

MILLIMAN ACTUARIAL VALUATION

City of Aurora General Employees' Retirement Plan

January 1, 2023 Actuarial Valuation

June 2023

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June 14, 2023

Board of Trustees
City of Aurora General Employees' Retirement Plan
12100 E. Iliff Avenue, Suite 108
Aurora, Colorado 80014

Dear Members of the Board:

As requested, we have performed an annual actuarial valuation of the City of Aurora General Employees' Retirement Plan as of January 1, 2023, for the plan year ending December 31, 2023. Our findings are set forth in this report. This report reflects the benefit provision and contribution rates in effect as of January 1, 2023.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the Plan's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different, and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the Plan have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the City and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the City. Further, in our opinion, each actuarial assumption and method used is reasonably related to the experience of the Plan and to reasonable expectations which, in combination, represent our best estimate of anticipated experience under the Plan, and meet the parameters set by Actuarial Standards of Practice.

This valuation report is only an estimate of the Plan's financial condition as of a single date. It can neither predict the Plan's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of Plan benefits, only the timing of Plan contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the Plan's funded ratio); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and has adopted them.

Actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the Plan. Actuarial computations under GASB Statements No. 67 and No. 68 are for purposes of fulfilling financial accounting requirements. The calculations in the enclosed report have been made on a basis consistent with our understanding of the Plan's funding requirements and goals, and of GASB

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Statements No. 67 and 68. Results under GASB Statements No. 67 and 68 are not included in this report, but this report will be the basis for determining these disclosures for the Measurement Period ending December 31, 2023 and the Employer Reporting Period ending December 31, 2024. The calculations in this report have been made on a basis consistent with our understanding of the plan provisions described in Appendix A of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

The valuation results were developed using models intended for valuations that use standard actuarial techniques. The intent of the models is to estimate future plan costs. We have reviewed the models, including their inputs, calculations, and outputs for consistency, reasonableness, and appropriateness to the intended purpose and in the compliance with generally accepted actuarial practice and relevant actuarial standards of practice.

Milliman's work is prepared solely for the internal business use of the City of Aurora General Employees' Retirement Plan ("Plan"). To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third-party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exception(s):

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- (b) The Plan may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third-party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

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

The signing actuary is independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, I hereby certify that, to the best of my knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the *Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* published by the American Academy of Actuaries. I am a member of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Sincerely,

A handwritten signature in blue ink that reads "Joel E. Stewart".

Joel E. Stewart, FSA, EA, MAAA
Principal and Consulting Actuary
JES:fm

Milliman

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Executive Summary

January 1, 2023 Actuarial Valuation

City of Aurora General Employees' Retirement Plan

This work product was prepared solely for the City of Aurora for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Overview

Actuarial Valuation For Plan Year Beginning		
	January 1, 2022	January 1, 2023
Assets		
Market Value of Plan Assets	\$ 673,636,548	\$ 579,063,885
Actuarial Value of Plan Assets	\$ 615,781,429	\$ 638,280,703
Ratio of Actuarial Value to Market Value	91.4%	110.2%
Return on Market Value of Plan Assets	19.7%	-11.8%
Liabilities		
Actuarial Present Value of Future Benefits	\$ 731,310,652	\$ 777,470,697
Actuarial Liability	\$ 628,618,281	\$ 669,516,926
Assumed Average Annual Long-Term Future Investment Return (Discount Rate)	7.00%	7.00%
Unfunded Actuarial Liability (UAL) Relative to:		
Market Value of Plan Assets	\$ (45,018,267)	\$ 90,453,041
Actuarial Value of Plan Assets	\$ 12,836,852	\$ 31,236,223
Funded Ratio Relative to:		
Market Value of Plan Assets	107.2%	86.5%
Actuarial Value of Plan Assets	98.0%	95.3%
Contribution Rates		
Total Normal Cost Rate	11.27%	11.09%
Employee Contribution Rate	7.00%	7.00%
Normal Cost Rate (Employer Portion)	4.27%	4.09%
UAL Rate	0.61%	1.49%
Employer Portion of the Actuarially Determined Contribution Rate	4.88%	5.58%
Employer Contribution Rate	7.00%	7.00%
Participant Data		
Active Participants	1,814	1,831
Retired Participants and Beneficiaries	1,240	1,296
Vested Terminated Participants	267	304
Total Participants	3,321	3,431

The Actuarial Present Value of Future Benefits includes the effects of projected future service and pay increases for current active participants, stated in present value terms using the plan's investment return assumption as the discount rate. The Actuarial Accrued Liability is the portion of that amount that is allocated to service already completed as of the valuation date by participants.

Purpose of this Report

This report has been prepared for the City of Aurora General Employees' Retirement Plan as of January 1, 2023 to:

1. Review the experience for the plan year ending December 31, 2022. "Experience" encompasses the performance of the plan's assets during the year and changes in plan participant demographics that impact liabilities.
2. Determine the plan's funded ratio.
3. Calculate the employer portion of the Actuarially Determined Contribution (ADC) for the plan year ending December 31, 2023 in accordance with the actuarial methods and funding policy as adopted by the Board of Trustees and outlined in City Code.
4. Provide the basis for later financial reporting under Governmental Accounting Standards Board (GASB) Statements Nos. 67 and 68.

Plan Provisions

The valuation reflects our understanding of the plan provisions in effect as of January 1, 2023. There have not been any plan changes since the last valuation.

The Board granted a discretionary cost of living increase for the Base Benefit for Tier 2 Participants effective January 1, 2023 equal to 5.00%. This change increased the calculated Actuarial Liability by approximately \$79,000. This liability increase is the effect of a single year's cost of living increase for the current retired population. Please see page 4 of this report for quantification of the effect recurring annual increases would have on key actuarial measurements.

Please see Appendix A for a detailed summary of plan provisions.

Actuarial Methods and Assumptions

The methods and assumptions used in this valuation are detailed in Appendix B. The Board of Trustees reviewed and adopted the use of the assumptions for the January 1, 2023 actuarial valuation at their April 2023 meeting. The assumptions are based on the 2019 Experience Study report dated February 17, 2020. There have been no assumption changes since the prior valuation.

Plan Experience

Actuarial gains or losses arise when actual experience differs from actuarial assumptions used in the valuation. During the year ending December 31, 2022, the Plan experienced an overall actuarial loss of approximately \$21.6 million. The actuarial loss can be broken down as follows.

Source of (Gain) or Loss	Amount in Millions
Investment experience	\$ 3.8
Demographic experience	<u>17.8</u>
Total (gain)/loss	\$ 21.6

The market value of assets returned -11.8% during 2022, which is 18.8% less than the prior valuation's return assumption of 7.0% resulting in an actuarial investment experience loss of \$125.0 million on a market value of assets basis. Under the smoothed actuarial value of assets basis used to calculate the actuarially determined contribution rate, the Plan defers two-thirds of this market value basis loss while recognizing an additional one-third of the 2021 market value basis gain of \$72.3 million, resulting in a net actuarial investment loss of \$3.8 million on a smoothed actuarial value of assets basis for the 2022 plan year.

The demographic experience was primarily due to the 2023 Cost of Living Adjustment (COLA) higher than expected (5.0% compared to expected of 2.5%) and salary increases for 2022 that were higher than expected, on average. Table 6 contains additional detail on the changes in the unfunded actuarial liability from January 1, 2022 to January 1, 2023.

Funding Analysis

Table 8 provides the detail on the calculation of the employer portion of the Actuarially Determined Contribution (ADC) to the Plan based on the January 1, 2023 actuarial valuation and the funding policy described in the City Code. The ADC is calculated with each year's actuarial valuation.

Beginning in 2017, employees contribute 7.00% of pay. Per the current City Code, employee contribution rates beyond 2017 may increase or decrease 0.25% of pay each year depending upon the funded ratio, but in no case would increase above 7.00% or decrease below 5.50%. Per the City Code, rate changes are based on a decision flowchart which increases rates (if permitted) when the funded ratio is less than 100% and decreases rates (if permitted) when the funded ratio is greater than 110%. One component used in determining the decision flowchart is the ADC. The City's current funding policy is to contribute the same rate of pay as employees.

The ADC calculated based on methodology adopted by the Board of Trustees consists of a rate related to amortization of the unfunded actuarial liability (UAL) and the normal cost rate calculated under the Entry Age Normal actuarial cost method. The normal cost rate includes a component for anticipated administrative expenses to be paid from plan assets.

The UAL-related portion of the ADC rate is determined via an open (i.e., rolling) 20-year level percent of projected payroll amortization calculation. Please note that under the assumptions used in this valuation, the rate so calculated pays approximately 98% of the interest on the UAL for 2023. If only the ADC was contributed, the contribution would not amortize any of the UAL's "principal". The normal cost component of the ADC should, when measured as a dollar amount, increase over time as the payroll for the active population increases (the normal cost is calculated as a level percentage of projected payroll).

An open 20-year level percent of projected payroll amortization that does not entail negative amortization falls under the "acceptable practices, with conditions" category in a report on public sector pension plan funding policy, as published by the Conference of Consulting Actuaries. The conditions include:

- The open period should apply to gain/loss UAL only; other sources of UAL such as assumption changes and plan amendments should be amortized over model fixed periods,
- Using a separate, fixed layer for extraordinary gain/loss events, and
- Demonstrating that policy objectives are being achieved.

Per current City Code, the ADC is only used to determine potential contribution rate increases, which are currently at the ceiling rate of 7.00% under the policy, and the Board follows the third condition above by

evaluating both the ADC and long-term funding projections of the Plan annually. Two amortization-policy considerations for the Board moving forward could be:

- Amortize plan amendments over a shorter, fixed period of ten years, and
- Amortize any surplus over an open 30-year period.

Table 14 provides a 30-year projection of employee and City contributions, as well as the funded ratio of the plan and the total normal cost rate. This projection assumes an open population with plan payroll that grows at 3.25% annually, market value asset returns of 7.00% in all future years, and both employees and the City each contributing 7.00% of payroll in all future years.

As shown in Table 14, if all future experience follows assumptions, there are no changes to assumptions, plan provisions or funding policy, and the 7.00% City and employee contributions are made each year, the Plan's funded ratio is expected to improve over the projection period once the 2022 loss has been fully recognized in the actuarial value of assets. That improvement is due to the normal cost rate decreasing over most of the projection period as new hire Tier 2 members replace departing Tier 1 members while the total contribution rate as a percent of payroll remains constant. As discussed further below, that projection assumes no future ad hoc COLAs are granted to Tier 2 members.

Evaluation of an Automatic COLA for Tier 2 Base Benefits

As disclosed in Appendix B, this valuation does **not** include the projected value of potential future ad hoc cost-of-living adjustments (COLAs) for Tier 2 base benefits in the calculation of the Actuarial Liability and Normal Cost. It is our understanding that Tier 2 base benefits for retirees have been provided the same percentage increase as the automatic COLA provided to Tier 1 base benefits each of the last five years. The following table illustrates the impact on key actuarial measurements of valuing recurring future annual COLAs on the base benefits of current and future Tier 2 retirees.

Assumed Future Tier 2 COLAs (Base Benefits)	0.00%	1.25%	2.50%
Unfunded Actuarial Liability (millions)	\$31.2	\$37.9	\$45.8
Funded Ratio (Actuarial Value of Assets)	95.3%	94.4%	93.3%
Total Normal Cost Rate (including expenses)	11.09%	11.77%	12.61%
Tier 2 Normal Cost Rate (including expenses)	10.70%	11.68%	12.87%
Employer portion of the ADC (as a % of pay)	5.58%	6.22%	7.83%

Over time the Plan's Normal Cost Rate will trend towards the Tier 2 rate, as Tier 1 employees retire and are replaced with new hire Tier 2 members. When the Plan is 100% funded, the difference between the total contribution rate and the Normal Cost Rate provides a "margin" for adverse future experience.

Risk Assessment and Disclosure

Appendix D contains a risk assessment and disclosure summary, as required by Actuarial Standard of Practice No. 51 (ASOP 51). This appendix uses the framework of ASOP 51 to communicate important information about significant risks to the Plan and the Plan's maturity.

Valuation Results

Table 1

STATEMENT OF PLAN NET ASSETS

	December 31, 2021	December 31, 2022
Cash and Cash Equivalents	\$ 124,027	\$ 153,568
Receivables		
Contributions	\$ 715,692	\$ 755,863
Interest and dividends	706,465	706,003
Securities sold	939,514	68,087
Other	<u>14,647</u>	<u>22,661</u>
Total receivables	\$ 2,376,318	\$ 1,552,614
Prepaid Expenses	\$ 38,518	\$ 48,453
Investments		
Short-term cash investments	\$ 13,409,023	\$ 10,359,496
Equity securities and funds	284,035,487	235,181,127
U.S. government and agency obligations	11,585,657	15,009,741
Corporate bonds and funds	140,544,037	106,298,864
Real estate funds	52,753,799	58,838,316
Alternative investments	<u>169,889,352</u>	<u>152,321,774</u>
Total Investments	\$ 672,217,355	\$ 578,009,318
Leased Assets		
Office lease		\$ 178,704
Accumulated amortization leased assets		<u>(82,478)</u>
Net leased assets		\$ 96,226
Liabilities		
Accounts payable and accrued expenses	\$ 214,434	\$ 233,012
Benefits and refunds payable	371,857	119,295
Securities purchased	533,379	344,687
Leased liability	<u></u>	<u>99,300</u>
Total Liabilities	\$ 1,119,670	\$ 796,294
Plan Net Assets	\$ 673,636,548	\$ 579,063,885

Table 2

STATEMENT OF CHANGES IN PLAN NET ASSETS

	2021	2022
Net market value at beginning of year	\$ 576,750,526	\$ 673,636,548
Beginning of Year Audit Adjustment	\$ 0	\$ (2,233)
Additions:		
Contributions:		
Plan member contributions	\$ 8,732,412	\$ 9,394,498
City of Aurora contributions	<u>8,732,379</u>	<u>9,393,456</u>
Total contributions	\$ 17,464,791	\$ 18,787,954
Investment Income		
Net appreciation/(depreciation)	\$ 102,310,979	\$ (83,098,660)
Interest	2,041,760	2,247,318
Dividends	10,208,406	5,029,934
Less investment expenses	<u>(2,459,915)</u>	<u>(2,537,245)</u>
Total	\$ 112,101,230	\$ (78,358,653)
Other income	\$ 5,104	\$ 3,531
Total additions	\$ 129,571,125	\$ (59,567,168)
Deductions:		
Benefit payments	\$ 29,667,046	\$ 31,617,329
Contribution refunds	2,463,308	2,774,106
Administrative and miscellaneous expenses	<u>554,749</u>	<u>611,827</u>
Total	\$ 32,685,103	\$ 35,003,262
Net change:	\$ 96,886,022	\$ (94,570,430)
Net market value at end of year	\$ 673,636,548	\$ 579,063,885

Table 3

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

For funding purposes, the Plan's asset valuation method recognizes investment gains and losses over a three-year period. The resulting Actuarial Value of Assets may not be less than 80% or more than 120% of the Market Value of Assets. The Actuarial Value of Assets as of January 1, 2023 is determined below.

Asset Reconciliation							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Market Value	Contributions				Actual	Market Value
	of Assets	(City and	Benefit	Administrative	Cash Flow	Investment	of Assets
	Beginning	Employee)	Payments	Expenses	(2)+(3)+(4)	Income	End of Year
Year	of Year						(1)+(5)+(6)
2022	\$673,636,548	\$18,787,954	\$(34,391,435)	\$(611,827)	\$(16,215,308)	\$(78,357,355)	\$579,063,885
2021	576,750,526	17,464,791	(32,130,354)	(554,749)	(15,220,312)	112,106,334	673,636,548
2020	524,036,473	16,862,206	(28,912,900)	(535,115)	(12,585,809)	65,299,862	576,750,526

Gain/(Loss) Calculation				
Year	Actual Investment Rate of Return	Actual Investment Return	Expected Investment Return	Difference between Actual and Expected
2022	-11.8%	\$(78,357,355)	\$46,596,621	\$ (124,953,976)
2021	19.7%	112,106,334	39,848,836	72,257,498
2020	12.6%	65,299,862	36,249,500	29,050,362

Asset Gain/(Loss) Deferred for Systematic Recognition in Subsequent Years

66⅔% of 2022 Gain/(Loss)	\$ (83,302,651)
33⅓% of 2021 Gain/(Loss)	<u>24,085,833</u>
	\$ (59,216,818)

Actuarial Value of Assets

1. Market value as of January 1, 2023	\$ 579,063,885
2. Prior gains/(losses) deferred	<u>(59,216,818)</u>
3. Preliminary Actuarial Value of Assets (1. - 2.)	\$ 638,280,703
4. Preliminary Actuarial Value of Assets as a Percentage of Market Value (3. ÷ 1.)	110.2%
5. Actuarial Value of Assets as of January 1, 2023 (3., limited to 80% - 120% of Market Value))	\$ 638,280,703

Table 4

ACTUARIAL BALANCE SHEET

Requirements

Present Value of Projected Benefits	Tier 1	Tier 2	Total
Retired Members			
Healthy Retirees	\$ 389,945,307	\$ 1,719,179	\$ 391,664,486
Disabled Retirees	5,729,760	60,915	5,790,675
Beneficiaries	19,333,779	77,764	19,411,543
Total	\$ 415,008,846	\$ 1,857,858	\$ 416,866,704
Vested Inactive Members			
Terminated Vested	\$ 20,130,093	\$ 3,035,287	\$ 23,165,380
Deferred Disabled	1,680,555	232,671	1,913,226
Total	\$ 21,810,648	\$ 3,267,958	\$ 25,078,606
Active Members			
Retirement	\$ 189,133,465	\$ 102,694,279	\$ 291,827,744
Withdrawal	7,352,262	22,200,287	29,552,549
Death	2,104,047	1,842,326	3,946,373
Disability	4,745,326	5,453,395	10,198,721
Total	\$ 203,335,100	\$ 132,190,287	\$ 335,525,387
Total Present Value of Projected Benefits	\$ 640,154,594	\$ 137,316,103	\$ 777,470,697

Resources

Actuarial Value of Assets	\$ 638,280,703
Present Value of Future Normal Costs	107,953,771
Unfunded Actuarial Liability	31,236,223
Total	\$ 777,470,697

Table 5

UNFUNDED ACTUARIAL LIABILITY (UAL)

Actuarial Liability	Tier 1	Tier 2	Total
Retired Members	\$ 415,008,846	\$ 1,857,858	\$ 416,866,704
Vested Inactive Members	21,810,648	3,267,958	25,078,606
Active Members	<u>173,968,359</u>	<u>53,603,257</u>	<u>227,571,616</u>
Total	\$ 610,787,853	\$ 58,729,073	\$ 669,516,926
Actuarial Value of Assets			\$ 638,280,703
Unfunded Actuarial Liability			\$ 31,236,223

Table 6

ANALYSIS OF EXPERIENCE (GAINS) AND LOSSES

Expected Unfunded Actuarial Liability

Unfunded Actuarial Liability as of January 1, 2022	\$ 12,836,852
Normal Cost (mid-year), including actual administrative expenses	14,716,281
Employee and Employer Contributions	(18,787,954)
Interest at 7.0% (assumption for prior year)	<u>758,481</u>
Expected Unfunded Actuarial Liability as of January 1, 2023	\$ 9,523,660

Changes

Investment ¹ (Gain)/Loss on an Actuarial Value of Assets Basis		3,832,181
Demographic Experience (Gain)/Loss		
Salary (Gain)/Loss	\$ 8,083,731	
New Entrant Participants Loss	1,010,135	
Retirement (Gain)/Loss	198,664	
Pensioner Mortality (Gain)/Loss	(811,876)	
Tier 1 Cost of Living Adjustment (Below)/Above Assumed	9,302,044	
All Other Demographic Experience	<u>19,108</u>	
Total Demographic Experience (Gain)/Loss		17,801,806
Assumption Changes		0
Tier 2 COLA ²		78,576
Plan Changes		<u>0</u>
Unfunded Actuarial Liability on January 1, 2023		\$ 31,236,223

¹ The investment (gain)/loss is based on the return on the Actuarial Value of Assets, which recognizes market value returns in any given year that are different than the valuation's investment return assumption systematically over a three year period.

² Tier 2 retirees received a cost of living increase on the Base Benefit effective January 1, 2023 equal to 5.0%. City Code allows the Board to grant a discretionary cost of living increase for the Base Benefit for Tier 2 retirees.

Table 7

NORMAL COST

Entry Age Normal Cost	Tier 1	Tier 2	Total
Retirement	\$ 3,231,829	\$ 6,849,216	\$ 10,081,045
Vested Withdrawal	1,161,256	2,330,291	3,491,547
Death	57,640	129,218	186,858
Disability	174,591	446,113	620,704
Total Normal Cost for Benefits	\$ 4,625,316	\$ 9,754,838	\$ 14,380,154
Interest to Mid-Year			494,793
Assumed Administrative Expenses (mid-year)			585,000
Total Normal Cost			\$ 15,459,947
As a Percentage of Valuation Salary*			11.09%

* Payroll for employees less than the assumed full retirement age (age 70) as of the valuation date.

Table 8

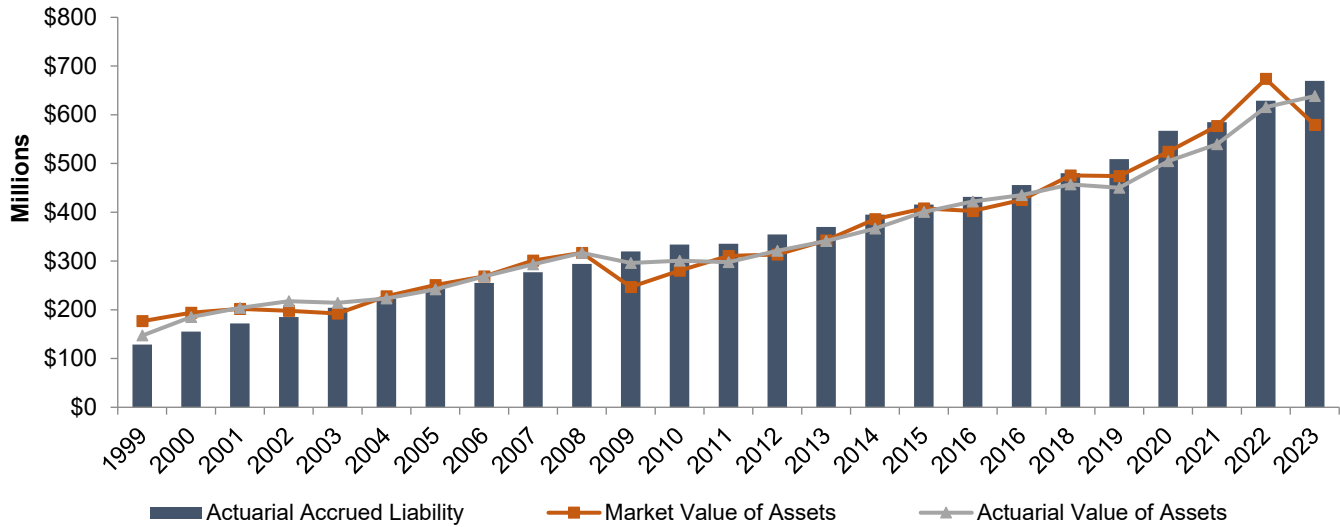
DEVELOPMENT OF EMPLOYER PORTION OF THE ACTUARIALLY DETERMINED CONTRIBUTION

	January 1, 2022	January 1, 2023
1. Present Value of Projected Benefits	\$ 731,310,652	\$ 777,470,697
2. Present Value of Future Normal Costs	<u>102,692,371</u>	<u>107,953,771</u>
3. Entry Age Normal Accrued Liability [(1) – (2)]	\$ 628,618,281	\$ 669,516,926
4. Actuarial Value of Assets	<u>615,781,429</u>	<u>638,280,703</u>
5. Unfunded Actuarial Liability (UAL): [(3) – (4)]	\$ 12,836,852	\$ 31,236,223
6. Amortization Period for UAL	20 years	20 years
7. Entry Age Normal Cost (mid-year)	\$ 14,689,454	\$ 15,459,947
8. Amortization of UAL (mid-year)	<u>912,347</u>	<u>2,220,036</u>
9. Total Cost: [(7)+(8)]	\$ 15,601,801	\$ 17,679,983
10. Anticipated Employee Contributions	<u>(9,193,544)</u>	<u>(9,839,546)</u>
11. Employer Portion of the Actuarially Determined Contribution: [(9)+(10)]	\$ 6,408,257	\$ 7,840,437
12. Anticipated Total Payroll	\$ 131,336,348	\$ 140,564,949
13. Employer Portion of the Actuarially Determined Contribution as a Percent of Anticipated Total Payroll	4.88%	5.58%

Historical Information and Projections

Table 9

HISTORICAL FUNDING PROGRESS PLAN ASSETS VS. ACTUARIAL ACCRUED LIABILITY



Jan. 1,	(A) Market Value of Assets (MVA)	(B) Actuarial Value of Assets (AVA)	(C) Actuarial Liability	(C) - (A) MVA Funding (Surplus)/ Shortfall	(A) / (C) MVA Funded Ratio	(C) - (B) AVA Funding (Surplus)/ Shortfall	(B) / (C) AVA Funded Ratio
1999	\$176,771,147	\$147,257,777	\$128,684,022	\$(48,087,125)	137%	\$(18,573,755)	114%
2000	193,982,980	185,264,480	155,169,044	(38,813,936)	125	(30,095,436)	119
2001	201,890,615	203,862,059	172,005,869	(29,884,746)	117	(31,856,190)	119
2002	198,007,236	217,476,110	184,999,951	(13,007,285)	107	(32,476,159)	118
2003	192,230,162	214,320,251	203,999,260	11,769,098	94	(10,320,991)	105
2004	227,797,938	223,140,793	223,126,549	(4,671,389)	102	(14,244)	100
2005	250,609,598	241,818,542	243,234,592	(7,375,006)	103	1,416,050	99
2006	268,374,886	268,566,265	255,005,107	(13,369,779)	105	(13,561,158)	105
2007	300,988,913	292,889,736	277,052,492	(23,936,421)	109	(15,837,244)	106
2008	316,737,760	316,567,579	294,142,225	(22,595,535)	108	(22,425,354)	108
2009	246,684,838	296,021,806	319,750,886	73,066,048	77	23,729,080	93
2010	280,221,050	300,704,227	333,831,950	53,610,900	84	33,127,723	90
2011	310,556,618	297,494,555	335,310,191	24,753,573	93	37,815,636	89
2012	313,281,809	320,996,231	354,416,941	41,135,132	88	33,420,710	91
2013	342,120,905	340,856,093	369,696,290	27,575,385	93	28,840,197	92
2014	385,882,442	366,577,369	395,063,666	9,181,224	98	28,486,297	93
2015	407,945,659	400,748,065	415,852,539	7,906,880	98	15,104,474	96
2016	402,516,572	422,124,860	431,659,846	29,143,274	93	9,534,986	98
2017	425,231,226	435,153,161	455,759,906	30,528,680	93	20,606,745	95
2018	475,556,466	457,124,471	479,969,556	4,413,090	99	22,845,085	95
2019	450,368,075	474,289,088	508,917,257	58,549,182	89	34,628,169	93
2020	524,036,473	504,806,469	567,006,106	42,969,633	92	62,199,637	89
2021	576,750,526	539,466,232	584,677,921	7,927,395	99	45,211,689	92
2022	673,636,548	615,781,429	628,618,281	(45,018,267)	107	12,836,852	98
2023	579,063,885	638,280,703	669,516,926	90,453,041	86	31,236,223	95

January 1, 2023 Actuarial Valuation

City of Aurora General Employees' Retirement Plan

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This work product was prepared solely for the City of Aurora for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 10

ANALYSIS OF EXPERIENCE (GAINS) AND LOSSES (HISTORICAL)

Plan Year Ending	Actuarial (Gains)/Losses			Changes in Plan Provisions	Changes in Assumption/Methods	Total (Gain)/Loss
	Asset Sources	Liability Sources	Total			
December 31, 2010	23,485,448	(8,080,563)	15,404,885	0	(15,247,082)*	157,803
December 31, 2011	(4,483,174)	(5,162,188)	(9,645,362)	0	975,975*	(8,669,387)
December 31, 2012	(1,064,320)	(6,771,318)	(7,835,638)	0	0	(7,835,638)
December 31, 2013	(5,791,149)	(5,712,203)	(11,503,352)	0	8,841,210*	(2,662,142)
December 31, 2014	(12,639,488)	(1,020,194)	(13,659,682)	0	0	(13,659,682)
December 31, 2015	1,452,303	(6,389,686)	(4,937,383)	0	956,983	(3,980,400)
December 31, 2016	11,641,132	(5,754,735)	5,886,397	0	6,996,522	12,882,919
December 31, 2017	1,207,709	2,378,124	3,585,833	(83,708)	0	3,502,125
December 31, 2018	6,124,973	7,094,194	13,219,167	4,302	0	13,223,469
December 31, 2019	(8,866,867)	1,705,597	(7,161,270)	3,639	36,085,838	28,928,207
December 31, 2020	(12,342,172)	(4,018,060)	(16,360,232)	(1,825,024)	0	(18,185,256)
December 31, 2021	(54,296,574)	22,580,265	(31,716,309)	54,421	0	(31,661,888)
December 31, 2022	3,832,181	17,801,806	21,633,987	78,576	0	21,712,563

Values for plan year ending December 31, 2015 and earlier as reported by the prior actuary.

* Net "non-recurring" changes. Prior actuary's report did not delineate between plan and assumption/method changes.

Table 11

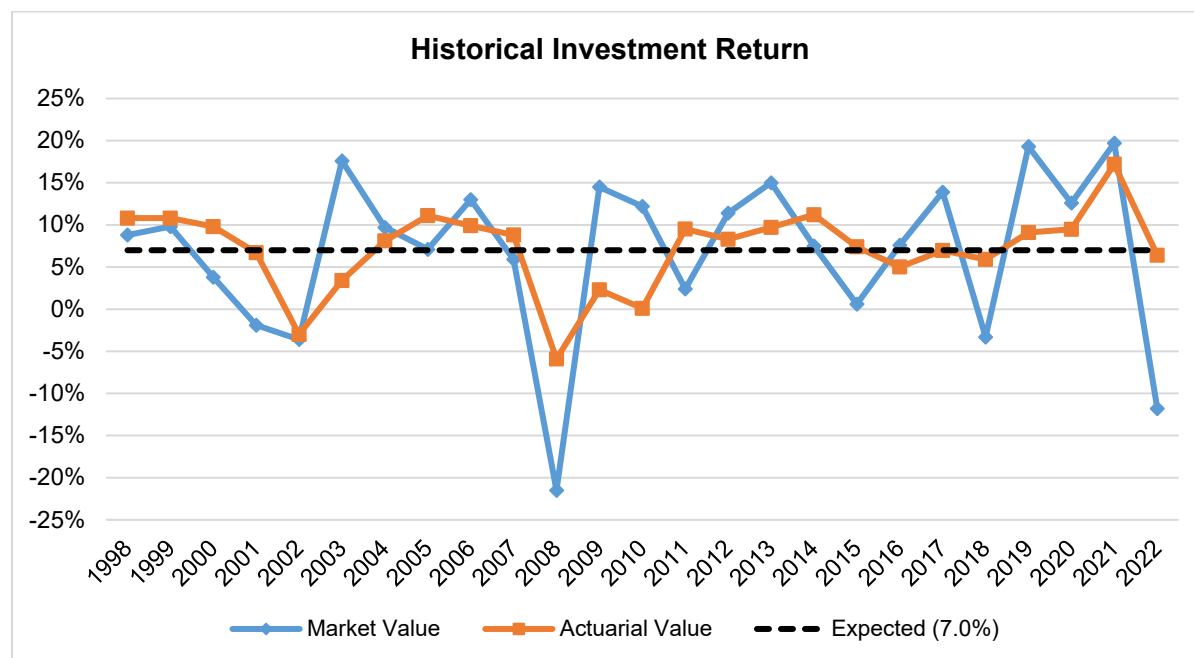
SOLVENCY TEST

Valuation Date	Actuarial Accrued Liabilities for:			Valuation Assets	Portion of Accrued Liabilities Covered by Valuation Assets		
	(1) Active Member Contributions	(2) Inactive Members	(3) Active Members		(1)	(2)	(3)
January 1, 2000	38,805,144	49,290,698	67,073,202	185,264,480	100%	100%	100%
January 1, 2001	41,631,805	56,856,612	73,517,451	203,862,059	100%	100%	100%
January 1, 2002	44,768,076	60,305,096	79,926,779	217,476,110	100%	100%	100%
January 1, 2003	48,736,137	66,075,645	89,187,478	214,320,251	100%	100%	100%
January 1, 2004	53,289,266	71,919,853	97,917,430	223,140,793	100%	100%	100%
January 1, 2005	58,118,119	80,238,773	104,877,700	241,818,542	100%	100%	99%
January 1, 2006	59,491,429	96,596,749	98,916,929	268,566,265	100%	100%	100%
January 1, 2007	61,700,894	108,083,741	107,267,857	292,889,736	100%	100%	100%
January 1, 2008	65,237,335	115,157,203	113,747,687	316,567,579	100%	100%	100%
January 1, 2009	68,764,295	131,939,654	119,046,937	296,021,806	100%	100%	80%
January 1, 2010	72,311,211	138,108,376	123,412,363	300,704,227	100%	100%	73%
January 1, 2011	74,768,249	142,446,528	118,095,414	297,494,555	100%	100%	68%
January 1, 2012	74,788,283	162,428,901	117,199,757	320,996,231	100%	100%	71%
January 1, 2013	74,453,807	179,793,207	115,449,276	340,856,093	100%	100%	75%
January 1, 2014	75,409,870	205,480,329	114,173,467	366,577,369	100%	100%	75%
January 1, 2015	74,299,208	226,648,240	114,905,091	400,748,065	100%	100%	87%
January 1, 2016	74,856,178	239,245,818	117,557,850	422,124,860	100%	100%	92%
January 1, 2017	73,701,869	261,377,011	120,681,026	435,153,161	100%	100%	83%
January 1, 2018	75,156,324	282,710,162	122,103,070	457,124,471	100%	100%	81%
January 1, 2019	74,072,180	312,151,820	122,693,257	474,289,088	100%	100%	72%
January 1, 2020	72,242,119	351,659,021	143,104,966	504,806,469	100%	100%	57%
January 1, 2021	75,147,460	366,787,270	142,743,191	539,466,232	100%	100%	68%
January 1, 2022	75,003,767	404,295,897	149,318,617	615,781,429	100%	100%	91%
January 1, 2023	74,931,355	441,945,310	152,640,261	638,280,703	100%	100%	80%

Values for January 1, 2016 and earlier as reported by the prior actuary.

Table 12

HISTORICAL INVESTMENT RETURN

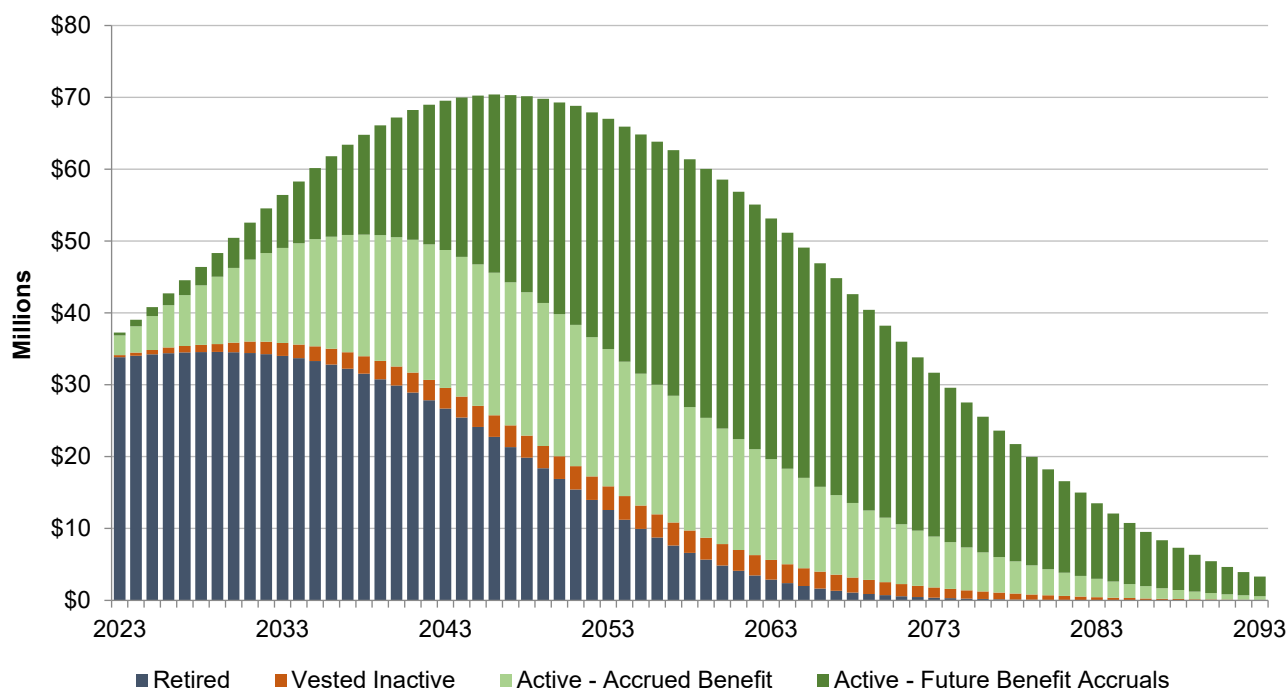


Annual Rate of Investment Return*					
For One-Year Period			For Period Ending December 31, 2022		
Plan Year Ending December 31,	Market	Actuarial	Period	Market	Actuarial
2022	-11.8%	6.4%	1 year	-11.8%	6.4%
2021	19.7%	17.2%	2 years	2.7%	11.7%
2020	12.6%	9.5%	3 years	5.9%	10.9%
2019	19.3%	9.1%	4 years	9.1%	10.5%
2018	-3.3%	5.9%	5 years	6.5%	9.5%
2017	13.9%	7.0%	6 years	7.7%	9.1%
2016	7.6%	5.0%	7 years	7.7%	8.5%
2015	0.6%	7.4%	8 years	6.8%	8.4%
2014	7.5%	11.2%	9 years	6.9%	8.7%
2013	15.0%	9.7%	10 years	7.7%	8.8%
2012	11.4%	8.3%	11 years	8.0%	8.7%
2011	2.4%	9.5%	12 years	7.5%	8.8%
2010	12.2%	0.1%	13 years	7.9%	8.1%
2009	14.5%	2.3%	14 years	8.3%	7.7%
2008	-21.5%	-5.9%	15 years	6.0%	6.7%
2007	5.9%	8.8%	16 years	6.0%	6.9%
2006	13.0%	9.9%	17 years	6.4%	7.0%
2005	7.1%	11.1%	18 years	6.5%	7.3%
2004	9.7%	8.1%	19 years	6.6%	7.3%
2003	17.6%	3.4%	20 years	7.1%	7.1%
2002	-3.6%	-3.0%	21 years	6.6%	6.6%
2001	-1.9%	6.7%	22 years	6.2%	6.6%
2000	3.8%	9.8%	23 years	6.1%	6.7%
1999	9.8%	10.8%	24 years	6.3%	6.9%
1998	8.8%	10.8%	25 years	6.4%	7.1%

* For 2016 and prior, rates reflect total investment return, net of investment related and administrative expenses.

Table 13

TWENTY-YEAR PROJECTION OF BENEFIT PAYMENTS FOR CURRENT PARTICIPANTS



Detail of Total Projected Benefit Payments and Contribution Refunds for Next 20 Years*

<u>Plan Year</u>	<u>Projected Benefit Payments and Contribution Refunds</u>	<u>Plan Year</u>	<u>Projected Benefit Payments and Contribution Refunds</u>
2023	\$ 37,261,000	2033	\$ 56,401,000
2024	39,034,000	2034	58,281,000
2025	40,801,000	2035	60,142,000
2026	42,724,000	2036	61,792,000
2027	44,549,000	2037	63,388,000
2028	46,379,000	2038	64,789,000
2029	48,333,000	2039	66,087,000
2030	50,445,000	2040	67,191,000
2031	52,566,000	2041	68,234,000
2032	54,531,000	2042	68,965,000

* This valuation, including the projected benefit payments shown, reflects only participants as of the valuation date and does not reflect any projected payments to future new entrants.

Table 14

30-YEAR PROJECTION OF CONTRIBUTIONS AND FUNDED RATIO (MILLIONS)

(1) Valuation as of January 1,	(2) Employer Contribution	(3) Employee Contribution	(4) Total Payroll	(5) Actuarial Liability	(6) Actuarial Value of Assets	(7) Unfunded Actuarial Liability	(8) Normal Cost Rate (w/Exp.)	(9) Funded Ratio
2023	9.8	9.8	140.6	669.5	638.3	31.2	11.1%	95%
2024	10.2	10.2	145.1	693.2	642.4	50.8	11.0%	93%
2025	10.5	10.5	149.9	717.2	622.9	94.3	11.0%	87%
2026	10.8	10.8	154.7	741.4	645.3	96.1	11.0%	87%
2027	11.2	11.2	159.7	765.9	668.0	97.9	10.9%	87%
2028	11.5	11.5	164.9	790.6	691.2	99.4	10.9%	87%
2029	11.9	11.9	170.3	815.8	714.8	101.0	10.9%	88%
2030	12.3	12.3	175.8	841.2	738.7	102.5	10.8%	88%
2031	12.7	12.7	181.6	866.7	763.0	103.7	10.8%	88%
2032	13.1	13.1	187.5	892.4	787.6	104.8	10.8%	88%
2033	13.5	13.5	193.5	918.5	812.7	105.8	10.8%	88%
2034	14.0	14.0	199.8	945.0	838.4	106.6	10.8%	89%
2035	14.4	14.4	206.3	972.1	865.0	107.1	10.7%	89%
2036	14.9	14.9	213.0	999.9	892.4	107.5	10.7%	89%
2037	15.4	15.4	220.0	1,028.6	920.9	107.7	10.7%	90%
2038	15.9	15.9	227.1	1,058.3	950.8	107.5	10.7%	90%
2039	16.4	16.4	234.5	1,089.4	982.3	107.1	10.7%	90%
2040	16.9	16.9	242.1	1,122.2	1,015.7	106.5	10.7%	91%
2041	17.5	17.5	250.0	1,156.8	1,051.5	105.3	10.7%	91%
2042	18.1	18.1	258.1	1,193.6	1,089.7	103.9	10.7%	91%
2043	18.7	18.7	266.5	1,233.1	1,131.1	102.0	10.7%	92%
2044	19.3	19.3	275.1	1,275.6	1,175.9	99.7	10.6%	92%
2045	19.9	19.9	284.1	1,321.6	1,224.6	97.0	10.6%	93%
2046	20.5	20.5	293.3	1,371.4	1,277.8	93.6	10.6%	93%
2047	21.2	21.2	302.9	1,425.6	1,335.8	89.8	10.6%	94%
2048	21.9	21.9	312.7	1,484.6	1,399.4	85.2	10.6%	94%
2049	22.6	22.6	322.9	1,548.9	1,468.9	80.0	10.6%	95%
2050	23.3	23.3	333.4	1,619.2	1,545.1	74.1	10.6%	95%
2051	24.1	24.1	344.2	1,696.1	1,628.7	67.4	10.6%	96%
2052	24.9	24.9	355.4	1,779.9	1,720.2	59.7	10.6%	97%

Note: These projections are based on the actuarial methods, assumptions and plan provisions disclosed in this report, including the use of a 7.00% future return on the market value of assets and a 3.25% future wage inflation. In addition, the projections assume future experience follows assumptions, there are no changes to assumptions, plan provisions or funding policy, and employee and employer contributions of 7.00% of compensation are made each year. In particular, the projection assumes Tier 2 members receive no future ad hoc COLAs.

Appendix A

Plan Summary

All actuarial calculations are based upon our understanding of the provisions of the City of Aurora General Employees' Retirement Plan, as amended through December 31, 2022. This summary does not attempt to cover all of the detailed provisions.

Plan

The City of Aurora General Employees' Retirement Plan is a single employer defined benefit pension plan created by the Aurora City Council in 1967 for the exclusive benefit of participants and their beneficiaries.

Plan Year

The Plan Year is the 12-month period beginning January 1 and ending December 31.

Effective Date

The original effective date of the Plan is March 1, 1967. The Plan was most recently amended effective January 1, 2021.

Employee

All full and part-time career service and Council-appointed employees of the City, other than police officers, firefighters, elected officials, certain executive-level personnel and temporary employees.

Participation

An Employee shall become a Participant upon completion of one hour of service.

Plan Tier

Participants in the plan prior to January 1, 2012 are Tier 1 participants. Participants who first enter the plan after December 31, 2011 are Tier 2 participants.

Final Average Monthly Compensation

An employee's compensation from the city during the 36 highest paid consecutive calendar months of the last ten years of credit service, divided by 36.

Compensation

Compensation means the total base pay, including acting pay, longevity credit, 414(h) and 457 contributions and Section 125 elective pre-tax employee contributions. Overtime, vacation and sick leave pay, and bonuses are excluded.

Compensation is limited under Internal Revenue Code Section 401(a)(17).

Credited Service

A participant's credited service is the elapsed time period from employment commencement date to the date of termination of such employment. Generally, one day of credited service shall be credited for each day in the elapsed period.

Employee Contributions

Beginning in 2017, employees contribute 7.00% of pay. Rates beyond 2017 may increase or decrease 0.25% each year upon the financial condition of the fund but in no case would the rate increase above 7.00% or decrease below 5.50%. Rate changes are based on a decision flowchart designed to keep the funded ratio between 100% and 110%. The employee's contribution account is credited with interest of 4.0% compounded biweekly.

Employer (City) Contributions

The city contributes to the trust an amount equal to the contributions of the employee. Currently, the City contributes 7.00% of payroll.

Normal Retirement Date

Tier 1 Participants: 65th Birthday

Tier 2 Participants: 67th Birthday

Normal Retirement Pension

Each participant who becomes eligible for a Normal Retirement Pension under the Plan will be entitled to receive a monthly retirement pension benefit beginning at the participant's Normal Retirement Date and payable in the Normal Benefit Form equal to 1.75% of Final Average Monthly Compensation multiplied by Years of Credited Service.

In lieu of a monthly pension, the participant may elect to receive a lump sum equal to the participant's contribution accumulated and vested city contributions.

Normal Benefit Form

Life Annuity

Early Retirement Pension

(a) Eligibility

Termination on or after age 50 with 10 or more years of credited service, and not eligible for Normal Retirement Pension or Special Early Retirement Pension

(b) Amount (Base Benefit)

A participant's Early Retirement Pension is a monthly pension benefit equal to his Normal Retirement Pension based on Final Average Monthly Compensation and Credited Service at his date of retirement, and reduced as follows:

Tier 1 Participants

- (i) After age 55: 2% per year prior to the earlier of age 65 (Normal Retirement) or Rule of 80 (age plus service equal to 80 or more)
- (ii) Under age 55 with less than 25 years of credited service: 2% per year for each year that the participant's years of credited service are less than 25 (up to a max of 20%), then further reduced by 6% per year for each year the commencement precedes age 55
- (iii) Under age 55 with at least 25 years of credited service: 6% per year prior to Rule of 80 (age plus service equal to 80 or more)

Tier 2 Participants: 6% per year prior to the earlier of age 67 (Normal Retirement) or Rule of 80 (age plus service equal to 80 or more)

For determining Rule of 80 date for early retirement reductions, service is determined at date of retirement and age is projected forward.

In lieu of a monthly pension, the participant may elect to receive a lump sum equal to the participant's contribution accumulated and vested city contributions.

Special Early Retirement Pension – Rule of 80

(a) Eligibility

Termination on or after age 50 with age plus credited service equal to 80 or more, and not eligible for Normal Retirement Pension

(b) Amount (Base Benefit)

A participant's Special Early Retirement Pension is a monthly pension benefit equal to his Normal Retirement Pension based on Final Average Monthly Compensation and Credited Service at his date of retirement, without reduction.

In lieu of a monthly pension, the participant may elect to receive a lump sum equal to the participant's contribution accumulated and vested city contributions.

Deferred Vested Pension

(a) Eligibility

5 or more years of Credited Service.

(b) Amount (Base Benefit)

A participant's Deferred Vested Pension shall be equal to the participant's Accrued Benefit, payable at Normal Retirement Date. If a participant terminates employment after completing 10 years of credited service, the participant may retire with an Early Retirement Benefit any time after attainment of age 50 and prior to the participant's normal retirement date.

In lieu of a monthly pension, the participant may elect to receive a lump sum equal to the participant's contribution accumulated and vested city contributions.

Money Purchase Pension

(a) Eligibility

Eligible for a Normal Retirement, Early Retirement, Special Early Retirement, or Deferred Vested Pension, and the monthly money purchase pension is greater than the monthly pension calculated pursuant to any of these pensions.

(b) Amount (Base Benefit)

A participant's Money Purchase Pension shall be a monthly amount equal to the Actuarial Equivalent of the participant's contribution accumulation and vested city contributions as of the date the pension commences. The Money Purchase Pension is payable in lieu of a Normal Retirement, Early Retirement, Special Early Retirement, or Deferred Vested Pension.

Disability Retirement Pension**(a) Eligibility**

Termination due to Disability, and the Participant received long-term disability insurance payments from the City until his Normal Retirement Date.

(b) Amount (Base Benefit)

A participant's Disability Retirement Pension shall be equal to the participant's Normal Retirement Pension based on the higher of the Final Average Monthly Compensation or the monthly rate of compensation on the date of disablement, and Credited Service the participant would have accrued had he continued employment through his Normal Retirement Date (or date of discontinuance of disability benefits, if earlier).

Supplemental Benefit**(a) Eligibility**

In receipt of a monthly benefit under a Normal Retirement, Early Retirement, Special Early Retirement, Deferred Vested, Disability Retirement, or Money Purchase Pension.

(b) Amount (Supplemental Benefit)

A monthly amount equal to \$176.00. This benefit is reduced proportionally if the years of credited service are less than 20.

Termination before Vested Benefit

If a participant terminates employment prior to 5 years of Credited Service, the participant will receive a refund of accumulated employee and vested employer contributions, if any.

Vesting Schedule**(a) For Defined Benefit:**

<u>Years of Credited Service</u>	<u>Vested Percentage</u>
Less than 5	0%
5 or more	100%

Participants are fully vested at Normal Retirement Date.

(b) For Vesting in City Contributions:

Participants are vested in the City's contributions and interest according to the following schedule:

<u>Years of Credited Service</u>	<u>Tier 1 Vested Percentage</u>	<u>Tier 2 Vested Percentage</u>
0	25%	0%
1	30%	0%
2	35%	0%
3	40%	0%
4	45%	0%
5	50%	50%
6	55%	55%
7	60%	60%

<u>Years of Credited Service</u>	<u>Tier 1 Vested Percentage</u>	<u>Tier 2 Vested Percentage</u>
8	65%	65%
9	70%	70%
10	75%	75%
11	80%	80%
12	85%	85%
13	90%	90%
14	95%	95%
15+	100%	100%

Participants are 100% vested in Employee contributions and interest immediately.

Optional Benefit Forms

Optional Benefit Forms are available for base benefits and equal to the Actuarial Equivalent of the Normal Benefit Form. Such distribution may be as a Joint & 50%, 75%, or 100% Survivor Annuity with Pop-up feature, a 10 or 15 Year Certain and Life Annuity or a Partial Lump Sum up to 20% of the actuarial equivalent of the accrued benefit.

The Supplemental Benefit is paid as a monthly benefit as long as a monthly Base Benefit is being received by a participant or a participant's beneficiary.

Pre-Retirement Death Benefit

If a participant dies prior to completing 5 years of service, the Participant's beneficiary will receive a refund of accumulated employee and vested employer contributions, if any. If a Participant dies after completing 5 years of service, the participant's beneficiary will receive a monthly benefit equal to the supplemental benefit plus the larger of the actuarial equivalent of 60% of the defined benefit formula benefit or the actuarial equivalent of the vested employee and employer contributions. Benefit payments may begin at any time after the date the participant would have attained the earliest retirement age.

Lump Sum Death Benefit

Upon the death of a Retired member receiving a monthly pension, \$6,250 shall be paid in a single sum to the member's designated beneficiary.

In addition, upon the last to die of a Retired member and any beneficiary receiving a monthly pension, a lump sum shall be paid to the estate. This amount shall be equal to the excess, if any, of the participant's contribution accumulation and vested city contributions on the date the pension commenced over the total monthly benefits paid from the time of pension commencement to the date of death.

Cost of Living Adjustment

Tier 1 Participants

- (a) **Base Benefit:** The monthly amount of the base benefit provided by the Plan shall be increased annually on the first day of each January by the change in the U.S. Consumer Price Index for Urban Wage Earners and Clerical Works (CPI-W) for the averages of the third quarter, rounded to the nearest ½%. The benefit cannot be decreased and annual increases may not exceed 5%.
- (b) **Supplemental Benefit:** Annual cost of living increases are discretionary and may be granted on an annual basis as determined by the board. The annual increase or decrease cannot exceed plus or minus 5%.

Tier 2 Participants

- (a) Base Benefit: Annual cost of living increases are discretionary and may be granted on an annual basis as determined by the Board. The annual increase cannot exceed the lesser of 5% or the increase which applies to Tier 1 participants.
- (b) Supplemental Benefit: Annual cost of living increases are discretionary and may be granted on an annual basis as determined by the Board. The annual increase or decrease cannot exceed plus or minus 5%.

Actuarial Equivalence

Actuarial Equivalence is calculated using the Society of Actuaries' Pub-2010 General Employees Retiree Mortality Table (amount weighted), blended 50% male, 50% female, and projected to 2028 using the ultimate rates from Scale MP-2018, a 7.0% interest rate, and a Cost-of-Living assumption of 2.5% for Tier 1 benefits and 0.25% for Tier 2 benefits.

Plan Changes

The Board granted a discretionary cost of living increase for the Base Benefit for Tier 2 Participants effective January 1, 2023 equal to 5.00%.

Appendix B

Actuarial Procedures and Assumptions

The actuarial assumptions used in the valuation are intended to estimate future experience affecting projected benefit flow and investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in the estimated costs of the Plan's benefits.

The tables in this section give rates of decrement, referred to in actuarial notation by the general symbol "q'." The underlying theory is described more fully in Jordan, *Life Contingencies*, Society of Actuaries (Second Edition, 1967), page 277. Any age referred to in a table is always the age of the person at his or her nearest birthday.

Actuarial Cost Method

The actuarial cost method we use to calculate the funding requirements of the Plan is called the **entry age normal actuarial cost method**.

Under this cost method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit age. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost. The portion of the actuarial present value not provided for at the valuation date by future Normal Costs is called the actuarial accrued liability.

Actuarial Value of Assets

The actuarial value of assets is determined by calculating the expected return on the prior year's market value of assets, adjusted for cash flows of contributions, administrative expenses, and benefit payments for the year, and interest credited using the Plan's long-term investment return assumption applicable to that plan year. The difference between this expected value and the actual return for the plan year is recognized over 3 years. The actuarial value of assets is then the actual market value minus the gains and losses for prior years that are still deferred. The resulting value is limited to between 80% and 120% of the market value of assets.

Actuarially Determined Contribution (Adopted January 1, 2017)

The method for calculating the Actuarially Determined Contribution (ADC) was adopted by the Board of Trustees. The ADC is calculated using a 20-year amortization of the unfunded actuarial accrued liability or funding excess to determine the amortization component of the ADC. On each valuation date, the newly determined unfunded actuarial accrued liability or funding excess is amortized over an open (or rolling) 20-year amortization period as a level percent of projected pay.

Investment Earnings (Adopted January 1, 2020)

7.00% per annum, compounded annually, net of investment expenses.

The investment return assumption was selected based on the Plan's asset allocation and capital market assumptions from several sources, including published studies summarizing the expectations of various investment experts. This information was then used to develop forward looking long-term expected returns, producing a range of reasonable expectations according to industry experts. Based on the resulting range of potential assumptions, in our professional judgement the selected investment return assumption is reasonable and is not expected to have any significant bias.

Inflation (Adopted January 1, 2020)

2.50% per annum, compounded annually. The assumption is based on capital market assumption sources and published studies used to develop the Plan's investment return assumption.

Compensation Increase (Inflation and Real Wage Growth adopted January 1, 2020; Merit adopted January 1, 2014)

Annual salary increases are based on a table graded by service. Rates are as follows:

Years of Service	Percentage Increase at Age			
	Inflation	Real Wage Growth	Merit	Total
0-1	2.50%	0.75%	2.75%	6.00%
2	2.50	0.75	2.25	5.50
3	2.50	0.75	1.75	5.00
4-7	2.50	0.75	1.25	4.50
8	2.50	0.75	0.75	4.00
9	2.50	0.75	0.50	3.75
10+	2.50	0.75	0.00	3.25

The inflation and real wage growth assumptions are based on capital market assumption sources and published studies used to develop the Plan's inflation assumption. The merit component is based on City of Aurora experience as reviewed with the 2019 Experience Study. The Plan's experience was reviewed as of the most recent measurement date. The assumption remains reasonable.

Total Payroll Growth Rate (Adopted January 1, 2014)

3.25% per annum.

Expenses (Adopted January 1, 2018)

Expenses other than investment expenses are assumed to be \$585,000 per year, payable mid-year.

Employee Contribution Rate

7.00% of compensation, the current employee contribution rate for 2023.

Per guidance provided in the City Code, actual future rates may increase or decrease 0.25% each year depending upon the financial condition of the Plan. Per the City Code, the contribution rate may not exceed 7.00% or be less than 5.50%.

Contribution Accumulation Rate (Adopted January 1, 2010)

4.00% per annum, compounded biweekly.

The contribution accumulation rate is established by the Board at a rate of at least three percent per annum compounded annually. The current rate is 4.00% per annum, compounded biweekly. The Retirement Board reviews this rate in December of each year and has the authority to change it.

Mortality (Adopted January 1, 2020)

Healthy Lives (post-retirement) – Pub-2010 General Employees Retiree Mortality Table (amount-weighted), projected generationally using Scale MP-2018

Healthy Lives (pre-retirement) – Pub-2010 General Employees Mortality Table (amount-weighted), projected generationally using Scale MP-2018

Disabled Lives – Pub-2010 Disabled Retiree (Non Safety) Mortality Table (amount-weighted), projected generationally using Scale MP-2018

The assumption included a margin for future mortality improvements at the time of the most recent experience study completed as of December 31, 2018.

The size of the Plan population is not large enough to have a statistically credible independent study of retiree mortality serve as the sole basis for assumption setting. As such, we rely on a standard published table that is appropriate to the Plan's employee and retiree population while also taking into account statistically significant trends in the United States regarding improvements in life expectancy. The Plan's mortality experience was reviewed as of the most recent measurement date. The assumption remains reasonable.

Retirement (Adopted January 1, 2020)

For active participants, table of rates by age, based on Tier and eligibility for unreduced retirement, as follows:

Age	Reduced		Unreduced	
	Tier 1	Tier 2	Tier 1	Tier 2
50	2.0%	2.0%	3.0%	3.0%
51	3.0	3.0	3.0	3.0
52	3.0	3.0	10.0	10.0
53	3.0	3.0	10.0	10.0
54	3.0	3.0	10.0	10.0
55	3.0	3.0	8.0	8.0
56	6.0	6.0	8.0	8.0
57	6.0	6.0	8.0	8.0
58	6.0	6.0	8.0	8.0
59	6.0	6.0	8.0	8.0
60	6.0	6.0	8.0	8.0
61	6.0	6.0	15.0	15.0
62	15.0	15.0	25.0	25.0
63	15.0	15.0	20.0	20.0
64	15.0	15.0	15.0	15.0
65	N/A	30.0	30.0	30.0
66	N/A	30.0	30.0	30.0
67	N/A	N/A	30.0	30.0
68	N/A	N/A	50.0	50.0
69	N/A	N/A	50.0	50.0
70+	N/A	N/A	100.0	100.0

Current and future vested inactive members are assumed to retire as follows:

- Tier 1: Earlier of age 55 with 10 or more years of service, or age 65
- Tier 2: Normal retirement age (67)

This assumption is based on the 2019 Experience Study. The Plan's experience was reviewed as of the most recent measurement date. The assumption remains reasonable.

Disablement (Adopted January 1, 2014)

Graduated rates based on age and gender. Sample rates are as follows:

Age	Male	Female
30	0.03%	0.11%
35	0.05	0.16
40	0.06	0.21
45	0.10	0.35
50	0.14	0.48
55	0.25	0.87
60	0.36	1.26

Withdrawal Rates (Adopted January 1, 2020)

Graduated rates based on years of service, age and gender are used. Sample rates are as follows:

Years of Service	Male	Female
0-1	20.0%	23.0%
1-2	17.6	19.8
2-3	14.3	16.5
3-4	11.0	13.0
4-5	9.9	12.1
<u>At Five or More Years of Service:</u>		
Age		
30	8.5%	11.0%
40	5.8	7.2
50	3.8	3.9
60	2.3	1.7

This assumption is based on the 2019 Experience Study. The Plan's experience was reviewed as of the most recent measurement date. The assumption remains reasonable.

Marital Assumptions

85% of active and deferred vested members not currently receiving benefits are assumed to be married. Male spouses are assumed to be three years older than their female spouses.

Form of Payment Election Assumption (Adopted in 2020)

Current inactive vested members are assumed to take a monthly annuity at retirement in lieu of a lump sum distribution (refund of contribution accumulation plus vested city contributions). 0% of retirements from active service and 30% of terminations from active service are assumed to take lump sums. 100% of members who opt for a monthly annuity are assumed to elect the normal form of payment.

This assumption is based on the 2019 Experience Study. The Plan's experience was reviewed as of the most recent measurement date. The assumption remains reasonable.

Post Retirement Cost of Living Adjustment Assumption (Adopted January 1, 2020 for Tier 1 Base Benefits; Adopted January 1, 2011 for all other benefits)

Tier 1 Participants: 2.50% per annum for base benefits; 0.00% per annum for supplemental benefits

Tier 2 Participants: 0.00% per annum for base benefits; 0.00% per annum for supplemental benefits

Development of Demographic Assumptions

An experience study was performed based on data over the five-year period ending December 31, 2018, as documented in the Experience Study report dated February 17, 2020. The demographic assumptions are reviewed annually and refined as necessary based on demographic experience and expectations of future experience. Assumptions for which participant data are limited, such as retiree mortality, were also drawn from published actuarial tables. The assumptions used in this valuation are based on the Experience Study report noted above, and were approved by the Board of Trustees at their September 2019 meeting reviewing the 2019 Experience Study.

Changes in Actuarial Assumptions and Methods as of January 1, 2023

None

Appendix C

Member Data

Valuation Date	January 1, 2022	January 1, 2023	Percentage Change
Active Participants			
Number	1,814	1,831	0.9%
<i>Tier 1</i>	529	461	
<i>Tier 2</i>	1,285	1,370	
Average Anticipated Total Payroll (for year following valuation date)	\$72,402	\$76,769	
<i>Tier 1</i>	\$84,583	\$90,550	
<i>Tier 2</i>	\$67,387	\$72,132	
Average Age	45.2	44.9	
<i>Tier 1</i>	53.6	53.8	
<i>Tier 2</i>	41.7	41.9	
Average Credited Service	8.3	8.0	
<i>Tier 1</i>	19.4	20.0	
<i>Tier 2</i>	3.7	3.9	
Vested Terminated Participants			
Number	250	288	15.2%
Average Final Average Compensation	\$54,727	\$56,465	
Average Age	50.7	49.9	
Retired Members and Beneficiaries			
Number	1,240	1,296	4.5%
Average Monthly Benefit	\$2,059	\$2,156	
Average Age	71.3	71.6	
Deferred Disabled			
Number	13	12	-7.7%
Average Monthly Benefit	\$2,376	\$2,432	
Average Age	53.2	53.7	
Deferred Beneficiaries			
Number	4	4	0.0%
Average Monthly Benefit	\$660	\$665	
Average Age	45.5	46.5	
Total Participants	3,321	3,431	3.3%

Table C-1

RECONCILIATION OF MEMBER DATA

	Actives	Inactive Deferred Participants	Retiree and Beneficiaries	Disabled Retirees	Total
Included in January 1, 2022 valuation:	1,814	267	1,209*	31	3,321
Change due to:					
New entrants	331	0	0	N/A	331
Rehired	3	(3)	0	0	0
Termination					
Nonvested	(182)	N/A	N/A	N/A	(182)
Vested	(52)	52	0	N/A	0
Retirement	(55)	(10)	65	0	0
Disabled	0	(1)	0	1	0
Death with no Beneficiary	(3)	0	(14)	0	(17)
Death with a Beneficiary	(2)	0	2	0	0
Alternate Payee	0	0	2	0	2
Lump sum/Refund of Contributions	(23)	(1)	0	0	(24)
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Net change	17	37	55	1	110
Included in January 1, 2023 valuation:	1,831	304	1,264*	32	3,431

* There are seven total participants as of January 1, 2022 and ten total participants as of January 1, 2023 who are both a retiree and a beneficiary.

Table C-2

SUMMARY OF ACTIVE MEMBERS

Number of Members by Age and Service Groups											
Age	Years of Service										Total
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40&Up	
0-24	46	23	-	-	-	-	-	-	-	-	69
25-29	71	82	15	-	-	-	-	-	-	-	168
30-34	56	128	64	6	2	-	-	-	-	-	256
35-39	39	88	55	13	17	-	-	-	-	-	212
40-44	31	79	64	25	23	9	-	-	-	-	231
45-49	20	47	60	21	21	26	2	-	-	-	197
50-54	22	58	48	25	35	29	9	2	-	-	228
55-59	25	37	50	16	40	25	14	7	6	-	220
60-64	12	27	35	20	32	14	11	8	7	6	172
65-69	3	10	19	6	9	5	5	4	1	-	62
70&Up	-	6	5	2	-	1	-	1	1	-	16
Total	325	585	415	134	179	109	41	22	15	6	1,831

Average Anticipated Total Payroll by Age and Service Groups											
Age	Years of Service										Average
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40&Up	
0-24	48,008	54,350	-	-	-	-	-	-	-	-	50,122
25-29	57,171	63,324	68,747	-	-	-	-	-	-	-	61,208
30-34	61,904	70,862	76,449	75,379	85,841	-	-	-	-	-	70,522
35-39	61,144	72,152	77,814	83,029	79,262	-	-	-	-	-	72,833
40-44	62,571	77,818	82,227	90,455	86,538	80,809	-	-	-	-	79,346
45-49	73,572	71,734	84,923	90,801	106,809	86,756	112,891	-	-	-	84,109
50-54	78,870	76,046	80,170	86,121	87,534	96,029	83,842	64,478	-	-	82,803
55-59	89,442	76,426	82,288	87,067	97,331	85,476	95,305	90,202	101,695	-	87,170
60-64	56,402	69,584	78,933	80,141	90,151	82,131	107,498	83,000	84,577	111,114	81,749
65-69	64,813	89,704	77,126	101,293	87,821	74,689	84,427	110,008	72,583	-	84,890
70&Up	-	62,855	55,860	65,648	-	63,993	-	129,234	69,554	-	65,657
Average	62,684	71,406	79,594	86,476	91,534	87,082	95,591	90,620	89,623	111,114	76,769

HISTORICAL SUMMARY

	2019	2020	2021	2022	2023
Number	1,754	1,816	1,794	1,814	1,831
Anticipated Total Payroll	\$111,930,915	\$119,182,291	\$120,524,338	\$131,336,348	\$140,564,949
Average Total Payroll	\$63,815	\$65,629	\$67,182	\$72,402	\$76,769
Average Age	45.8	45.6	45.6	45.2	44.9
Average Service	9.1	8.5	8.7	8.3	8.0

Table C-2 (Continued)

SUMMARY OF ACTIVE MEMBERS

HISTORICAL SUMMARY OF ACTIVE MEMBER DATA								
Year Beginning January 1,	Active Members		Covered Payroll		Average Salary		Average Age	Average Service
	Number	Percent Increase (Decrease)	Amount in \$ Millions	Percent Increase (Decrease)	\$ Amount	Percent Increase (Decrease)		
2000	1,434	2.7%	51.2	7.6%	35,691	4.6%	44.3	9.3
2001	1,493	4.1%	56.2	9.8%	37,630	5.4%	44.6	9.2
2002	1,582	6.0%	62.2	10.7%	39,304	4.4%	44.6	9.0
2003	1,580	(0.1)%	65.4	5.1%	41,387	5.3%	45.1	9.4
2004	1,614	2.2%	69.2	5.8%	42,896	3.6%	45.5	9.7
2005	1,626	0.7%	72.7	5.1%	44,737	4.3%	45.7	9.9
2006	1,604	(1.4)%	72.0	(1.0)%	44,865	0.3%	46.1	10.0
2007	1,648	2.7%	76.6	6.4%	46,493	3.6%	46.2	9.9
2008	1,751	6.3%	84.5	10.3%	48,277	3.8%	45.8	9.7
2009	1,711	(2.3)%	86.1	1.9%	50,321	4.2%	46.3	10.0
2010	1,624	(5.1)%	84.4	(2.0)%	51,973	3.3%	47.1	10.9
2011	1,601	(1.4)%	84.0	(0.5)%	52,450	0.9%	47.4	11.3
2012	1,560	(2.6)%	81.5	(3.0)%	52,241	(0.4)%	47.9	11.5
2013	1,564	0.3%	81.5	0.0%	52,088	(0.3)%	47.9	11.3
2014	1,605	2.6%	84.1	3.2%	52,402	0.6%	47.5	11.0
2015	1,643	2.4%	92.0	9.4%	56,021	6.9%	47.3	10.5
2016	1,650	0.4%	95.9	4.2%	58,101	3.7%	47.1	10.4
2017	1,733	5.0%	102.8	7.2%	59,308	2.1%	46.4	9.6
2018	1,755	1.3%	107.4	4.5%	61,183	3.2%	46.3	9.5
2019	1,754	(0.1)%	111.9	4.2%	63,815	4.3%	45.8	9.1
2020	1,816	3.5%	119.2	6.5%	65,629	2.8%	45.6	8.5
2021	1,794	-1.2%	120.5	1.1%	67,182	2.4%	45.6	8.7
2022	1,814	1.1%	131.3	9.0%	72,402	7.8%	45.2	8.3
2023	1,831	0.9%	140.6	7.1%	76,769	6.0%	44.9	8.0

Table C-3

SUMMARY OF INACTIVE VESTED MEMBERS*

Number of Members by Age and Service Groups										
Age	<5	5-9	10-14	15-19	Years of Service		30-34	35-39	40&Up	Total
					20-24	25-29				
0-29	-	9	-	-	-	-	-	-	-	9
30-34	-	8	1	-	-	-	-	-	-	9
35-39	-	26	5	1	-	-	-	-	1	33
40-44	-	23	13	4	-	-	-	1	-	41
45-49	-	24	19	8	4	1	-	-	1	57
50-54	-	42	7	4	2	-	-	-	-	55
55-59	-	26	2	2	-	2	-	1	1	34
60-64	-	38	2	3	2	-	-	-	1	46
65&Up	-	15	-	1	-	-	-	-	-	16
Total	-	211	49	23	8	3	-	2	4	300

Average Final Average Compensation by Age and Service Groups										
Age	<5	5-9	10-14	15-19	Years of Service		30-34	35-39	40&Up	Average
					20-24	25-29				
0-29	-	49,780	-	-	-	-	-	-	-	49,780
30-34	-	54,312	23,432	-	-	-	-	-	-	50,881
35-39	-	57,494	68,614	48,505	-	-	-	-	63,893	59,100
40-44	-	61,786	55,527	56,225	-	-	-	28,909	-	58,457
45-49	-	65,338	66,252	59,246	56,263	65,010	-	-	39,068	63,684
50-54	-	58,008	77,103	73,726	53,946	-	-	-	-	61,434
55-59	-	53,353	45,816	42,096	-	50,145	-	22,596	50,151	51,060
60-64	-	42,704	49,400	48,118	30,255	-	-	-	48,159	42,926
65&Up	-	52,268	-	51,348	-	-	-	-	-	52,211
Average	-	54,961	62,802	57,486	49,182	55,100	-	25,752	50,318	56,026

HISTORICAL SUMMARY

	2019	2020	2021	2022	2023
Deferred Vested					
Number	231	240	234	250	288
Average Final Average Compensation	\$49,904	\$50,545	\$53,204	\$54,727	\$56,465
Average Service	8.6	8.6	8.5	8.8	8.8
Average Age	50.9	51.2	51.0	50.7	49.9
Deferred Disabled					
Number	16	14	14	13	12
Average Final Average Compensation	\$42,070	\$44,887	\$44,290	\$44,274	\$45,484
Average Service	29.8	27.4	30.1	32.4	32.8
Average Age	54.7	54.9	53.3	53.2	53.7

* Does not include four deferred beneficiaries.

Table C-4

SUMMARY OF RETIREES AND BENEFICIARIES

<u>Members in Pay Status</u>		
<u>Age</u>	<u>Number of Members</u>	<u>Monthly Benefit Amount</u>
< 55	16	\$28,797
55 - 59	60	120,500
60 - 64	180	449,216
65 - 69	333	763,031
70 - 74	309	701,530
75 - 79	209	394,262
80 - 84	99	180,933
85 - 89	58	111,534
90 & Up	<u>32</u>	<u>44,401</u>
Total	1,296*	\$2,794,204

HISTORICAL SUMMARY

	2019	2020	2021	2022	2023
Number	1,078	1,134	1,184	1,240	1,296
Total Monthly Benefit	\$1,997,450	\$2,175,218	\$2,308,307	\$2,552,584	\$2,794,204
Average Monthly Benefit	\$1,853	\$1,918	\$1,950	\$2,059	\$2,156
Average Age	70.7	70.8	71.1	71.3	71.6

Table C-5

**SCHEDULE OF RETIREES AND BENEFICIARIES
ADDED TO AND REMOVED FROM ROLLS**

Plan Year Ending	Number Added to Rolls	Allowances Added to Rolls ⁽¹⁾	Number Removed from Rolls	Annual Allowances Removed from Rolls	Number of Annual Allowances	Annual Allowances	% Increase in Annual Allowances	Average Annual Allowances
12/31/1998	24	\$336,386	10	\$92,939	334	\$3,142,316	8.4%	\$9,408
12/31/1999	26	494,602	12	86,138	348	3,550,780	13.0	10,204
12/31/2000	29	424,053	7	40,491	370	4,059,627	14.3	10,972
12/31/2001	34	522,592	19	141,937	385	4,440,282	9.4	11,533
12/31/2002	29	519,243	17	141,245	397	4,818,280	8.5	12,137
12/31/2003	16	439,456	17	114,998	396	5,142,738	6.7	12,987
12/31/2004	42	432,739	17	155,755	421	5,731,232	11.4	13,613
12/31/2005	53	1,360,120	12	148,221	462	6,943,131	21.1	15,028
12/31/2006	44	983,775	9	91,156	497	7,835,750	12.9	15,766
12/31/2007	36	797,303	19	196,227	514	8,436,826	7.7	16,414
12/31/2008	54	1,429,071	16	271,603	552	9,594,295	13.7	17,381
12/31/2009	41	604,010	19	213,688	574	9,984,617	4.1	17,395
12/31/2010	59	1,188,630	19	231,051	614	10,942,196	9.6	17,821
12/31/2011	67	1,844,967	19	255,630	662	12,531,532	14.5	18,930
12/31/2012	66	1,573,353	13	144,397	715	13,960,488	11.4	19,525
12/31/2013	55	1,246,991	13	180,841	757	15,026,638	7.6	19,850
12/31/2014	75	1,893,779	18	243,569	814	16,676,848	11.0	20,488
12/31/2015	65	1,496,283	21	439,176	858	17,733,955	6.3	20,669
12/31/2016	99	1,961,129	12	141,738	945	19,553,346	10.3	20,691
12/31/2017	64	1,981,956	13	193,799	996	21,341,503	9.1	21,427
12/31/2018	99	2,869,920	17	242,026	1,078	23,969,397	12.3	22,235
12/31/2019	86	2,632,899	30	499,676	1,134	26,102,620	8.9	23,018
12/31/2020	76	1,984,935	26	387,871	1,184	27,699,684	6.1	23,395
12/31/2021	81	3,387,402	25	456,078	1,240	30,631,008	10.6	24,702
12/31/2022	70	3,332,791	14	433,352	1,296	33,530,447	9.5	25,872

⁽¹⁾ Includes Cost of Living adjustments

Appendix D

Risk Assessment and Disclosure

The purpose of this appendix is to identify, assess, and provide illustrations of risks that are significant to the Plan. Historical data is included.

The results of the actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match the assumptions. As an example, 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 potential differences when making decisions that may affect the future financial health of the Plan, or of the Plan's participants.

In addition, as plans mature they accumulate larger pools of assets and liabilities. This increases the potential risk to plan funding and the finances of those who are responsible for plan funding. As an example, it is more difficult for a plan sponsor to deal with the effects of a 10% investment loss on a plan with \$1 Billion in assets and liabilities than if the same plan sponsor is responsible for a 10% investment loss on 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) addresses these issues by providing actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. Specifically, it directs the actuary to:

- 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.

ASOP 51 states that if in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

This appendix 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.

A summary of maturity statistics and historical information is below.

	2019	2020	2021	2022	2023
Assets and Payroll					
Market Value of Assets (MVA)	\$450,368,075	\$524,036,473	\$576,750,526	\$673,636,548	\$579,063,885
Covered Payroll	\$111,930,915	\$119,182,291	\$120,524,338	\$131,336,348	\$140,564,949
Ratio, MVA to Covered Payroll	4.0	4.4	4.8	5.1	4.1
Actuarial Liability					
For Retirees and Beneficiaries	\$291,980,950	\$330,411,123	\$347,180,009	\$382,324,136	\$416,866,704
For Deferred Vested Participants	20,170,870	21,247,898	19,607,261	21,971,761	25,078,606
For Active Participants	<u>196,765,437</u>	<u>215,347,085</u>	<u>217,890,651</u>	<u>224,322,384</u>	<u>227,571,616</u>
Total	\$508,917,257	\$567,006,106	\$584,677,921	\$628,618,281	\$669,516,926
In-pay Liability as a % of Total	57.4%	58.3%	59.4%	60.8%	62.3%
Duration (years)	13.9	15.1	15.0	14.9	14.8
Cash Flow Measures					
Prior Year MVA	\$475,556,466	\$450,368,075	\$524,036,473	\$576,750,526	\$673,636,548
Benefit Payments	24,228,316	28,079,798	28,912,900	32,130,354	34,391,435
Contributions (City + Member)	15,270,419	16,377,838	16,862,206	17,464,791	18,787,954
Benefit Payments as a % of Contributions	158.7%	171.4%	171.5%	184.0%	183.1%
Benefit Payments as a % of Prior MVA	5.1%	6.2%	5.5%	5.6%	5.1%
Net Cash Flow as a % of Prior MVA	-1.9%	-2.6%	-2.3%	-2.5%	-2.3%

Liquidity Risk

- **Identification:** 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 flow, in which contributions do not exceed annual benefit payments plus expenses.
- **Assessment:** This Plan has high cash flow requirements because benefit payments are approximately 183% of Plan contributions. The Plan also allows for lump sum distributions, which may add volatility to the amount and timing of benefit distributions. As a result, there is liquidity risk that assets may need to be liquidated at a loss before planned in order to pay benefits.

Maturity Risk

- **Identification:** This is the potential for total plan liabilities to become more heavily weighted toward inactive liabilities over time.
- **Assessment:** The Plan is subject to maturity risk because as Plan assets and liabilities continue to grow, the impact of any gains or losses on the assets or liabilities also becomes larger. Currently assets are equal to 4.1 times payroll indicating a one-year loss of 10% would be equal to 41% of payroll. Last year's net cash flow was equal to -2.3% of the beginning of year assets, which means asset needed to return 2.3% last year to remain level.

Retirement Risk

- **Identification:** This is the potential for participants to retire and receive subsidized benefits more valuable than expected.
- **Assessment:** The plan has valuable early retirement subsidies, including unreduced benefits for Rule of 80 retirements. In addition, retiring participants have the option to take an annuity or receive a refund of contributions plus the City match. When participants retire earlier than expected or elect a form of payment more valuable than the valuation form of payment assumption, the plan incurs a loss.

Investment Risk

- **Identification:** The potential that investment returns will be different than expected.
- **Assessment:** To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, funding contributions and funded status may differ significantly from those presented in this valuation. In addition, as discussed under the liquidity and maturity risk assessments above, this risk will be exacerbated as the Plan matures and possibly needs to liquidate assets in a down market to pay benefits to participants, losing the recovery on those assets when the market goes back up.
- **Additional Assessment:** This is one of the most substantial risks the plan faces. You may wish to explore asset/liability modeling or other plan forecasts to see what impact investment volatility has on the Plan's funded status.

Interest Rate Risk

- **Identification:** The potential that interest rates will be different than expected.
- **Assessment:** The pension liabilities reported herein have been calculated by computing the present value of expected future benefit payments using the interest rate described in Appendix B. If interest rates in future valuations are different from that used in this valuation, future pension liabilities, funding contributions and funded status may differ significantly from those presented in this valuation. As a general rule, using a higher interest rate to compute the present value of future benefit payments will result in a lower pension liability, and vice versa. One aspect that can be used to estimate the impact of different interest rates is the plan's duration.

If the interest rate changes by 1%, the estimated percentage change in pension liability is the Plan's duration in years. The approximate duration of this Plan is 14.8 years. As such, if the interest rate changes by 1%, the estimated change in pension liability is 14.8%.

Demographic Risk

- **Identification:** The potential that mortality or other demographic experience will be different than expected.
- **Assessment:** The pension liabilities reported herein have been calculated by assuming that participants will follow patterns of demographic experience (e.g. mortality, withdrawal, disability, retirement, form of payment election, etc.) 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, funding contributions and funded status may differ significantly from those presented in this valuation.