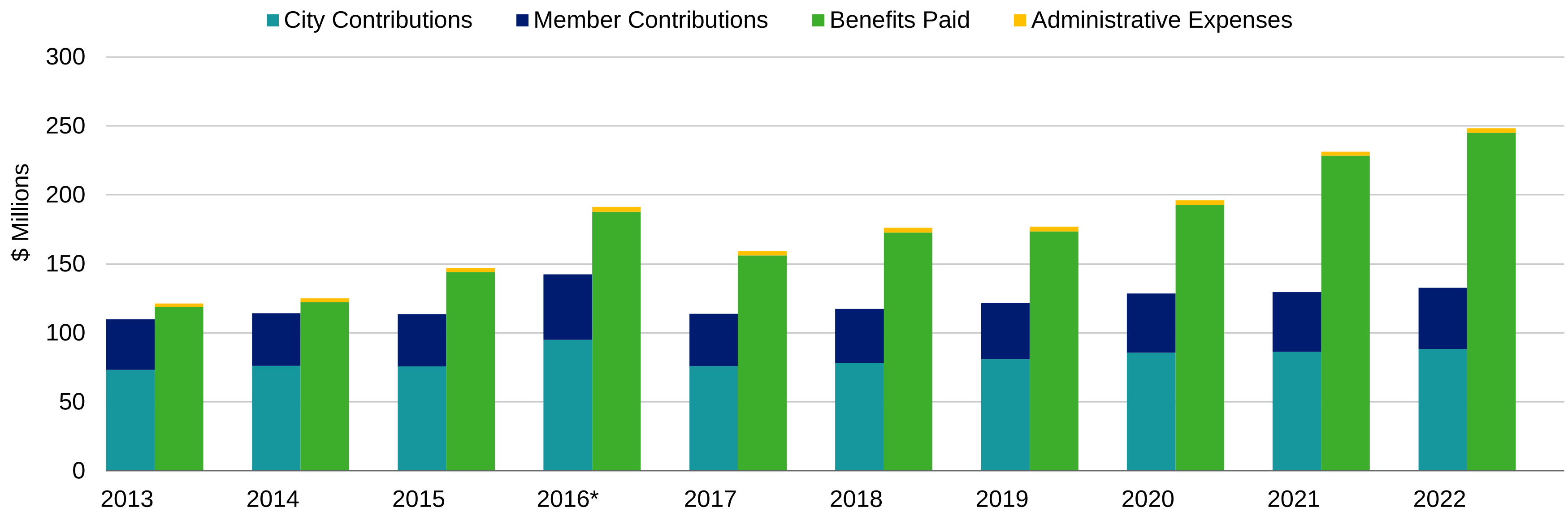
	Active Participants			Retired Participants and Beneficiaries		
Year Ended December 31[1]	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2013	3,955	41.5	13.9	2,317	67.1	$3,796
2014	3,944	41.9	14.3	2,373	67.4	3,879
2015	3,815	42.4	14.8	2,478	67.4	3,951
2016	3,787	42.4	14.8	2,634	67.5	4,049
2017	3,906	42.1	14.5	2,719	67.8	4,160
2018	4,042	41.9	14.3	2,779	68.1	4,281
2019	4,081	41.9	14.2	2,858	68.3	4,411
2020	4,119	41.7	14.0	2,980	68.4	4,556
2021	4,155	41.4	13.6	3,135	68.5	4,660
2022	4,188	41.2	13.4	3,271	68.6	4,949

[1]Prior to 2016, the valuation cycle was for the 12-month period ending September 30.

Financial information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Comparison of Contributions Made with Benefits and Expenses Paid for Years Ended September 30, 2013 – December 31, 2022



*The cash flows shown for 2016 reflect a 15-month period, due to the change in Plan Year from a September 30 year-end to a December 31, year-end

Section 2: Actuarial Valuation Results

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

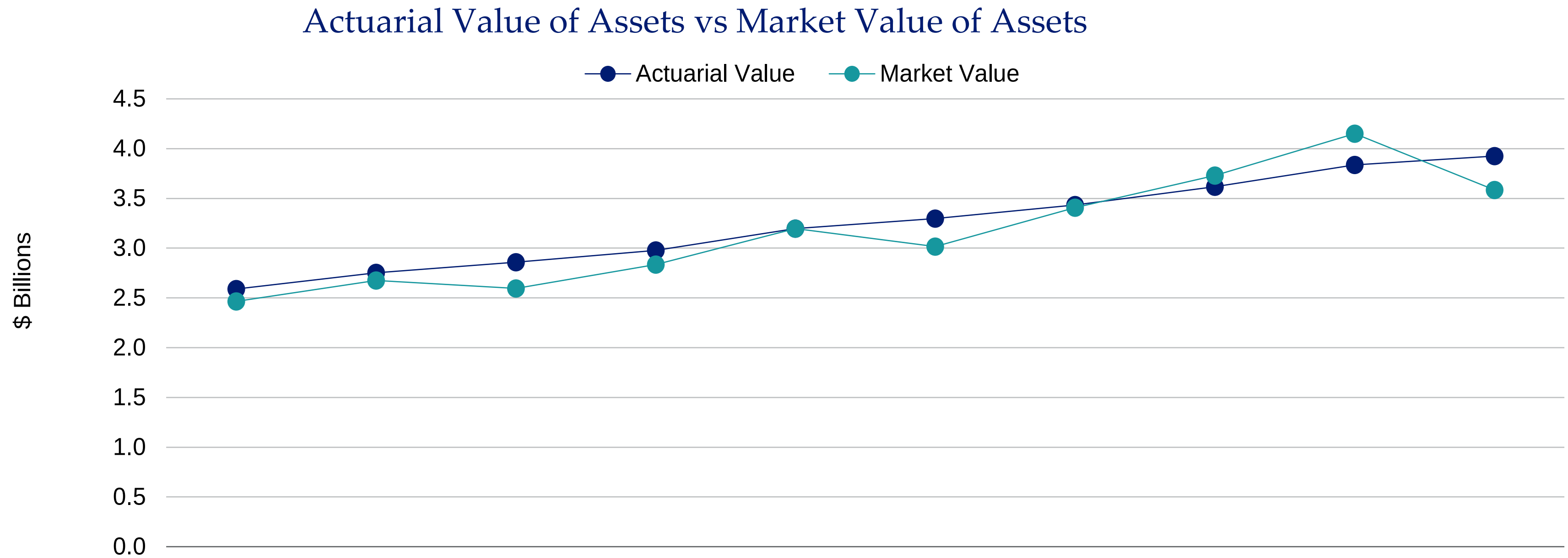
Determination of Actuarial Value of Assets for Year Ended December 31, 2022

			Original Amount[1]	Percent Deferred[2]	Unrecognized Amount[3]	
1	Market value of assets, December 31, 2022					$3,586,483,199
2	Calculation of unrecognized return					
	(a)	Year ended December 31, 2022	-$745,558,729	80%	-$596,446,983	
	(b)	Year ended December 31, 2021	254,753,759	60%	152,852,256	
	(c)	Year ended December 31, 2020	145,345,337	40%	58,138,134	
	(d)	Year ended December 31, 2019	232,480,658	20%	46,496,132	
	(e)	Year ended December 31, 2018	-352,315,393	0%	0	
	(f)	Total unrecognized return				-$338,960,461
3	Preliminary actuarial value: (1) - (2f)					3,925,443,660
4	Adjustment to be within 20% corridor					0
5	Final actuarial value of assets as of December 31, 2022: (3) + (4)					$3,925,443,660
6	Actuarial value as a percentage of market value: (5) ÷ (1)					109.5%
7	Amount deferred for future recognition[4]: (1) - (5)					-$338,960,461

[1]Total return minus expected return on a market value basis
[2]Percent deferred applies to the current valuation year
[3]Recognition at 20% per year over five years
[4]Deferred return as of December 31, 2022 recognized in each of the next four years:

(a) Amount recognized on December 31, 2023	-$22,595,795
(b) Amount recognized on December 31, 2024	-69,091,927
(c) Amount recognized on December 31, 2025	-98,160,994
(d) Amount recognized on December 31, 2026	-149,111,745

Asset history for years ended December 31

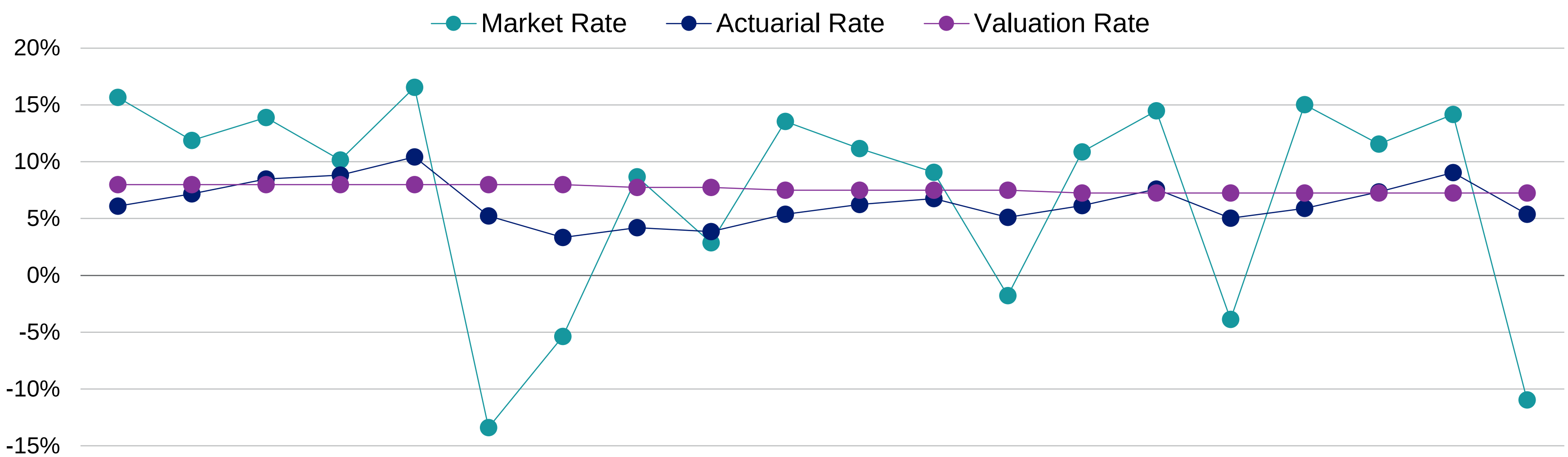


	2013	2014	2015	2016[1]	2017	2018	2019	2020	2021	2022
Actuarial Value[2]	$2.59	$2.75	$2.86	$2.98	$3.20	$3.30	$3.43	$3.62	$3.84	$3.93
Market Value[2]	2.46	2.68	2.60	2.83	3.20	3.02	3.41	3.73	4.15	3.59
Ratio	1.05	1.03	1.10	1.05	1.00	1.09	1.01	0.97	0.92	1.09

[1] 2016 reflects a 15-month period due to the change in Plan Year from a September 30 year-end to a December 31 year-end
[2] In $ billions

Historical investment returns

Market and Actuarial Rates of Return for Years Ended September 30, 2003 -December 31, 2022



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016[1]	2017	2018	2019	2020	2021	2022
Market rate	15.66%	11.87%	13.90%	10.15%	16.54%	-13.40%	-5.36%	8.68%	2.87%	13.54%	11.17%	9.07%	-1.79%	10.87%	14.48%	-3.87%	15.03%	11.56%	14.17%	-10.96%
Actuarial rate	6.10%	7.18%	8.49%	8.82%	10.41%	5.24%	3.33%	4.20%	3.87%	5.39%	6.23%	6.77%	5.10%	6.15%	7.59%	5.03%	5.89%	7.35%	9.06%	5.39%
Assumed rate	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	7.75%	7.75%	7.50%	7.50%	7.50%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%

Average Rates of Return	Actuarial Value	Market Value
Most recent five-year average return:	6.57%	4.56%
Most recent ten-year average return:	6.49%	6.34%
Most recent 15-year average return:	5.95%	5.00%
20-year average return:	6.33%	6.37%

[1] Prior to 2017, valuation cycles reflect 12-month periods ending September 30. The amounts for the period ended December 31, 2016 cover the 15 months from October 1, 2015 through December 31, 2016. The actuarial and market returns for the year ended December 31, 2016 were 5.99% and 9.26%, respectively.

Actuarial experience

Assumptions should consider experience and should be based on reasonable expectations for the future.

Each year actual experience is compared to that projected by the assumptions. Differences are reflected in the actuarial valuation.

Assumptions are not changed if experience is believed to be a short-term development that will not continue over the long term. On the other hand, if experience is expected to continue, assumptions are changed.

Actuarial Experience for Year Ended December 31, 2022

1	Loss from investments[1]	-$70,327,269
2	Gain from administrative expenses	71,215
3	Net gain from contributions	10,810,002
4	Net loss from other experience	-113,283,062
5	Net experience gain: **1 + 2 + 3 +4**	-$172,729,114

[1]Details on next page

Investment experience

Actuarial planning is long term. The obligations of a pension plan are expected to continue for the lifetime of all its participants.

The assumed long-term rate of return of 7.25% considers past experience, the asset allocation policy of the Board and future expectations.

Investment Experience

		Year Ended December 31, 2022	
		Market Value	**Actuarial Value**
1	Net investment income	-$448,808,248	$203,691,606
2	Average value of assets	4,093,110,078	3,779,570,685
3	Rate of return: **1 ÷ 2**	-10.96%	5.39%
4	Assumed rate of return	7.25%	7.25%
5	Expected investment income: **2 x 4**	296,750,481	274,018,875
6	Investment gain/(loss): **1 - 5**	-$745,558,729	-$70,327,269

Contributions

Contributions for the year ended December 31, 2022 totaled $132,674,881, compared to the projected amount of $118,111,275. This resulted in a gain of $10,810,002 for the year, when adjusted for timing.

Non-investment experience

Administrative expenses

Administrative expenses for the year ended December 31, 2022 totaled $3,333,274, as compared to the assumption of $3,400,000. This resulted in an experience gain of $71,215 for the year, including an adjustment for interest.

Other experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- Mortality experience (more or fewer than expected deaths)
- The extent of turnover among participants
- Retirement experience (earlier or later than projected)
- The number of disability retirements (more or fewer than projected)
- Salary increases (greater or smaller than projected), and
- Inflationary cost-of-living adjustments higher or lower than anticipated.

The net loss from this other experience for the year ended December 31, 2022 amounted to $113,283,063, which is 2.5% of the actuarial accrued liability.

Actuarial assumptions

- There are no assumption changes reflected in this report. Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan provisions

- There were no changes in plan provisions since the prior valuation. A summary of plan provisions is in *Section 4, Exhibit II*.

Unfunded Actuarial Accrued Liability

Development of Unfunded Actuarial Accrued Liability for Year Ended December 31, 2022

1	Unfunded actuarial accrued liability at beginning of year	$495,940,411
2	Normal cost at beginning of year	82,672,392
3	Total contributions	-132,674,881
4	Interest on 1, 2 & 3	37,139,964
5	Expected unfunded actuarial accrued liability	$483,077,886
6	Changes due to experience gains and losses	$183,539,116
7	Unfunded actuarial accrued liability at end of year	$666,617,002

Recommended contribution

The recommended contribution is equal to the employer normal cost payment and a 20-year level percentage-of-pay payment on the unfunded actuarial accrued liability. As of January 1, 2023, the recommended contribution is $137,395,187, or 37.01% of payroll.

As set by State legislature, the total amount of annual contributions is comprised of a 12.32% of pay member contribution and a 24.64% of pay City contribution, for a total contribution of 36.96% of pay. Since the recommended contribution is 37.01% of payroll, there is a deficit of 0.05% of projected pay.

The calculated normal cost (including expenses) is 23.71% of projected payroll after adjustment for timing. The remaining 13.25% of projected payroll will amortize the unfunded actuarial accrued liability over a period of 20.11 years if all assumptions are met. This is a reasonable amortization period and complies with the Board's Actuarial Funding Policy and the Texas State Pension Review Board's Guidelines for Actuarial Soundness.

Recommended Contribution

		2023		2022	
		Amount	**% of Projected Payroll**	**Amount**	**% of Projected Payroll**
1	Total normal cost	$81,670,689		$79,389,321	
2	Administrative expenses	3,283,071		3,283,071	
3	Employer normal cost: (1) + (2), adjusted for timing	$88,033,334	23.71%	$85,669,266	23.65%
4	Actuarial accrued liability	$4,592,060,662		$4,333,329,726	
5	Actuarial value of assets	3,925,443,660		3,837,389,315	
6	Unfunded actuarial accrued liability: (5) - (6)	$666,617,002		$495,940,411	
7	Payment on unfunded actuarial accrued liability, adjusted for timing	49,361,853	13.30%	36,723,543	10.13%
8	Recommended contribution: (3) + (7)	$137,395,187	37.01%	$122,392,809	33.78%
9	Projected payroll	$371,263,456		$362,274,741	

Note: Recommended contributions are assumed to be paid at the middle of every year.

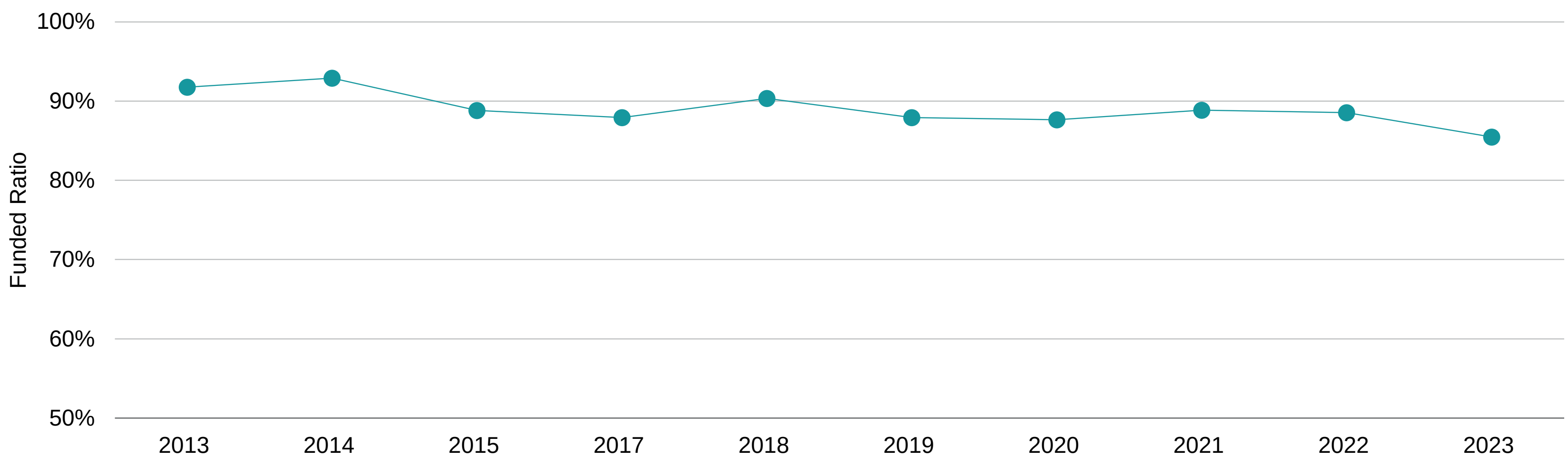
Reconciliation of recommended contribution

Reconciliation of Recommended Contribution from January 1, 2022 to January 1, 2023

		Amount	% of Projected Payroll
1	Recommended contribution as of January 1, 2022	$122,392,809	33.78%
2	Effect of increase in projected payroll	3,036,388	0.82%
3	Effect of maintaining 20-year amortization period	-1,692,150	-0.46%
4	Effect of contributions more than recommended contribution	-827,903	-0.22%
5	Effect of investment loss	5,386,134	1.45%
6	Effect of other gains and losses on accrued liability	8,670,523	2.34%
7	Net effect of other changes, including composition and number of participants	429,386	0.12%
8	Total change	$15,002,378	4.05%
9	Total change in percentage due to payroll change		-0.82%
10	Recommended contribution as of January 1, 2023	$137,395,187	37.01%

Schedule of funding progress through December 31, 2022

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)
10/01/2013	$2,588,307,109	$2,821,195,803	$232,888,694	91.75%
10/01/2014	2,752,286,963	2,962,238,443	209,951,480	92.91%
10/01/2015	2,858,461,847	3,218,382,810	359,920,963	88.82%
01/01/2017	2,976,885,674	3,385,806,423	408,920,749	87.92%
01/01/2018	3,196,529,718	3,538,230,508	341,700,790	90.34%
01/01/2019	3,297,010,974	3,749,250,860	452,239,886	87.94%
01/01/2020	3,434,094,746	3,918,523,796	484,429,050	87.64%
01/01/2021	3,616,358,403	4,069,999,173	453,640,770	88.85%
01/01/2022	3,837,389,315	4,333,329,726	495,940,411	88.56%
01/01/2023	3,925,443,660	4,592,060,662	666,617,002	85.48%



Risk

The actuarial valuation results are dependent on a single set of assumptions; however, there is a risk that emerging results may differ significantly as actual experience proves to be different from the current assumptions.

We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Fund's future financial condition but have included a brief discussion of some risks that may affect the Fund.

- Economic and Other Related Risks. Potential implications for the Fund due to the following economic effects (that were not reflected as of the valuation date) include:
  - Volatile financial markets and investment returns lower than assumed
  - High inflationary environment impacting salary increases and COLAs
  - Lingering direct and indirect effects of the COVID-19 pandemic
- Investment Risk (the risk that returns will be different than expected)

  If the actual return on market value for the prior plan year were 1% different (either higher or lower), the unfunded actuarial liability would change by 1.08%, or about $7.2 million.

  Since the Fund's assets are much larger than contributions, investment performance may create volatility in the recommended contribution requirements. For example, for the prior plan year, if the actual return on market value were 1% different, the recommended contribution would increase or decrease by $532,000 (0.14% of payroll.

  The market value rate of return over the last 20 years has ranged from a low of -13.40% to a high of 16.54%.
- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the recommended contribution.
- Contribution Risk (the risk that actual contributions will be different from recommended contribution)

  Plan contributions are set by statute. Periodic projections comparing expected statutory contributions with the recommended contributions may be developed to determine if the statutory amounts are sufficient to fund the Plan and to ensure the payment of promised benefits.

  If contributions remain at current level and future experience matches the current assumptions, we project the unfunded actuarial accrued liability will be paid off in 20.1 years, which complies with the Board's 22-year target as of this valuation. Currently, contribution risk for the Fund is negligible.

Section 2: Actuarial Valuation Results

- Demographic Risk (the risk that participant experience will be different than assumed)

  Examples of this risk include:

  – Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.

  – More or less active participant turnover than assumed.

  – Annual cost-of-living allowances higher than assumed.

- There are external factors including legislative or financial reporting changes that could impact the Plan's funding and disclosure requirements. While we do not assume any changes in such external factors, it is important to understand that they could have significant consequences for the Fund.

- Actual Experience Over the Last Ten Years

  Past experience can help demonstrate the sensitivity of key results to the Fund's actual experience. Over the past ten years:

  – The non-investment gain(loss) for a year has ranged from a loss of $124.4 million to a gain of $51.9 million.

  – The funded percentage on the actuarial value of assets has ranged from a low of 85.5% to a high of 92.9% since 2013.

Plan Year Ended[1]	Investment Gain/(Loss)[2]	All Other Gains and (Losses)[2]
2013	-$30,907,149	$6,935,575
2014	-18,857,958	19,347,769
2015	-65,637,791	51,917,066
2016[3]	-89,308,635	22,587,408
2017	203,417,007	27,628,779
2018	-352,315,393	-57,794,682
2019	232,480,658	24,122,222
2020	145,345,337	11,608,096
2021	254,753,759	-124,402,894
2022	-745,558,729	-113,211,847

[1] Prior to 2016, valuation cycles reflect 12-month periods ending September 30.
[2] Based on market value of assets
[3] 2016 reflects a 15-month period due to the change in Plan Year from a September 30 year-end to a December 31 year-end

Maturity Measures

As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Fund's asset allocation is aligned to meet emerging pension liabilities.

Currently the Fund has a non-active to active participant ratio of 0.78.

For the prior year, benefits paid (including BackDROP payments and administrative expenses) were $115.6 million more than contributions received. Plans with high levels of negative cash flows may have a need for a larger allocation to income generating assets, which can create a drag on investment return.

Detailed Risk Assessment

- We recommend a more detailed assessment of the risks to provide the Board with a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing, and stochastic modeling.
- A detailed risk assessment could be important for the Fund because:
  - Relatively small changes in investment performance can produce large swings in the unfunded liabilities since the assets and liabilities are of similar size.
  - The Fund's asset allocation has potential for a significant amount of investment return volatility.
  - Retired participants account for over half of the Fund's liabilities, leaving limited options for reducing plan costs in the event of adverse experience.
  - Potential changes in the plan of benefits may result in participant choices that vary from those assumed.
  - Since annual cost-of-living allowances are tied to inflation, extended periods of high inflation may lead to significant increases in plan liabilities.
  - The Board has not had a detailed risk assessment in recent years.

GFOA funded liability by type

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the Fund's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent. The Board's funding policy targets 100 percent funding by December 31, 2044.

GFOA Funded Liability by Type as of December 31

	2022	2021
Actuarial accrued liability (AAL)		
Active member contributions	$482,366,089	$477,041,939
Retirees and beneficiaries	2,783,218,074	2,535,674,833
Active and inactive members (employer-financed)	1,326,476,499	1,320,612,954
Total	$4,592,060,662	$4,333,329,726
Actuarial value of assets	3,925,443,660	3,837,389,315
Cumulative portion of AAL covered		
Active member contributions	100.00%	100.00%
Retirees and beneficiaries	100.00%	100.00%
Active and inactive members (employer-financed)	49.75%	62.45%

Volatility ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 10.2. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 10.2% of one-year's payroll. Since actuarial gains and losses are amortized over 5 years, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain or loss.

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by projected payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 13.1. This is about 28.4% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long term.

Volatility Ratios for 2013 – 2023 Valuations

Actuarial Valuation Date	Asset Volatility Risk	Liability Volatility Risk
10/01/2013	8.3	9.5
10/01/2014	8.7	9.6
10/01/2015	8.6	10.7
01/01/2017	9.3	11.1
01/01/2018	10.4	11.5
01/01/2019	9.4	11.7
01/01/2020	10.6	12.2
01/01/2021	11.0	12.0
01/01/2022	12.2	12.7
01/01/2023	10.2	13.1

Section 3: Supplemental Information

Exhibit A: Table of Plan Demographics

A-1 Total

Category	Year Ended December 31 2022	Year Ended December 31 2021	Change From Prior Year
Active participants in valuation:			
Number	4,188	4,155	0.8%
Average age	41.2	41.4	-0.2
Average years of service	13.4	13.6	-0.2
Total payroll	$350,736,436	$341,117,890	2.8%
Average payroll	83,748	82,098	2.0%
Account balances	482,366,089	477,041,939	1.1%
Total active vested participants	1,130	1,127	0.3%
Inactive participants:			
• Inactive vested participants[1]	0	2	-100.0%
• Inactive nonvested participants due a refund	19	18	5.6%
Retired participants:			
Number in pay status	2,674	2,563	4.3%
Average age	67.7	67.6	0.1
Average monthly benefit	$5,180	$4,878	6.2%
Disabled participants:			
Number in pay status	59	63	-6.3%
Average age	66.7	66.2	0.5
Average monthly benefit	$3,155	$2,979	5.9%
Beneficiaries:			
Number in pay status	538	509	5.7%
Average age	73.5	73.4	0.1
Average monthly benefit	$3,997	$3,769	6.0%

[1]Terminated participants with 20 or more year of service are included as inactive vested participants.

Exhibit A: Table of Plan Demographics

A-2 Fire

Category	Year Ended December 31 2022	Year Ended December 31 2021	Change From Prior Year
Active participants in valuation:			
Number	1,772	1,743	1.7%
Average age	41.8	42.0	-0.2
Average years of service	14.1	14.3	-0.2
Total payroll	$141,454,611	$137,336,682	3.0%
Average payroll	79,828	78,793	1.3%
Account balances	210,491,353	206,349,495	2.0%
Total active vested participants	505	484	4.3%
Inactive participants:			
• Inactive vested participants[1]	0	2	-100.0%
• Inactive nonvested participants due a refund	8	8	0.0%
Retired participants:			
Number in pay status	1,079	1,040	3.8%
Average age	68.7	68.5	0.2
Average monthly benefit	$5,158	$4,894	5.4%
Disabled participants:			
Number in pay status	25	27	-7.4%
Average age	68.6	68.7	-0.1
Average monthly benefit	$3,156	$2,959	6.7%
Beneficiaries:			
Number in pay status	223	206	8.3%
Average age	74.6	74.8	-0.2
Average monthly benefit	$4,238	$3,998	6.0%

[1]Terminated participants with 20 or more year of service are included as inactive vested participants.

Exhibit A: Table of Plan Demographics

A-3 Police

Category	2022	2021	Change From Prior Year
	Year Ended December 31		
Active participants in valuation:			
Number	2,416	2,412	0.2%
Average age	40.7	40.9	-0.2
Average years of service	12.9	13.1	-0.2
Total payroll	$209,281,825	$203,781,208	2.7%
Average payroll	86,623	84,486	2.5%
Account balances	271,874,736	270,692,444	0.4%
Total active vested participants	625	643	-2.8%
Inactive participants:			
• Inactive vested participants[1]	0	0	0.0%
• Inactive nonvested participants due a refund	11	10	10.0%
Retired participants:			
Number in pay status	1,595	1,523	4.7%
Average age	67.0	67.0	0.0
Average monthly benefit	$5,195	$4,868	6.7%
Disabled participants:			
Number in pay status	34	36	-5.6%
Average age	65.3	64.3	1.0
Average monthly benefit	$3,154	$2,993	5.4%
Beneficiaries:			
Number in pay status	315	303	4.0%
Average age	72.7	72.3	0.4
Average monthly benefit	$3,826	$3,614	5.9%

[1]Terminated participants with 20 or more year of service are included as inactive vested participants.

Exhibit B: Participants in Active Service as of December 31, 2022 by Age and Years of Service

B-1 Total

		Years of Service								
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	130	130	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	551	478	73	- -	- -	- -	- -	- -	- -	- -
30 - 34	595	291	246	58	- -	- -	- -	- -	- -	- -
35 - 39	667	132	176	310	49	- -	- -	- -	- -	- -
40 - 44	674	28	52	273	265	56	- -	- -	- -	- -
45 - 49	618	10	6	103	198	258	43	- -	- -	- -
50 - 54	619	1	4	29	106	209	261	9	- -	- -
55 - 59	251	- -	- -	11	23	41	134	38	4	- -
60 - 64	73	- -	- -	- -	6	5	32	18	11	1
65 - 69	9	- -	- -	- -	- -	3	2	- -	1	3
70 & over	1	- -	- -	- -	- -	- -	- -	- -	- -	1
Total	4,188	1,070	557	784	647	572	472	65	16	5

Exhibit B: Participants in Active Service as of December 31, 2022 by Age and Years of Service

B-2 Fire

		Years of Service								
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	39	39	--	--	--	--	--	--	--	--
25 - 29	143	119	24	--	--	--	--	--	--	--
30 - 34	241	123	105	13	--	--	--	--	--	--
35 - 39	334	65	106	142	21	--	--	--	--	--
40 - 44	357	1	29	163	127	37	--	--	--	--
45 - 49	303	--	--	44	106	124	29	--	--	--
50 - 54	235	--	--	3	37	107	84	4	--	--
55 - 59	85	--	--	--	--	16	45	20	4	--
60 - 64	30	--	--	--	--	--	10	11	8	1
65 - 69	4	--	--	--	--	--	--	--	1	3
70 & over	1	--	--	--	--	--	--	--	--	1
Total	1,772	347	264	365	291	284	168	35	13	5

Exhibit B: Participants in Active Service as of December 31, 2022 by Age and Years of Service

B-3 Police

		Years of Service							
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 & over**
Under 25	91	91	--	--	--	--	--	--	--
25 - 29	408	359	49	--	--	--	--	--	--
30 - 34	354	168	141	45	--	--	--	--	--
35 - 39	333	67	70	168	28	--	--	--	--
40 - 44	317	27	23	110	138	19	--	--	--
45 - 49	315	10	6	59	92	134	14	--	--
50 - 54	384	1	4	26	69	102	177	5	--
55 - 59	166	--	--	11	23	25	89	18	--
60 - 64	43	--	--	--	6	5	22	7	3
70 & over	5	--	--	--	--	3	2	--	--
Total	2,416	723	293	419	356	288	304	30	3

Exhibit C: Reconciliation of Participant Data

	Active Participants	Inactive Vested Participants	Disableds	Retired Participants	Beneficiaries	Total
Number as of January 1, 2022	**4,155**	**2**	**63**	**2,563**	**509**	**7,292**
New participants	234	N/A	N/A	N/A	N/A	234
Terminations – with vested rights	0	0	0	0	0	0
Terminations – without vested rights	-4	N/A	N/A	N/A	N/A	-4
Retirements	-147	-2	N/A	149	N/A	0
New disabilities	-1	0	1	N/A	N/A	0
Return to work	0	0	0	0	N/A	0
Deceased	-9	0	-5	-51	-17	-82
New beneficiaries	0	0	0	0	49	49
Lump sum cash-outs	-40	0	0	0	0	-40
Rehire	0	0	N/A	0	N/A	0
Payment period for dependent children expired	N/A	N/A	0	0	-3	-3
Data adjustments	0	0	0	-2	0	-2
QDRO adjustments[1]	0	0	0	15	0	15
Number as of January 1, 2023	**4,188**	**0**	**59**	**2,674**	**538**	**7,459**

Note: Chart excludes terminated participants due a refund of employee contributions.

[1]The data includes 15 new former spouses receiving benefit under qualified domestic relations orders (QDROs); there were former spouses whose benefit terminated during the year.

Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended December 31, 2022		Year Ended December 31, 2021	
Net assets at market value at the beginning of the year		$4,150,928,708		$3,731,196,911
Contribution and other income:				
City contributions	$88,371,349		$86,322,619	
Member contributions	44,303,532		43,213,365	
Total contribution income		*$132,674,881*		*$129,535,984*
Investment income:				
Investment income	-$436,628,657		$535,637,585	
Less investment fees	-12,179,591		-14,063,821	
Net investment income		*-$448,808,248*		*$521,573,764*
Total income available for benefits		**-$316,133,367**		**$651,109,748**
Less benefit payments and administrative expenses:				
Administrative expenses	-$3,333,274		-$2,962,649	
Benefits	-219,777,348		-185,480,980	
BackDROP payments	-22,915,353		-41,754,670	
Refunds	-2,286,167		-1,179,652	
Net benefit payments and administrative expenses		*-$248,312,142*		*-$231,377,951*
Change in reserve for future benefits		**-$564,445,509**		**$419,731,797**
Net assets at market value at the end of the year		**$3,586,483,199**		**$4,150,928,708**

Exhibit E: Summary Statement of Plan Assets

	December 31, 2022		December 31, 2021	
Cash equivalents		$62,306,872		$93,706,814
Total accounts receivable		15,791,307		21,644,133
Investments:				
Equities	$1,885,327,649		$2,336,570,879	
Fixed income	1,130,700,202		1,253,728,718	
Real estate and real assets	515,384,465		474,836,991	
Property, plant and equipment	648,614		672,021	
Total investments at market value		3,532,060,930		4,065,808,609
Total assets		3,610,159,109		4,181,159,556
Total accounts payable		-23,675,910		-30,230,848
Net assets at market value		**$3,586,483,199**		**$4,150,928,708**
Net assets at actuarial value		**$3,925,443,660**		**$3,837,389,315**

Exhibit F: Development of the Fund through December 31, 2022

Year Ended December 31[1]	Employer Contributions	Employee Contributions	Net Investment Return[2]	Admin. Expenses	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2013	$73,255,620	$36,629,009	$248,187,404	$2,714,633	$118,680,884	$2,464,678,516	$2,588,307,109	105.0%
2014	76,145,635	38,072,618	223,053,939	2,789,578	122,305,997	2,676,855,133	2,752,286,963	102.8%
2015	75,801,715	37,901,064	-47,586,525	2,903,392	144,157,312	2,595,910,683	2,858,461,847	110.1%
2016[3]	94,972,075	47,485,016	287,674,638	3,568,003	187,925,984	2,834,548,425	2,976,885,674	105.0%
2017	75,915,522	37,958,082	407,279,701	3,034,563	156,137,449	3,196,529,718	3,196,529,718	100.0%
2018	78,312,472	39,182,276	-122,694,031	3,479,408	172,692,367	3,015,158,660	3,297,010,974	109.3%
2019	81,016,332	40,507,611	449,066,512	3,564,973	173,494,107	3,408,690,035	3,434,094,746	100.7%
2020	85,693,319	42,846,035	390,027,733	3,389,565	192,670,646	3,731,196,911	3,616,358,403	96.9%
2021	86,322,619	43,213,365	521,573,764	2,962,649	228,415,302	4,150,928,708	3,837,389,315	92.4%
2022	88,371,349	44,303,532	-448,808,248	3,333,274	244,978,868	3,586,483,199	3,925,443,660	109.5%

[1]Prior to 2016, financial information was based on 12-month periods ending September 30.
[2]On a market basis, net of investment fees.
[3]Reflects the 15-month period from October 1, 2015 through December 31, 2016.

Section 4: Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions, Methods and Models

Rationale for Assumptions:	The assumptions and methods upon which this valuation is based were set by the Board of Trustees, based on recommendations by Segal following a 4.25-year experience study for the period ended December 31, 2018. The information and analysis used in selecting each assumption are shown in that experience study report. Assumptions are generally reviewed annually and updated on a five-year cycle.
Net Investment Return:	7.25%. The net investment return assumption was chosen by the Pension Fund's Board of Trustees, with input from the actuary. The assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes as well as the Fund's target asset allocation.
Administrative Expenses:	$3,400,000 payable mid-year for the year beginning January 1, 2023 (equivalent to $3,283,071 payable at the beginning of the year
Salary Increases:	See table below

Salary Increases:

Years of Service	Rate (%)
1	14.00%
2	9.00
3	6.00
4	5.00
5	4.00
6	3.75
7	3.50
8	3.25
9 or more	3.00

Includes an underlying 3.00% inflation component

Assumed to occur at the beginning of each year

Payroll Growth:	3.00%, used to amortize the unfunded actuarial accrued liability as a level percentage of payroll.

Cost-of-Living Adjustments:	
Retirement before October 1, 1999:	3.00%
Retirement on or after October 1, 1999:	2.25%
	Valuation liabilities reflect the actual COLA granted for 2022. The stated assumptions apply to 2023 forward, at the beginning of each year.
Mortality Rates:	
Pre-retirement:	PUBS-2010 Safety Employee Amount-Weighted Table, generationally projected using Scale SSA2019-2D
Healthy annuitants:	PUBS-2010 Safety Healthy Retiree Amount-Weighted Table, generationally projected using Scale SSA2019-2D
Disabled annuitants:	PUBS-2010 Safety Disabled Retiree Amount-Weighted Table, generationally projected using Scale SSA2019-2D
Beneficiaries:	PUBS-2010 Safety Contingent Survivor Amount-Weighted Table, generationally projected using Scale SSA2019-2D
	The tables above, projected to 2022, reasonably reflect the mortality experience of the Fire and Police Pension Fund as of the measurement date. The mortality tables are generationally projected using Scale SSA2019-2D to reflect future mortality improvement.
Duty Death Percentages:	10% of deaths are assumed to be in the line of duty

Annuitant Mortality Rates:

	Rate (%)[1]					
	Healthy		Disabled		Beneficiary	
Age	Male	Female	Male	Female	Male	Female
55	0.31	0.26	0.48	0.46	0.82	0.45
60	0.51	0.45	0.74	0.70	1.01	0.62
65	0.88	0.77	1.19	1.06	1.38	0.90
70	1.57	1.33	1.91	1.61	2.13	1.35
75	2.83	2.30	3.24	2.44	3.38	2.15
80	5.10	3.96	5.60	3.96	5.36	3.57
85	9.14	6.84	9.21	6.84	8.74	6.32
90	15.86	11.82	15.86	11.82	14.42	11.33

[1]Rates shown do not include generational projection.

Catastrophic Disability:	0% of disabilities are assumed to be catastrophic

Termination Rates Before Retirement:

	Rate (%)						
	Mortality[1]		Disability[2]		Withdrawal[3]		
Age	Male	Female	Fire	Police	Years of Service	Fire	Police
20	0.04	0.02	0.01	0.01	Less than 1	1.00	2.25
25	0.04	0.02	0.01	0.01	1	1.00	2.25
30	0.04	0.03	0.01	0.01	2	0.60	2.25
35	0.05	0.04	0.01	0.01	3	0.50	2.25
40	0.06	0.05	0.02	0.02	4 - 7	0.40	2.25
45	0.08	0.07	0.04	0.04	8	0.40	2.00
50	0.12	0.09	0.00	0.00	9 - 11	0.40	0.50
55	0.18	0.12	0.00	0.00	12 - 20	0.10	0.50
60	0.26	0.17	0.00	0.00	20 or more	0.00	0.00

[1]Rates shown do not include generational projection.
[2]Disability rates cease at 21 years of service
[3]Withdrawal rates cease at first eligibility for retirement

Retirement Rates:

Fire		Police	
Years of Service	Rate (%)	Years of Service	Rate (%)
20 – 25	1.5	20 – 22	2.5
26	2.0	23 – 24	3.0
27 – 28	3.0	25	4.0
29	8.0	26	5.0
30	10.0	27	10.0
31	15.0	28	12.0
32	30.0	29	17.0
33 – 35	45.0	30	27.0
36	35.0	31	30.0
37	55.0	32	50.0
38	30.0	33	60.0
39	25.0	34	50.0
40	35.0	35 – 38	45.0
41	15.0	39	70.0
42	40.0	40	100.0
43	100.0		

Retirement is assumed to occur no later than age 65 if participant has at least 20 years of service.

Section 4: Actuarial Valuation Basis

Retirement Rates for Inactive Vested Participants:	Former participants with rights to deferred benefits are assumed to retire at earliest eligibility.
Description of Weighted Average Retirement Age:	Age 59.4 for Firefighters and 57.2 for Police Officers, determined as follows: The weighted average retirement age for each participant is calculated as the sum of the product of each potential current or future retirement age times the probability of surviving from current age to that age and then retiring at that age, assuming no other decrements. The overall weighted retirement age is the average of the individual retirement ages based on all the active participants included in the January 1, 2023 actuarial valuation.
Percent Married:	Males: 95% Females: 60%
Age of Spouse:	Females three years younger than males
Marriage after Retirement:	The retiree liability includes a 0.20% load and the disability liability includes a 0.40% load to account for unmarried retirees marrying after retirement.
Beneficiary Liability:	The spousal beneficiary liability includes a 2% load to account for future increased spousal benefits when dependent children receiving benefits reach the age of majority and are no longer eligible to receive benefits.
Utilization of BackDROP:	90% of retiring Firefighters and new beneficiaries are assumed to elect a four-year BackDROP. Firefighters who retire prior to 24 years of service are not assumed to utilize the BackDROP provisions of the plan. 75% of retiring Police Officers and new beneficiaries are assumed to elect a three-year BackDROP. Police Officers who retire prior to 23 years of service are not assumed to utilize the BackDROP provisions of the plan.
13th and 14th Checks:	For purposes of estimating the cost of this asymmetric benefit, active liabilities are loaded by 0.03% and non-active liabilities are loaded by 0.1%.
Sick Leave:	For purposes of calculating Fund benefits, total service at decrement is increased by 1.0% for Firefighters and 0.2% for Police Officers to recognize inclusion of sick leave.
Decrement Methodology:	Decrement rates are independent probabilities, and all decrements are assumed to occur at the beginning of the valuation year.
Benefit Limits:	Salary and benefit limitations under IRC Sections 401(a)(17) and 415 are disregarded for purposes of determining the valuation liabilities.
Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the actuarial value, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.

Section 4: Actuarial Valuation Basis

Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is age at the member's hire date. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation
Models:	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Deterministic cost projections are based on a proprietary forecasting model. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.
Justification for Change in Actuarial Assumptions:	There have been no changes in actuarial assumptions since the last valuation.

Exhibit II: Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	January 1 through December 31
Plan Status:	Ongoing
Normal Retirement:	
Service Requirement	• 20 years of service and contributions, regardless of age
Amount	• 2.25% of Average Salary for each of the first 20 years of service, plus • 5.00% of Average Salary for each of the next 7 years of service, plus • 2.00% of Average Salary for each of the next 3 years of service, plus • 0.50% of Average Salary for each year of service thereafter, with a maximum benefit percentage of 87.50%.
Average Salary	• The average of the highest three years of annual salary during the five-year period ending on the date of retirement.
Disability:	
Eligibility	• Immediately eligible upon membership, payable after 30 days of continuous disability
Amount	• 50% of Average Salary
Catastrophic Injury Disability:	
Eligibility	• Be unable to secure any type of third-party employment, or engage in any self-employment, and as a result make an annual income below the poverty level.
Amount	• 87.50% of Average Salary
Termination Benefits:	• No benefits are vested prior to eligibility for disability or normal retirement benefits, or at death. However, a participant may receive a refund of member contributions without interest.

Survivor's Pre-Retirement Death Benefit (death not in line of duty):	
Eligibility	• Immediately upon membership
Amount	• *Spouse* - Participant's accrued benefit, with a minimum of 50% of average salary and a maximum based on 27 years of service. 25% of the benefit is paid to the children who are under age 18 or disabled, if any, divided equally among them. • *Children only (under age 18, or disabled)* -Participant's accrued benefit, with a minimum of 50% of average salary and a maximum based on 27 years of service. Benefits are divided equally among the children. • *Dependent parents, no wife or children* - 33% of Average Salary, if two; 25% if one. • *No dependents* - Lump sum equal to ten times the accrued retirement benefit based on service and salary at time of death, or a refund of member contributions, if greater. • *Wholly-dependent orphaned children* - 100% of the surviving spouse's benefit for life.
Survivor's Pre-Retirement Death Benefit (death in line of duty):	
Eligibility	• Immediately upon membership
Amount	• Surviving spouse and dependent children will receive a total pension equal to the salary, including longevity pay, of the member at the time of death.
Post-Retirement Death Benefit:	
Amount	• Percentage of Average Salary available for retirement benefit, with a maximum benefit based on 27 years of service, with the percentage based on the formula in effect on the date of the retiree's death minus BackDROP period; maximum benefit equal to benefit being received by retiree at death. • For marriages after retirement if the widow was married less than five years a lump sum of $15,000 is payable and if the widow was married at least five years than the widow is eligible for the entire death benefit of a surviving spouse starting at age 55. • If a retiree dies leaving no beneficiaries, the estate is entitled to an amount equal to ten times the annual annuity awarded on the date of retirement, minus any payments already made to the retiree.
Cost-of-Living Adjustments:	• If retirement was before October 1, 1999, the benefits are adjusted annually by 100% of the CPI, provided the index shows an increase, if the percentage increase is 8% or less. If the increase is more than 8%, the benefits shall be increased by 8% plus a percentage equal to 75% of the percentage increase that is more than 8%. If retirement is on or after October 1, 1999, benefits are adjusted by 75% of the CPI.
13th and 14th Pension Checks:	• The Board may authorize the disbursement of a 13th pension check in a year in which the arithmetic average of the annual rates of return for the most recent five years exceeds the assumed rate by at least 100 basis points. A 14th check may be authorized if the five-year average return exceeds the assumed rate by at least 300 basis points.

BackDROP:	
Eligibility	• Participants who are eligible to retire may elect a BackDROP. (Not applicable to line-of-duty or disability). The surviving spouse of an active member may elect a BackDROP, but the service upon which the spousal BackDROP benefit is based may not exceed 27 years of service.
Amount	• The backward deferred retirement option plan (BackDROP) benefit provides a lump sum payment based on pay and service as of the BackDROP retirement date times the number of months elected in exchange for a reduced monthly benefit. The monthly benefit is based on pay and all service as of the BackDROP retirement date plus sick leave credit.
BackDROP Retirement Date	• Actual retirement date minus number of months elected. The number of months cannot exceed the lesser of 60 months or the number of months of service in excess of 20 years.
Contributions:	
Member contributions	• Members pay 12.32% of total salary, excluding overtime pay
City contributions	• The City pays 24.64% of total salary, excluding overtime pay
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Appendix A: Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Retirees and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing retirees and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the recommended contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Appendix A: Definition of Pension Terms

Actuarial Present Value of Future Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.
Actuarially Determined Contribution (ADC):	The employer's contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is intended to pay off the Unfunded Actuarial Accrued Liability.

Appendix A: Definition of Pension Terms

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: Investment return - the rate of investment yield that the Plan will earn over the long-term future; Mortality rates - the rate or probability of death at a given age for employees and retirees; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates - the rate or probability of disability retirement at a given age; Withdrawal rates - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Plan that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.

Appendix A: Definition of Pension Terms

Investment Return:	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	The portion of the Actuarial Present Value of Future Benefits and expenses, if applicable, allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in each future year in determining the Amortization Period.
Plan Fiduciary Net Position:	Market value of assets.
Service Costs:	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Benefits is determined. The expected benefits to be paid in the future are discounted to this date.