Milliman

CITY OF NORWICH
VOLUNTEER FIREFIGHTERS' PENSION PLAN

Actuarial Valuation as of January 1, 2022
To Determine Funding for Fiscal Years 2022-23 and 2023-24

Prepared by

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March 24, 2022

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Certification

We have performed an actuarial valuation of the Plan as of January 1, 2022 to determine funding for fiscal years 2022-23 and 2023-24. This report presents the results of our valuation.

The ultimate cost of a pension plan is the total amount needed to provide benefits for plan members and beneficiaries and to pay the expenses of administering the plan. Pension costs are met by contributions and by investment return on plan assets. The principal purpose of this report is to set forth an actuarial recommendation of the contribution, or range of contributions, which will properly fund the plan, in accordance with applicable government regulations. In addition, this report provides:

- A valuation of plan assets and liabilities to review the year-to-year progress of funding.
- Information needed to meet disclosure requirements.
- Review of plan experience for the previous year to ascertain whether the assumptions and methods employed for valuation purposes are reflective of actual events and remain appropriate for prospective application.
- Assessment of the relative funded position of the plan, i.e., through a comparison of plan assets and projected plan liabilities.
- Comments on any other matters which may be of assistance in the funding and operation of the plan.

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In preparing this report, we relied on employee census data and financial information as of the valuation date, furnished by the City. We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have found them to be reasonably consistent and comparable with data used for other purposes. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete and our calculations may need to be revised. If there are material defects in the data, it is possible that they would be uncovered by a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Certification

The calculations reported herein have been made on a basis consistent with our understanding of ERISA and the related sections of the tax code. Additional determinations may be needed for purposes other than meeting funding requirements, such as judging benefit security at plan termination or meeting employer accounting requirements. On the basis of the foregoing, we hereby certify that, to the best of our knowledge, this report is complete and accurate and all costs and liabilities were determined in conformance with generally accepted actuarial principles and practices.

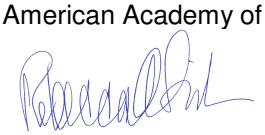
We further certify that, in our opinion, each actuarial assumption, method and technique used is reasonable taking into account the experience of the Plan and reasonable expectations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as, but not limited to, the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the actuarial assignment, we did not perform an analysis of the potential range of such future measurement.

The valuation results were developed using models intended for valuations that use standard actuarial techniques. In addition to the models described previously, Milliman has developed certain models to develop the expected long term rate of return on assets used in this analysis. We have reviewed the models, including their inputs, calculations, and outputs for consistency, reasonableness, and appropriateness to the intended purpose and in compliance with generally accepted actuarial practice and relevant actuarial standards of practice (ASOP). The models, including all input, calculations, and output may not be appropriate for any other purpose.

Although it is possible that the COVID-19 pandemic could have a material impact on the projected mortality, liabilities, and contribution requirements, we have chosen not to make an adjustment in the projections at this time, given the substantial current uncertainty regarding the impact of COVID-19 on mortality and plan costs, including whether the pandemic will increase or decrease mortality during the term of our projections. We will be monitoring this development closely and may adjust future projections to reflect the impact of COVID-19, if and when it becomes appropriate.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.



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Section I - Executive Summary
Changes Since the Prior Valuation

Plan Changes

This valuation reflects the increase in employee contributions from $264 to $288 per year. The retirement benefit multiplier also increased from $22 to $24 per month. These plan changes increased the Unfunded Accrued Liability by about $393,000 and increased the Actuarially Determined Contribution by $33,000.

Changes in Actuarial Methods and Assumptions

We lowered the interest rate from 6.75% to 6.25%. We also lowered the amortization growth rate and assumed rate of inflation from 2.75% to 2.25%. These assumption changes increased the Unfunded Accrued Liability by about $363,000 and increased the Actuarially Determined Contribution by about $38,000.

Other Significant Changes

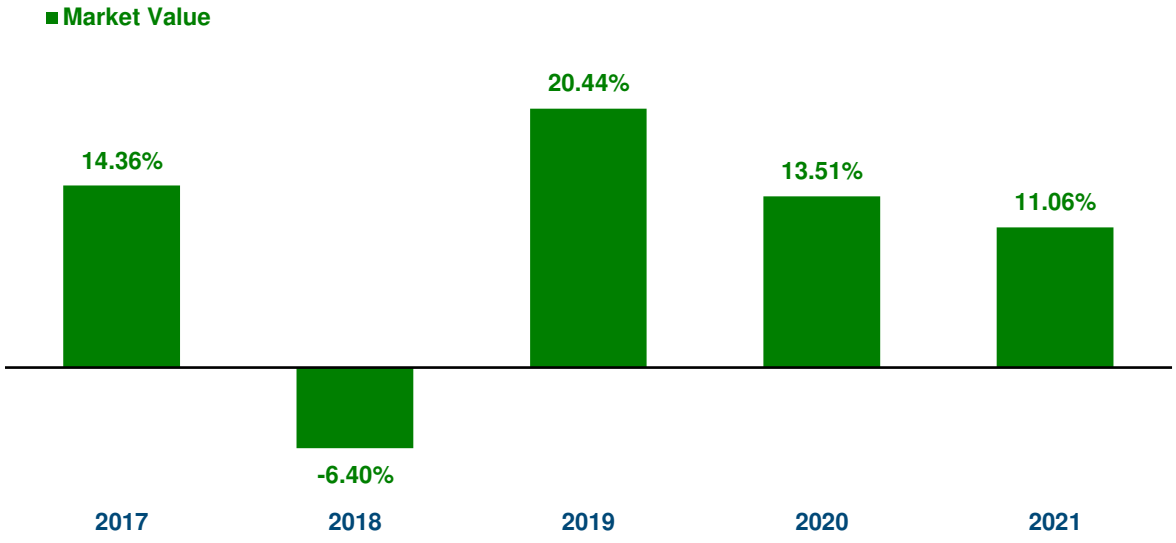
None.

Section I - Executive Summary
Assets

Valuations for this plan are only prepared in even-numbered years. Over the past two years, the plan's assets changed as follows;

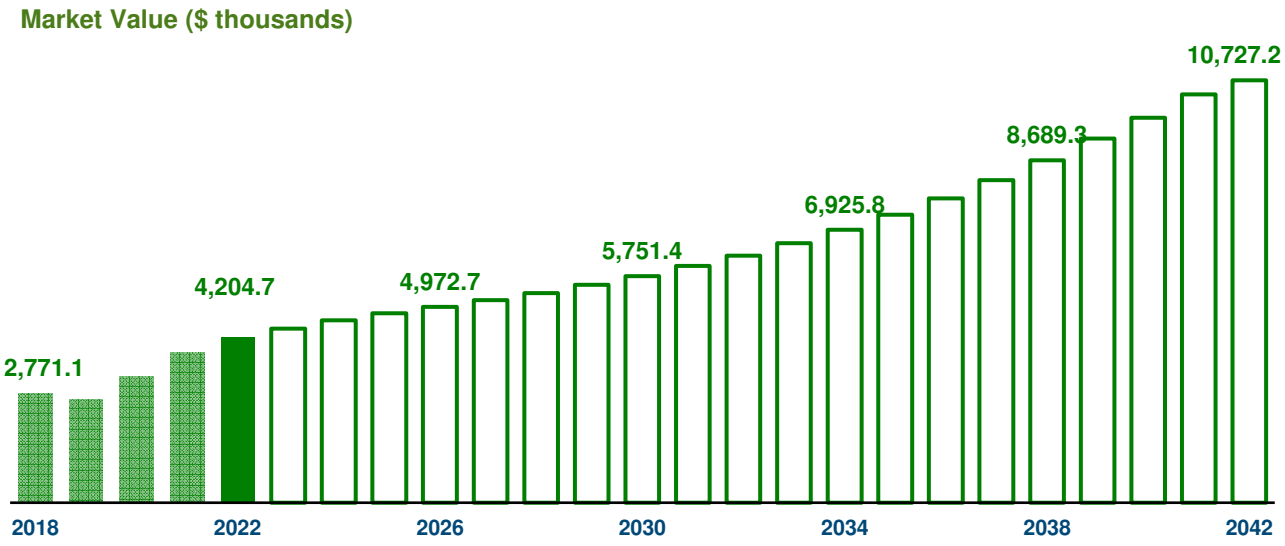
Value as of January 1, 2020	$3,199,398
City and Member Contributions	534,976
Investment Income	443,553
Benefit Payments and Administrative Expenses	(366,022)
Value as of January 1, 2021	3,811,905
City and Member Contributions	366,921
Investment Income	420,105
Benefit Payments and Administrative Expenses	(394,232)
Value as of January 1, 2022	4,204,699

In 2020, the plan's assets earned 13.51% on a Market Value basis. The actuarial assumption for this period was 6.75%; the result is an asset gain of about $221,900. In 2021, the plan's assets earned 11.06% on a Market Value basis. The actuarial assumption for this period was 6.75%; the result is an asset gain of about $163,700. Historical rates of return are shown in the graph below.

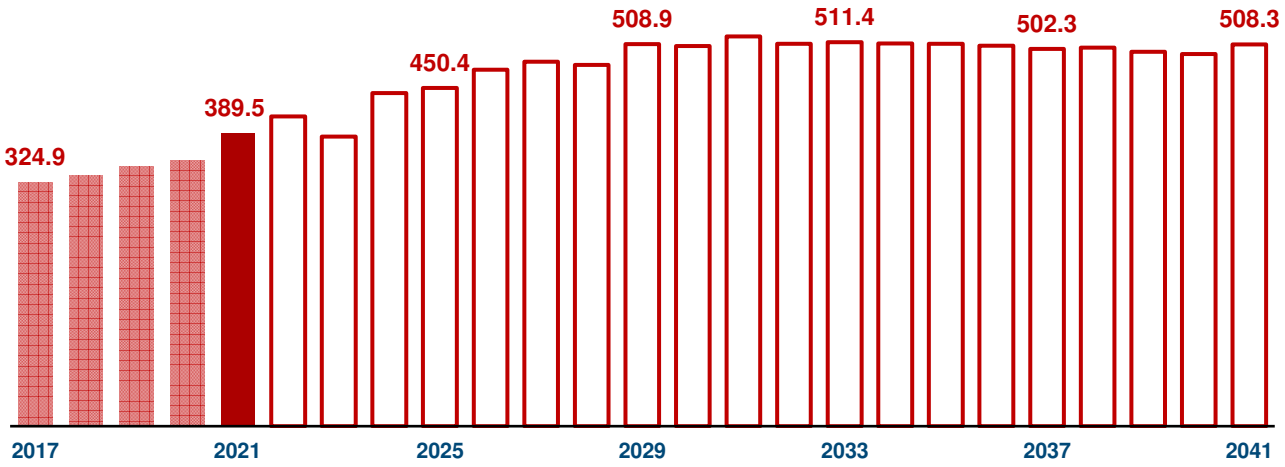


Section I - Executive Summary
Assets (continued)

The graph below shows how this year's asset values compare to where the plan's assets have been over the past several years and how they are projected to change over the next 20 years. For purposes of this projection, we have assumed that the City always contributes the Actuarially Determined Contribution and the investments always earn the assumed interest rate each year.

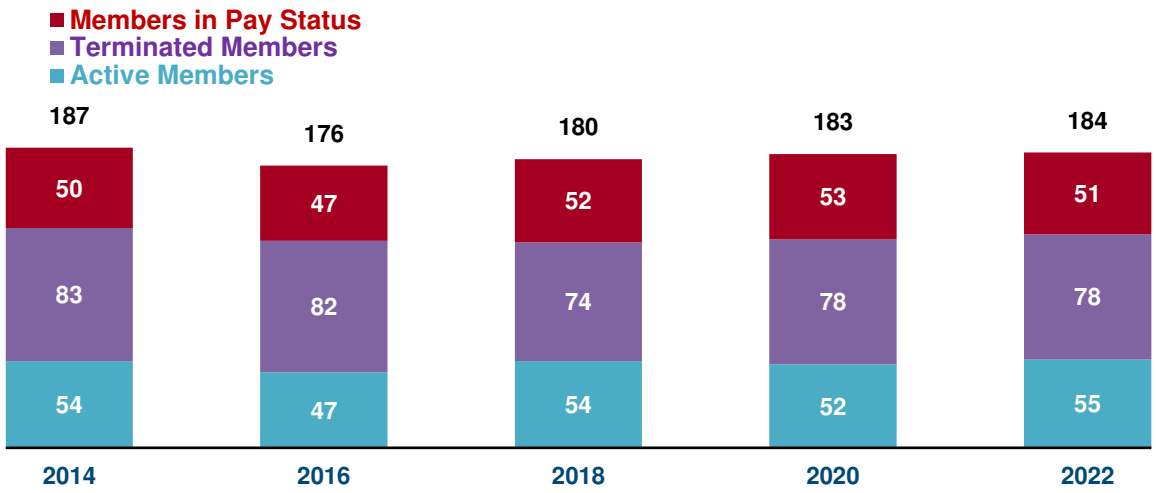


In 2021 the plan paid out $389,500 in benefits to members. Over the next 20 years, the plan is projected to pay out a total of $9,723,000 in benefits to members.



Section I - Executive Summary
Membership

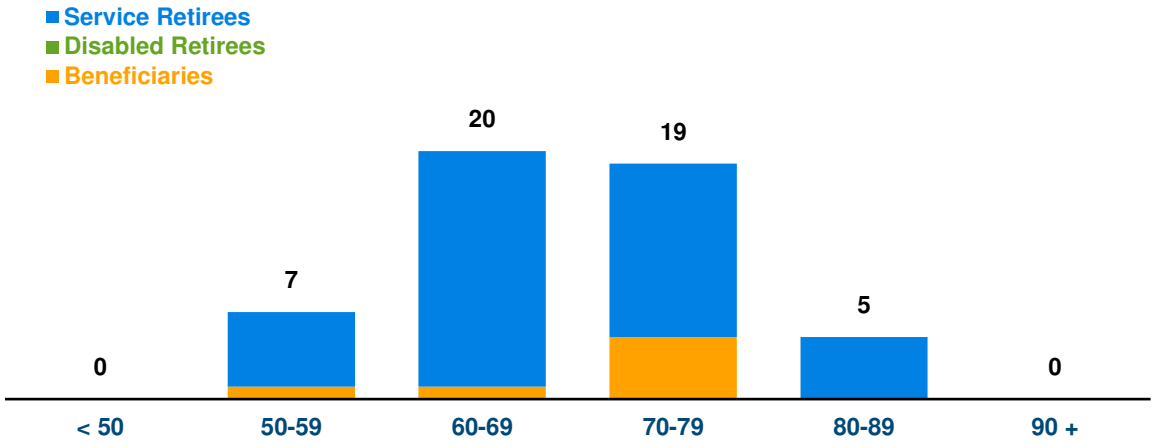
There are three basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a vested right to benefits but have not yet started collecting, and (3) active employees who have met the eligibility requirements for membership. Because valuations are only prepared in even-numberred years, membership data is not available for odd-numbered years.



Members in Pay Status on January 1, 2022

Service Retirees	44	Average Age	69.2
Disabled Retirees	0	Total Annual Benefit	$372,917
Beneficiaries	7	Average Annual Benefit	7,312
Total	51		

The members in pay status fall across a wide distribution of ages:



Section I - Executive Summary
Membership (continued)

Terminated Vested Members on January 1, 2022

Count	4
Average Age	49.4
Total Annual Benefit	$23,496
Average Annual Benefit	5,874

Members Due Refunds

Count	74

Active Members on January 1, 2022

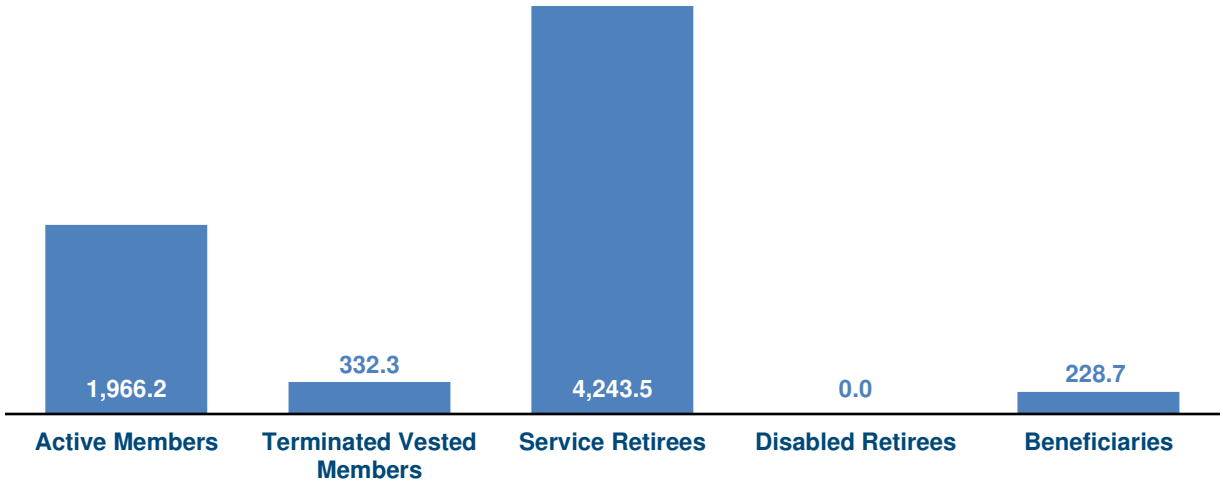
Count	55
Average Age	41.8
Average Service	13.3

The table below illustrates the age and years of service of the active membership:

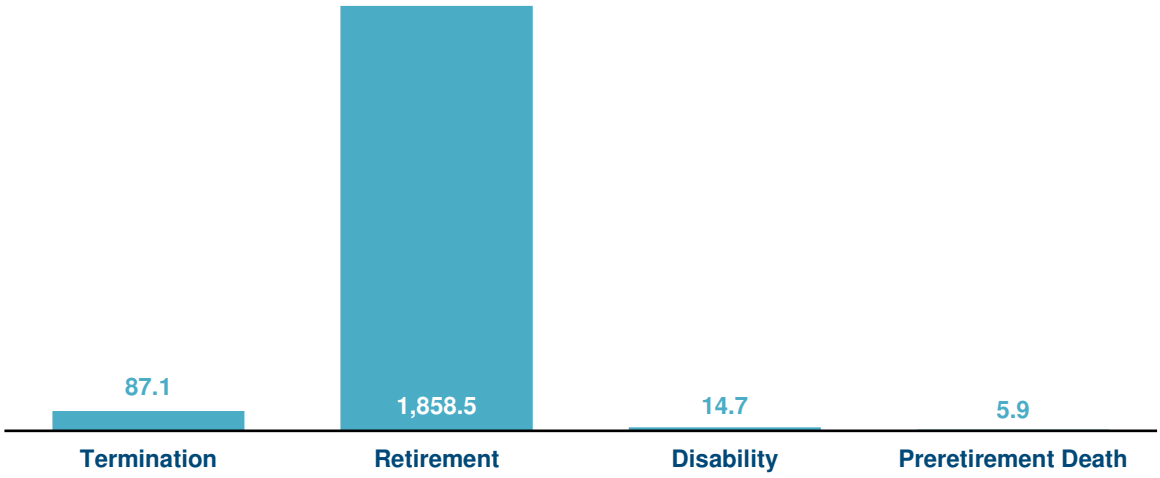
	Years of Service							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
< 25	4	2						6
25-29	3	1						4
30-34	6		1					7
35-39	4	2	1					7
40-44	3	2			1			6
45-49	1				4	1	1	7
50-54	2	1	1	1	5		3	13
55-59	1	1	1	1				4
60-64								0
65+		1						1
Total	24	10	4	2	10	1	4	55

Section I - Executive Summary
Accrued Liability

The Accrued Liability as of January 1, 2022 is $6,770,676, which consists of the following pieces (in thousands $):

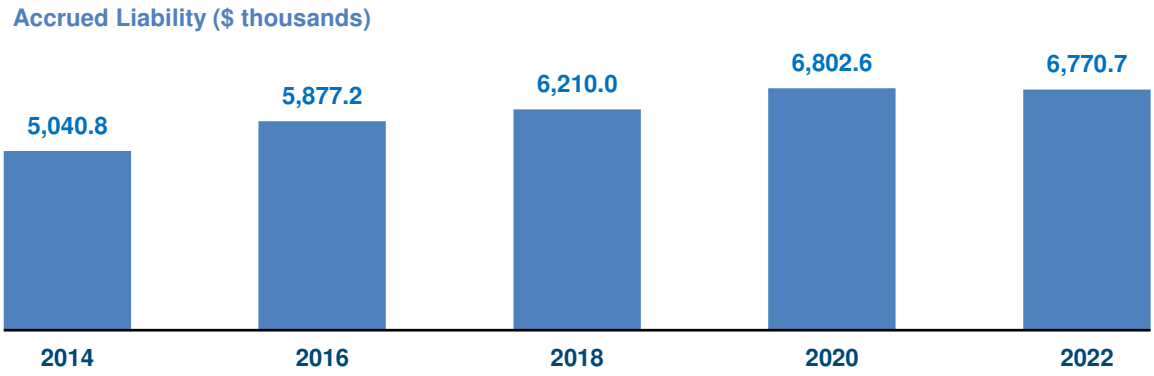


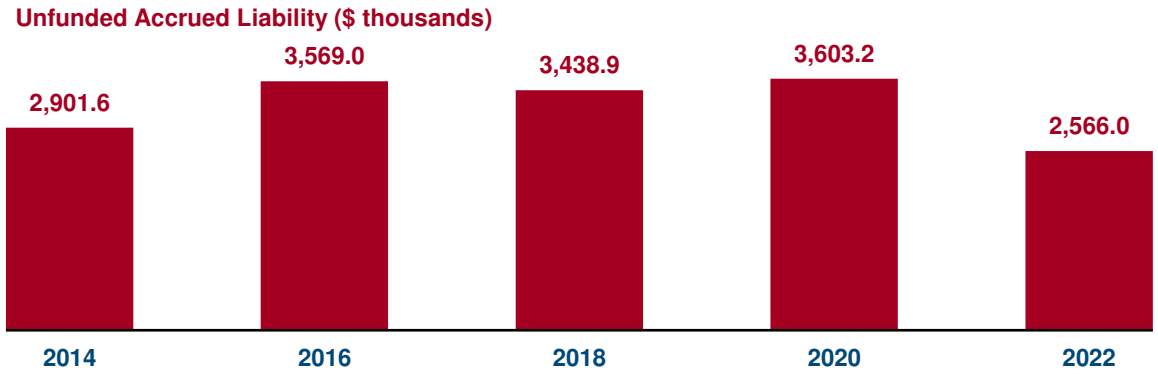
The Accrued Liability for active members can be broken down further by the different types of benefits provided by the plan:

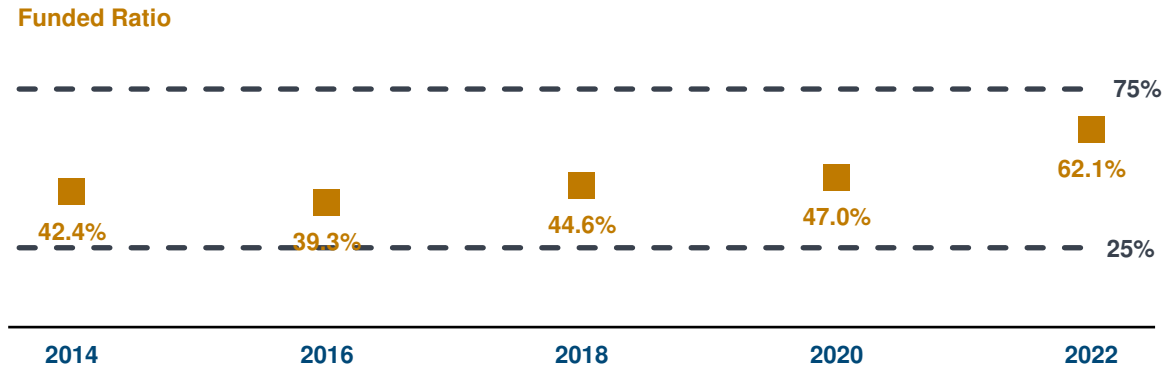


Section I - Executive Summary
Funded Status

The Accrued Liability grows over time as active members earn additional benefits, and goes down over time as members receive benefits; it may also change when there are changes to the plan provisions or changes in the actuarial assumptions. The Unfunded Accrued Liability is the dollar difference between the Accrued Liability and the Actuarial Value of Assets; the Funded Ratio is the ratio of the two.



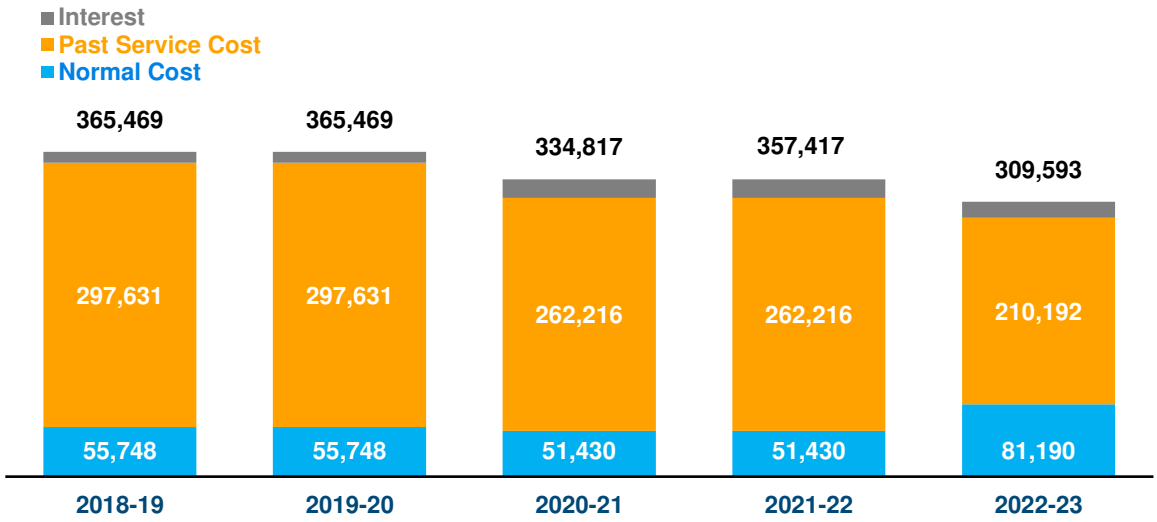




Section I - Executive Summary
Actuarially Determined Contribution

The Actuarially Determined Contribution consists of three pieces: a Normal Cost payment to fund the benefits earned each year, a Past Service Cost to gradually reduce any unfunded or surplus liability, and Interest to reflect the timing of the contribution relative to the valuation date.

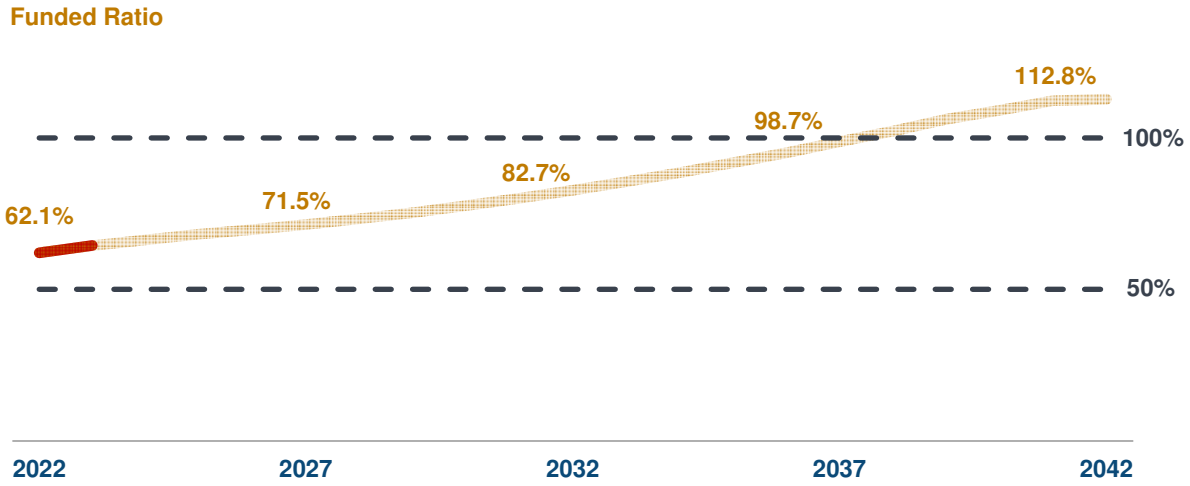
The Actuarially Determined Contribution for fiscal year 2022-23 is shown graphically below, along with the comparable figures for the preceding four fiscal years. Note that the Normal Cost is relatively consistent from year to year, whereas the Past Service Cost tends to be more volatile since it reflects the impact of asset performance.

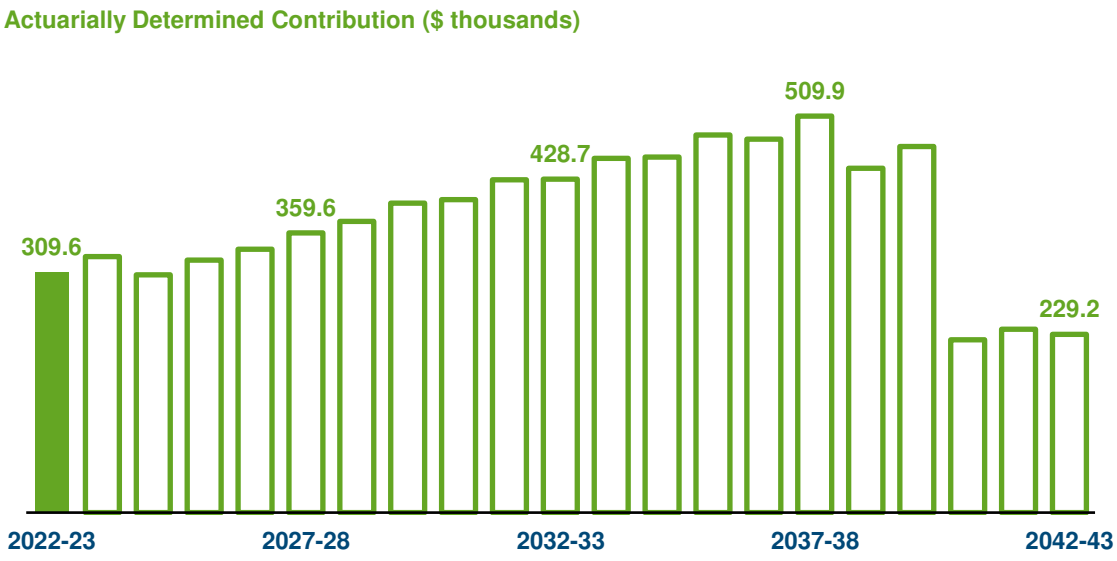


Since valuations are only performed in even-numbered years, each valuation also produces the Actuarially Determined Contribution for the off year between valuations. Based on the January 1, 2022 valuation, the Actuarially Determined Contribution for fiscal year 2023-24 is $328,943.

Section I - Executive Summary
Long-Range Forecast

If the City pays the Actuarially Determined Contribution each year, the investments earn exactly the assumed interest rate each year, and there are no changes in the plan provisions or in the actuarial methods and assumptions, then we project the following changes in the plan's funded status and the long-range contribution levels:

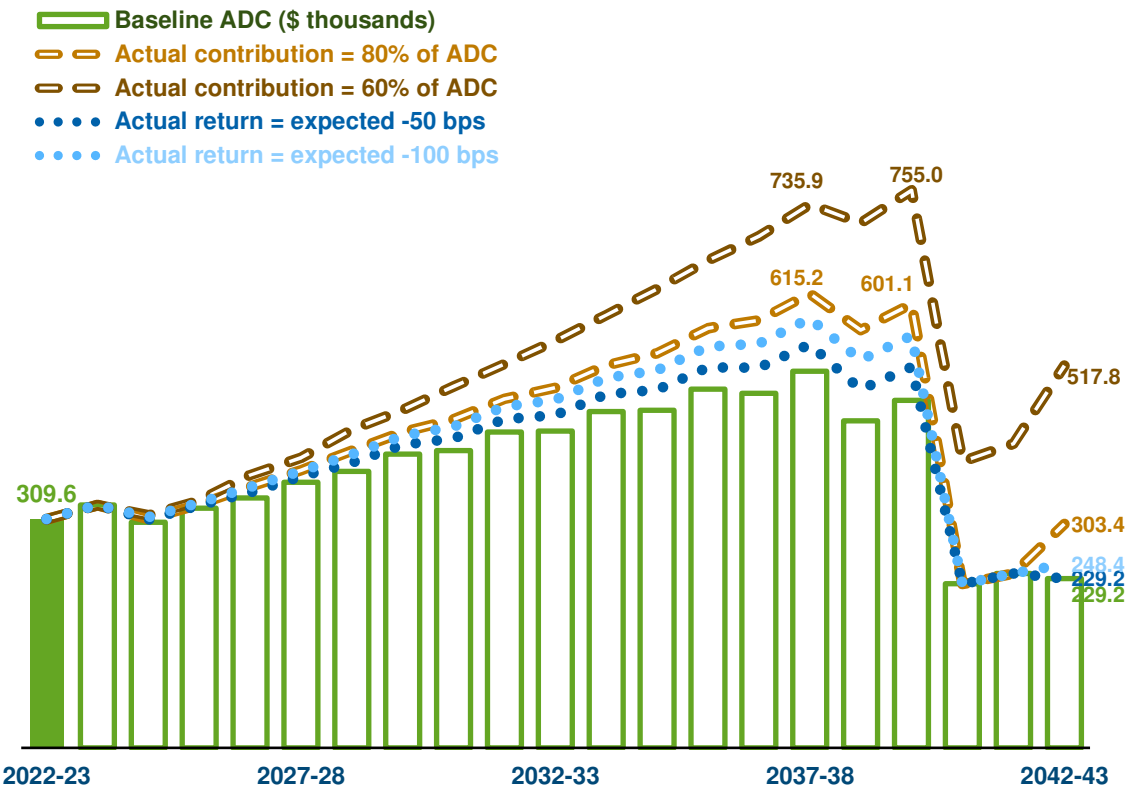




To the extent that there are future investment or liability gains or losses, changes in the actuarial assumptions or methods, or plan changes, the actual valuation results will differ from these forecasts. Please see Section III C for more details of the long range forecast.

Section I - Executive Summary
Long-Range Forecast (continued)

Pension benefits are paid for through a combination of contributions from the City and from employees, and from investment income. If the City pays less than the Actuarially Determined Contribution each year, or if the investments persistently earn less than the assumed interest rate, then the plan's funded status would suffer, and to compensate, the City's contribution levels would be pushed higher. The risks of underfunding and underearning are illustrated in the hypothetical scenarios below:



The scenarios illustrated above are based on deterministic projections that assume emerging plan experience always exactly matches the actuarial assumptions; in particular that actual asset returns will be constant in every year of the projection period. Variation in asset returns, contribution amounts, and many other factors may have a significant impact on the long-term financial health of the plan, the liquidity constraints on plan assets, and the City's future contribution levels. Stochastic projections could be prepared that would enable the City to understand the potential range of future results based on the expected variability in asset returns and other factors. Such analysis was beyond the scope of this engagement.

Section I - Executive Summary
Summary of Principal Results

Membership as of	January 1, 2020	January 1, 2022
Active Members	52	55
Terminated Members	78	78
Members in Pay Status	53	51
Total Count	183	184

Assets and Liabilities as of	January 1, 2020	January 1, 2022
Market Value of Assets	$3,199,398	$4,204,699
Actuarial Value of Assets	3,199,398	4,204,699
Accrued Liability for Active Members	1,596,729	1,966,222
Accrued Liability for Terminated Members	1,134,277	332,276
Accrued Liability for Members in Pay Status	4,071,583	4,472,179
Total Accrued Liability	6,802,589	6,770,677
Unfunded Accrued Liability	3,603,191	2,565,978
Funded Ratio	47.0%	62.1%

Actuarially Determined Contribution for Fiscal Year	2020-21	2022-23
Normal Cost	$51,430	$81,190
Past Service Cost	262,216	210,192
Interest Adjustment	21,171	18,211
Actuarially Determined Contribution	334,817	309,593

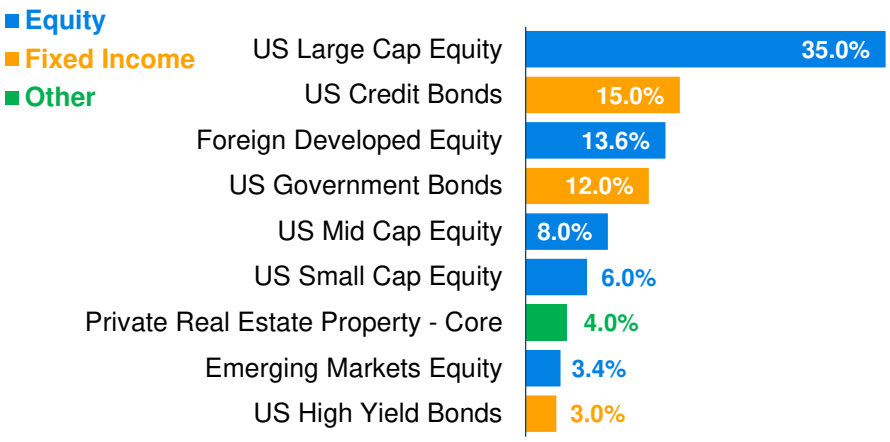
Actuarially Determined Contribution for Second Fiscal Year	2021-22	2023-24
Interest Adjustment	$22,600	$19,350
Actuarially Determined Contribution	357,417	328,943

Section II - Plan Assets
Summary of Fund Transactions

Market Value as of January 1, 2020	$3,199,398
City Contributions	517,552
Member Contributions	17,424
Net Investment Income	443,553
Benefit Payments	(353,760)
Administrative Expenses	(12,262)
Market Value as of December 31, 2020	3,811,905
Expected Return on Market Value of Assets	221,612
Market Value (Gain)/Loss	(221,941)
Approximate Rate of Return *	13.51%
Market Value as of January 1, 2021	$3,811,905
City Contributions	357,417
Member Contributions	9,504
Net Investment Income	420,105
Benefit Payments	(389,459)
Administrative Expenses	(4,773)
Market Value as of December 31, 2021	4,204,699
Expected Return on Market Value of Assets	256,393
Market Value (Gain)/Loss	(163,712)
Approximate Rate of Return *	11.06%

* The rate shown here is not the dollar or time weighted investment yield rate which measures investment performance. It is an approximate net return assuming all activity occurred on average midway through the fiscal year.

Target Asset Allocation as of December 31, 2021



Section III - Development of Contribution
A. Past Service Cost

In determining the Past Service Cost, the Unfunded Accrued Liability is amortized as a level percent using layered 20-year bases.

		January 1, 2022
1.	Accrued Liability	
	Active Members	$1,966,222
	Terminated Members	332,276
	Service Retirees*	4,243,488
	Disabled Retirees	0
	Beneficiaries	228,691
	Total Accrued Liability	6,770,677
2.	Actuarial Value of Assets	4,204,699
3.	Unfunded Accrued Liability: (1) - (2)	2,565,978
4.	Outstanding Balance of Amortization Bases Established in Prior Years (see Section IIIB)	3,519,615
5.	New Amortization Base Established January 1, 2022: (3) - (4)	(953,637)
6.	Amortization Growth Rate	2.25%
7.	New Past Service Cost: (5) amortized over 20 years	(67,003)
8.	Past Service Cost for Bases Established in Prior Years (see Section IIIB)	277,195
9.	Total Past Service Cost: (7) + (8)	210,192

Section III - Development of Contribution
B. Past Service Costs Established in Prior Years

The amortization base established with each valuation is gradually funded over time; the amortization payment is termed the Past Service Cost. The January 1, 2014 amortization base had a 25 year period. All subsequent bases have a 20 year period.

Date Established	Original Amount	Outstanding Balance as of January 1, 2020	Amortization Payment as of January 1, 2020	Outstanding Balance as of January 1, 2022	Years Remaining as of January 1, 2022	Past Service Cost as of January 1, 2022
January 1, 2014	$2,921,763	$2,786,958	$202,391	$2,723,265	17	$213,953
January 1, 2018	517,184	491,069	37,013	476,824	16	39,125
January 1, 2020	325,164	325,164	22,812	319,526	18	24,117
January 1, 2022	(953,637)	0	0	(953,637)	20	(67,003)
Total		3,603,191	262,216	2,565,978		210,192

Section III - Development of Contribution
C. Actuarially Determined Contribution

		Fiscal Years 2020-21 and 2021-22	Fiscal Years 2022-23 and 2023-24
1.	Total Normal Cost	$57,394	$87,742
2.	Expected Member Contributions	13,464	15,552
3.	Expected Administrative Expenses	7,500	9,000
4.	Net Normal Cost: (1) - (2) + (3)	51,430	81,190
5.	Past Service Cost (see Section IIIA)	262,216	210,192
6.	Interest on (4) + (5) to beginning of first fiscal year	21,171	18,211
7.	Actuarially Determined Contribution for first FY: (4) + (5) + (6)	334,817	309,593
8.	Interest on (7) to beginning of second fiscal year	22,600	19,350
9.	Actuarially Determined Contribution for second FY: (7) + (8)	357,417	328,943

Section III - Development of Contribution
D. Long Range Forecast

This forecast is based on the results of the January 1, 2022 actuarial valuation and assumes that the City will pay the Actuarially Determined Contribution each year, the assets will return the assumed interest rate on a market value basis each year, and there are no future changes in the actuarial methods or assumptions or in the plan provisions. For purposes of this forecast the amortization period declines to 1 year to illustrate the progress of the plan towards becoming fully funded; in actual practice the amortization period will not be less than 10 years in order to shield the City from contribution volatility. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets.

	Values as of the Valuation Date					Cash Flows Projected to the Following Fiscal Year			
Valuation Date	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio	Fiscal Year	City Contributions	Member Contributions	Benefit Payments	Net Cash Flows
1/1/2022	$6,770,677	$4,204,699	$2,565,978	62.1%	2023-24	$309,593	$15,553	($385,435)	($60,289)
1/1/2023	6,858,000	4,422,000	2,436,000	64.5%	2024-25	329,000	14,000	(443,000)	(100,000)
1/1/2024	6,983,000	4,631,000	2,352,000	66.3%	2025-26	306,000	16,000	(450,000)	(128,000)
1/1/2025	7,046,000	4,811,000	2,235,000	68.3%	2026-27	325,000	15,000	(475,000)	(135,000)
1/1/2026	7,127,000	4,973,000	2,154,000	69.8%	2027-28	338,000	15,000	(485,000)	(132,000)
1/1/2027	7,191,000	5,139,000	2,052,000	71.5%	2028-29	360,000	16,000	(481,000)	(105,000)
1/1/2028	7,256,000	5,318,000	1,938,000	73.3%	2029-30	374,000	15,000	(509,000)	(120,000)
1/1/2029	7,345,000	5,535,000	1,810,000	75.4%	2030-31	398,000	16,000	(506,000)	(92,000)
1/1/2030	7,410,000	5,751,000	1,659,000	77.6%	2031-32	402,000	16,000	(519,000)	(101,000)
1/1/2031	7,499,000	6,008,000	1,491,000	80.1%	2032-33	428,000	16,000	(509,000)	(65,000)
1/1/2032	7,587,000	6,273,000	1,314,000	82.7%	2033-34	429,000	16,000	(511,000)	(66,000)
1/1/2033	7,699,000	6,590,000	1,109,000	85.6%	2034-35	455,000	16,000	(510,000)	(39,000)
1/1/2034	7,823,000	6,926,000	897,000	88.5%	2035-36	457,000	16,000	(509,000)	(36,000)
1/1/2035	7,965,000	7,312,000	653,000	91.8%	2036-37	485,000	16,000	(507,000)	(6,000)
1/1/2036	8,121,000	7,723,000	398,000	95.1%	2037-38	480,000	16,000	(502,000)	(6,000)
1/1/2037	8,298,000	8,192,000	106,000	98.7%	2038-39	510,000	16,000	(504,000)	22,000
1/1/2038	8,496,000	8,689,000	(193,000)	102.3%	2039-40	443,000	16,000	(499,000)	(40,000)
1/1/2039	8,714,000	9,246,000	(532,000)	106.1%	2040-41	471,000	16,000	(496,000)	(9,000)
1/1/2040	8,960,000	9,775,000	(815,000)	109.1%	2041-42	222,000	16,000	(508,000)	(270,000)
1/1/2041	9,232,000	10,367,000	(1,135,000)	112.3%	2042-43	236,000	15,000	(526,000)	(275,000)

Section III - Development of Contribution
E. History of Funded Status

Valuation Date	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
January 1, 2014	$2,139,179	$5,040,812	$2,901,633	42.4%
January 1, 2016	2,308,178	5,877,178	3,569,000	39.3%
January 1, 2018	2,771,076	6,210,023	3,438,947	44.6%
January 1, 2020	3,199,398	6,802,589	3,603,191	47.0%
January 1, 2022	4,204,699	6,770,677	2,565,978	62.1%

Section III - Development of Contribution
F. History of City Contributions

Fiscal Year	Actuarially Determined Contribution	Actual City Contribution	Payroll	Actual Contribution as a Percent of Payroll
2013-14	$308,987	$344,664	N/A	N/A
2014-15	303,861	365,969	N/A	N/A
2015-16	303,861	373,322	N/A	N/A
2016-17	373,322	186,661	N/A	N/A
2017-18	373,322	369,396	N/A	N/A
2018-19	365,469	365,469	N/A	N/A
2019-20	365,469	517,552	N/A	N/A
2020-21	334,817	357,417	N/A	N/A
2021-22	357,417	TBD	N/A	N/A
2022-23	309,593	TBD	N/A	N/A
2023-24	328,943	TBD	N/A	N/A

Section IV - Membership Data
A. Reconciliation of Membership from Prior Valuation

Details of the changes in the Plan membership since the last valuation are shown below. Additional details on the Plan membership are provided in the remainder of Section IV.

	Active Members	Terminated Vested Members	Due Employee Contributions	Service Retirees	Disabled Retirees	Beneficiaries	Total
Count January 1, 2020	52	4	74	45	0	8	183
Terminated							
- no benefits due	-	-	-	-	-	-	0
- paid refund	-	-	(1)	-	-	-	(1)
- contributions due	(3)	-	3	-	-	-	0
- vested benefits due	(1)	1	-	-	-	-	0
Retired	(2)	-	-	2	-	-	0
Died							
- with beneficiary	-	-	-	(1)	-	-	(1)
- no beneficiary	-	-	-	(2)	-	(2)	(4)
Benefits expired	-	-	-	-	-	-	0
New member	6	-	-	-	-	-	6
Rehired	3	(1)	(2)	-	-	-	0
New Alternate Payee	-	-	-	-	-	1	1
Correction	-	-	-	-	-	-	0
Count January 1, 2022	55	4	74	44	0	7	184

Section IV - Membership Data
B. Statistics of Active Membership

	As of January 1, 2020	As of January 1, 2022
Number of Active Members	52	55
Average Age	40.5	41.8
Average Service	12.9	13.3

Section IV - Membership Data
C. Statistics of Inactive Membership

	As of January 1, 2020	As of January 1, 2022
Terminated Vested Members		
Number	4	4
Total Annual Benefit	$23,232	$23,496
Average Annual Benefit	5,808	5,874
Average Age	48.1	49.4
Members Due Refunds		
Number	74	74
Service Retirees		
Number	45	44
Total Annual Benefit	$328,836	$351,444
Average Annual Benefit	7,307	7,987
Average Age	68.0	69.2
Disabled Retirees		
Number	0	0
Total Annual Benefit	$0	$0
Average Annual Benefit	0	0
Average Age	0.0	0.0
Beneficiaries		
Number	8	7
Total Annual Benefit	$24,255	$21,473
Average Annual Benefit	3,032	3,068
Average Age	69.3	69.4

Section IV - Membership Data
D. Distribution of Inactive Members as of January 1, 2022

	Age	Number	Annual Benefits
Terminated Vested Members	< 50	1	$5,280
	50 - 59	3	18,216
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	0	0
	Total	4	23,496
Service Retirees	< 50	0	$0
	50 - 59	6	55,440
	60 - 69	19	157,332
	70 - 79	14	92,736
	80 - 89	5	45,936
	90 +	0	0
	Total	44	351,444
Disabled Retirees	< 50	0	$0
	50 - 59	0	0
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	0	0
	Total	0	0
Beneficiaries	< 50	0	$0
	50 - 59	1	2,019
	60 - 69	1	7,776
	70 - 79	5	11,678
	80 - 89	0	0
	90 +	0	0
	Total	7	21,473

Section V - Analysis of Risk
A. Introduction

The results of this actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match these assumptions. As an example, the plan's investments may perform better or worse than assumed in any single year and over any longer time horizon. It is therefore important to consider the potential impacts of these likely differences when making decisions that may affect the future financial health of the plan, or of the plan's members.

In addition, as plans mature they accumulate larger pools of assets and liabilities. The increase in size in turn increases the potential magnitude of adverse experience. As an example, the dollar impact of a 10% investment loss on a plan with $1 billion in assets and liabilities is much greater than the dollar impact for a plan with $1 million in assets and liabilities. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the plan is today, and how mature it may become in the future.

Actuarial Standard of Practice No. 51 (ASOP 51) directs actuaries to provide pension plan sponsors with information concerning the risks associated with the plan:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

This section of the report uses the framework of ASOP 51 to communicate important information about significant risks to the plan, the plan's maturity, and relevant historical plan data.

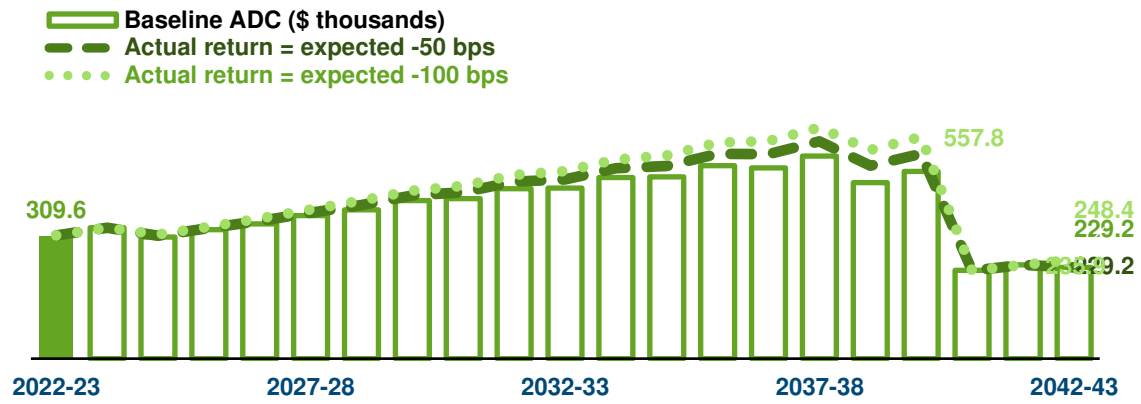
Please see Section III C for more information on the basis for the projected results shown on the following pages.

Section V - Analysis of Risk
B. Risk Identification and Assessment

Investment Risk

Definition: This is the potential that investment returns will be different than expected.

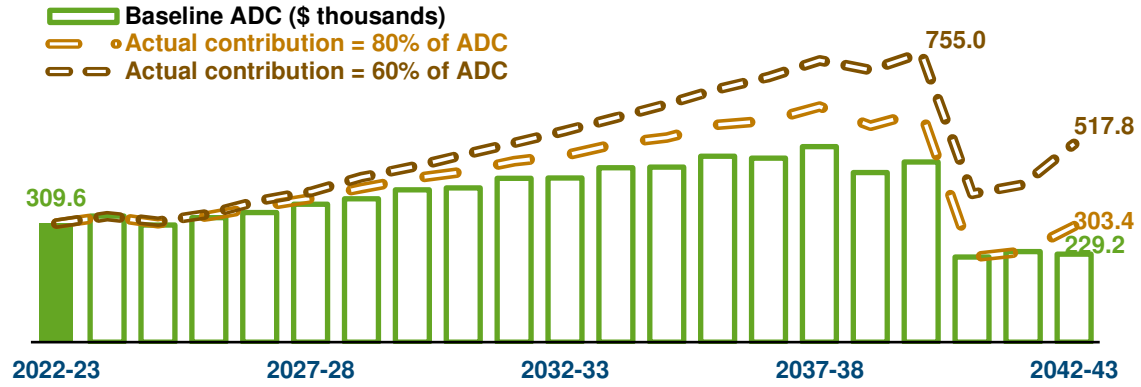
Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. The consequences of persistent underperformance on future Actuarially Determined Contribution levels are illustrated below:



Contribution Risk

Definition: This is the potential that actual future contributions will be less than the Actuarially Determined Contribution.

Identification: Over the past 8 years, actual contributions have been 105.5% of the Actuarially Determined Contribution in total. The consequences of persistent underfunding on future Actuarially Determined Contribution levels are illustrated below:



Section V - Analysis of Risk
B. Risk Identification and Assessment

Liquidity Risk

Definition: This is the potential that assets must be liquidated at a loss earlier than planned in order to pay for the plan's benefits and operating costs. This risk is heightened for plans with negative cash flows, in which contributions are not sufficient to cover benefit payments plus expenses.

Identification: In 2021, the plan had negative cash flow, with city and member contributions to the plan of $366,921 compared to $394,232 of benefit payments and administrative expenses paid out of the plan. We suggest that you consult with your investment advisors with respect to the liquidity characteristics of the plan's investment holdings.

Inflation Risk

Definition: This is the potential for a pension to lose purchasing power over time due to inflation.

Identification: The members of pension plans without fully inflation-indexed benefits are subject to the risk that their purchasing power will be reduced over time due to inflation.

Assessment: This plan does not contain a mechanism to regularly increase benefits after retirement, so members bear all of the inflation risk.

Insolvency Risk

Definition: This is the potential that a plan will become insolvent; that is, assets will be fully depleted.

Identification: If a plan becomes insolvent, contractually required benefits must be paid from the plan sponsor's other remaining assets.

Assessment: Under the GASB 68 depletion date methodology, the plan is not projected to become insolvent. Please see the GASB 68 report for more details on the underlying analysis.

Demographic Risks

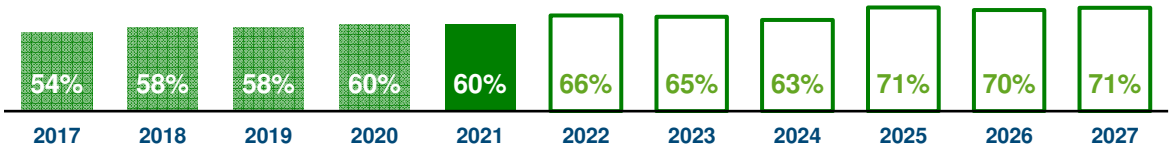
Definition: This is the potential that mortality, turnover, retirement, or other demographic experience will be different than expected.

Identification: The pension liabilities reported herein have been calculated by assuming that members will follow patterns of demographic experience as described in Appendix B. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, future pension liabilities, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. Formal Experience Studies performed on a regular basis are helpful in ensuring that the demographic assumptions reflect emerging plan experience.

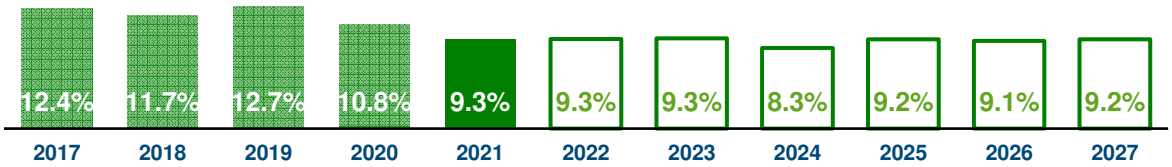
Section V - Analysis of Risk
C. Maturity Measures

The metrics presented below are different ways of understanding the plan's maturity level, both in the past and as it is expected to change in the coming years.

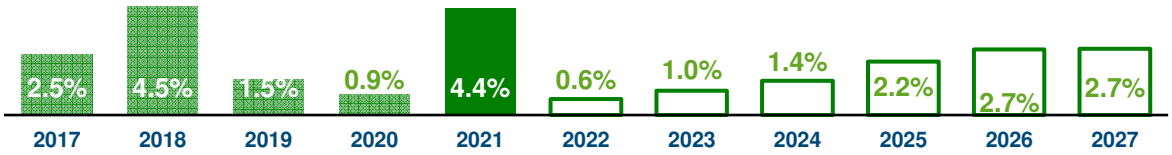
Accrued Liability for members in pay status compared to total Accrued Liability



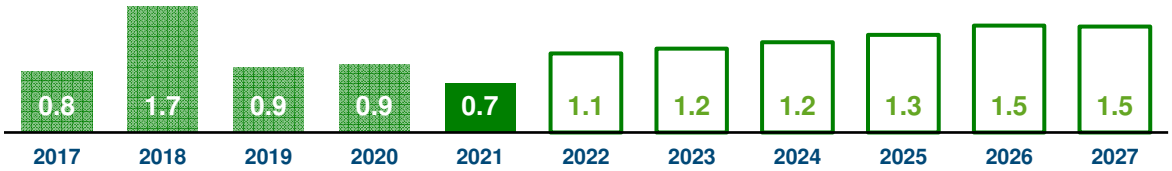
Benefit Payments compared to Market Value of Assets



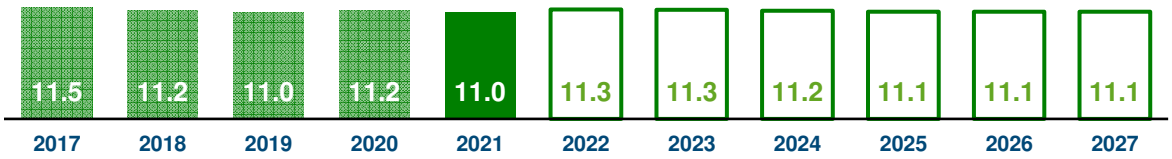
Net Cash Flows compared to Market Value of Assets



Benefit Payments compared to City Contributions



Duration of Accrued Liability (based on GASB 68 sensitivity disclosures)



Appendix A - Actuarial Funding Method

The actuarial funding method used in the valuation of this Plan is known as the Entry Age Normal Method. The Actuarially Determined Contribution consists of three pieces: Normal Cost plus a Past Service Cost payment to gradually eliminate the Unfunded Accrued Liability plus Interest to reflect the timing of the contribution relative to the valuation date.

The Normal Cost is determined by calculating the present value of future benefits for present active Members that will become payable as the result of death, disability, retirement or termination. This cost is then spread as a level percentage from entry age to termination as an Active Member. If Normal Costs had been paid at this level for all prior years, a fund would have accumulated. Because this fund represents the portion of benefits that would have been funded to date, it is termed the Accrued Liability. In fact, it is calculated by adding the present value of benefits for Retired Members and Terminated Vested Members to the present value of benefits for Active Members and subtracting the present value of future Normal Cost contributions.

The funding cost of the Plan is derived by making certain specific assumptions as to rates of interest, mortality, turnover, etc. which are assumed to hold for many years into the future. Since actual experience may differ somewhat from the assumptions, the costs determined by the valuation must be regarded as estimates of the true costs of the Plan.

The Unfunded Accrued Liability is the excess of the Accrued Liability over the assets which have been accumulated for the plan. This Unfunded Accrued Liability is amortized using layered 20-year bases as a level percent.

Plan assets are valued at market value.

The long-range forecasts included in this report have been developed by assuming that members will terminate, retire, become disabled, and die according to the actuarial assumptions with respect to these causes of decrement, and that pay increases, cost of living adjustments, and so forth will likewise occur according to the actuarial assumptions. Members who are projected to leave active service are assumed to be replaced by new active members with the same age, service, gender, and pay characteristics as those hired in the past few years.

Appendix B - Actuarial Assumptions

Each of the assumptions used in this valuation was set based on industry standard published tables and data, the particular characteristics of the plan, relevant information from the plan sponsor or other sources about future expectations, and our professional judgment regarding future plan experience. We believe the assumptions are reasonable for the contingencies they are measuring, and are not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Interest Rate

6.25% (prior: 6.75%)

Inflation

2.25% (prior: 2.75%)

Amortization Growth Rate

2.25% (prior: 2.75%)

Expenses

Average of prior 2 years' administrative expenses, increased by 3% and rounded to nearest $100

Mortality

PubS-2010 Mortality Table with generational projection per the MP-2019 Ultimate Scale, with employee rates before benefit commencement and healthy or disabled annuitant rates after benefit commencement. This assumption includes a margin for future improvements in longevity beyond the valuation date.

Turnover

Age	Rate
25	5.00%
35	2.50%
45	0.75%
55	0.00%

Retirement

100% at Normal Retirement Date

Disability

Age	Male	Female
25	0.038%	0.047%
35	0.069%	0.136%
45	0.202%	0.303%
55	0.722%	0.952%

Marital Status

80% of members are assumed to be married with female spouses 3 years younger than the male spouses.

Appendix C - Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan. It is not intended to be, nor should it be interpreted as a complete statement of all plan provisions. All eligibility requirements and benefit amounts shall be determined in strict accordance with the plan document itself. To the extent that this summary does not accurately reflect the plan provisions, then the results of this valuation may not be accurate.

Eligibility	Volunteers become eligible on the first of the year after completing 12 months of continuous service.
Member's Contributions	$288 per year (prior: $264 per year). Contributions cease after 30 years of service (40 years of service for employees hired before January 1, 2015).
Credited Service	At the end of each plan year, a Volunteer earns a year of Credited Service if he or she completes the Emergency Call Requirement and Training Requirement for the department during the preceding calendar year and makes the required employee contribution. Emergency Call Requirement: The lesser of 20% of the department's emergency calls or 150 emergency calls. Training Requirement: The lesser of 20% of the department's training sessions and drills or 20 hours of training and drills.
Normal Retirement Date	Age 55 with 20 years of Credited Service for Members hired prior to January 1, 2015. Age 55 with 25 years of Credited Service for Members hired after January 1, 2015.
Normal Retirement Benefit	$24.00 per month (prior: $22.00 per month) multiplied by years of Credited Service. Credited Service is limited to 30 years for employees hired after January 1, 2015 and 40 years for employees hired prior to January 1, 2015.
Deferred Retirement	Members may commence receiving retirement benefits and remain an active Volunteer after Normal Retirement Date. Benefits are adjusted annually to reflect additional years of Credited Service earned after Normal Retirement benefits commence.
Normal Form of Annuity	90% Joint and Survivor Annuity.
Disability Eligibility	Total and pemanent disability in the line of duty.
Disability Benefit	$24.00 per month (prior: $22.00 per month) multiplied by 30 years of Credited Service (40 years for employees hired prior to January 1, 2015).

Appendix C - Summary of Plan Provisions

Pre-Retirement Termination	Refund of employee contributions with interest at 3.0%.
Pre-Retirement Death Benefit	$660 per month to the surviving spouse. A refund of employee contributions with interest is payable if there is no surviving spouse.

Appendix D - Glossary

Actuarial Cost Method - This is a procedure for determining the Actuarial Present Value of Benefits and allocating it to time periods to produce the Actuarial Accrued Liability and the Normal Cost.

Accrued Liability - This is the portion of the Actuarial Present Value of Benefits attributable to periods prior to the valuation date by the Actuarial Cost Method (i.e., that portion not provided by future Normal Costs).

Actuarial Assumptions - With any valuation of future benefits, assumptions of anticipated future events are required. If actual events differ from the assumptions made, the actual cost of the plan will vary as well. Some examples of key assumptions include the interest rate, salary scale, and rates of mortality, turnover and retirement.

Actuarial Present Value of Benefits - This is the present value, as of the valuation date, of future payments for benefits and expenses under the Plan, where each payment is: a) multiplied by the probability of the event occurring on which the payment is conditioned, such as the probability of survival, death, disability, termination of employment, etc.; and b) discounted at the assumed interest rate.

Actuarial Value of Assets - This is the value of cash, investments and other property belonging to the plan, typically adjusted to recognize investment gains or losses over a period of years to dampen the impact of market volatility on the Actuarially Determined Contribution.

Actuarially Determined Contribution ("ADC") - This is the employer's periodic contributions to a defined benefit plan, calculated in accordance with actuarial standards of practice.

Attribution Period - The period of an employee's service to which the expected benefit obligation for that employee is assigned. The beginning of the attribution period is the employee's date of hire and costs are spread across all employment.

Interest Rate - This is the long-term expected rate of return on any investments set aside to pay for the benefits. In a financial reporting context (e.g., GASB 68) this is termed the Discount Rate.

Normal Cost - This is the portion of the Actuarial Present Value of Benefits allocated to a valuation year by the Actuarial Cost Method.

Past Service Cost - This is a catch-up payment to fund the Unfunded Accrued Liability over time (generally 10 to 30 years). A closed amortization period is a specific number of years counted from one date and reducing to zero with the passage of time; an open amortization period is one that begins again or is recalculated at each valuation date. Also known as the Amortization Payment.

Return on Plan Assets - This is the actual investment return on plan assets during the fiscal year.

Unfunded Accrued Liability - This is the excess of the Accrued Liability over the Actuarial Value of Assets.