



**THE CITY OF OMAHA
POLICE & FIRE RETIREMENT SYSTEM**

**Actuarial Valuation as of January 1, 2021
To Determine Funding for Fiscal Year 2021**

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Certification

We have performed an actuarial valuation of the Plan as of January 1, 2021 to determine funding for fiscal year 2021. 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.

This report may not be used for purposes other than those listed above without Milliman's prior written consent. If this report is distributed to other parties, it must be copied in its entirety, including this certification section.

Milliman's work is prepared solely for the internal business use of the City of Omaha ("City") and the City of Omaha Police and Fire Retirement System ("System"). 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 exceptions: (a) the City and System may provide a copy of Milliman's work, in its entirety, to the City and System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the City and System; and (b) the City and System 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.

In preparing this report, we relied on employee census data and financial information as of the valuation date, furnished by the City and System. 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

Figures for periods prior to January 1, 2021 have been obtained from actuarial valuation reports prepared by Cavanaugh Macdonald Consulting LLC and from the City's Comprehensive Annual Financial Reports. The actuarial assumptions used herein were adopted by the Board based on an experience study prepared by Cavanaugh Macdonald Consulting LLC for the period ending December 31, 2015. We are unable to judge the reasonableness of the assumptions or methods without performing a substantial amount of additional work beyond the scope of the assignment, and have not done so. We will perform an experience study in the near future and will report the results of that analysis when it is complete.

The valuation results were developed using models employing standard actuarial techniques. In addition, Milliman has developed certain models to develop the expected long term rate of return on assets. 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. The models, including all input, calculations, and output, may not be appropriate for any other purpose.

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 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 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

None.

Changes in Actuarial Methods and Assumptions

None.

Other Significant Changes

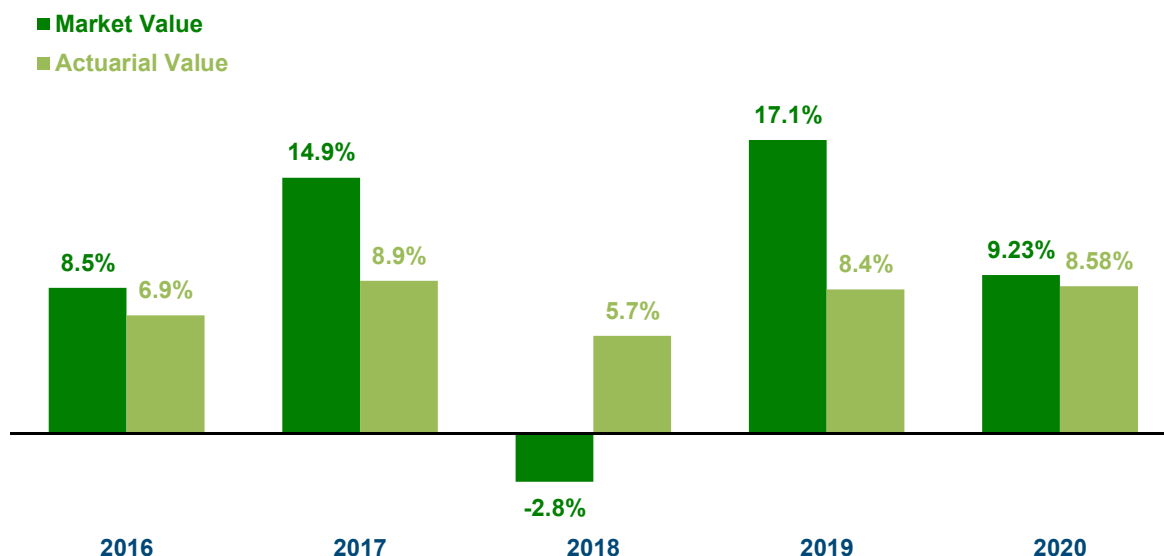
None.

Section I - Executive Summary Assets

There are two different measures of the plan's assets that are used throughout this report. The Market Value is a snapshot of the plan's investments as of the valuation date. The Actuarial Value is a smoothed asset value designed to temper the volatile fluctuations in the market by recognizing investment gains or losses asymptotically over four years.

	Market	Actuarial
Value as of January 1, 2020	\$800,871,242	\$787,558,791
City and Member Contributions	76,176,798	76,176,798
Investment Income	73,649,012	67,357,297
Benefit Payments	<u>(81,784,170)</u>	<u>(81,784,170)</u>
Value as of January 1, 2021	868,912,882	849,308,716

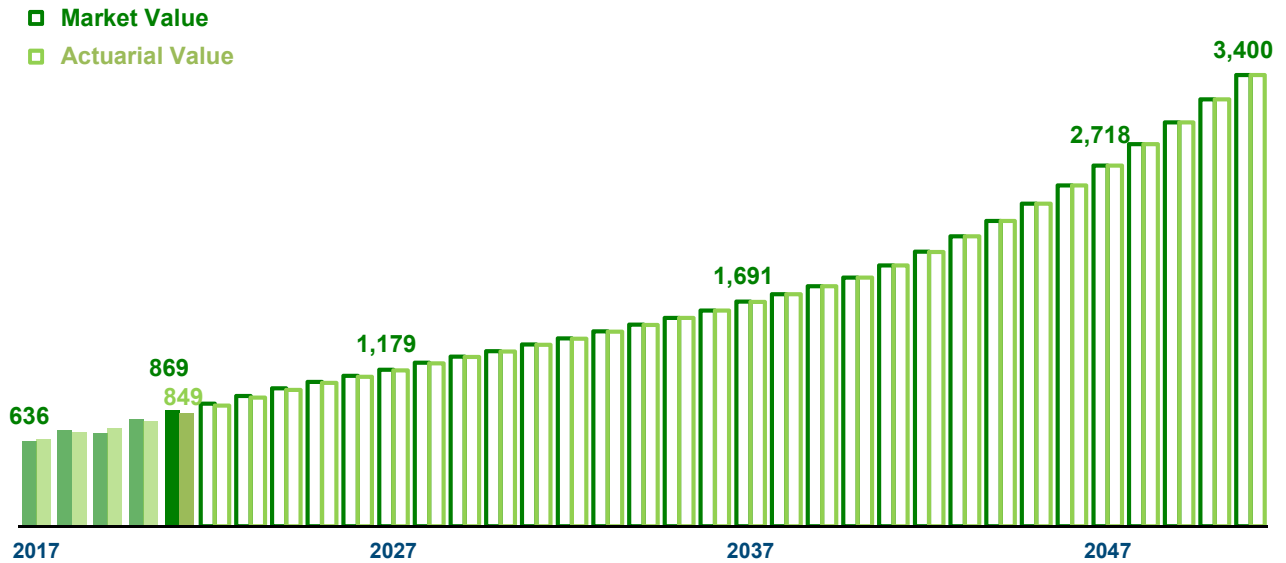
For fiscal year 2020, the plan's assets earned 9.23% on a Market Value basis and 8.58% on an Actuarial Value basis. The actuarial assumption for this period was 7.75%; the result is an asset gain of about \$11.8 million on a Market Value basis and a gain of about \$6.5 million on an Actuarial Value basis. Historical rates of return are shown in the graph below.



Please note that the Actuarial Value currently is less than the Market Value by \$19.6 million. This figure represents investment gains that will be gradually recognized in future years. This process will exert downward pressure on the City's Actuarially Determined Contribution, unless there are offsetting market losses.

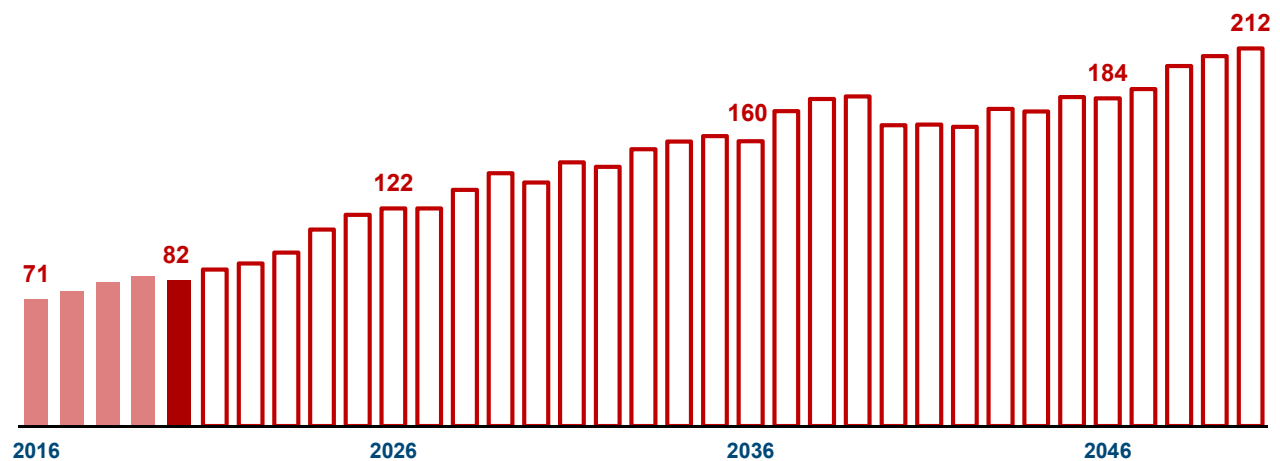
Section I - Executive Summary Assets (continued)

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 30 years. For purposes of this projection, we have assumed that the City always contributes the 2021 City Ordinance Rate and the investments always earn the assumed interest rate each year.



In 2020, the plan paid out \$81.8 million in benefits to members. Over the next 30 years, the plan is projected to pay out a total of \$4,683 million in benefits to members.

Benefit Payments

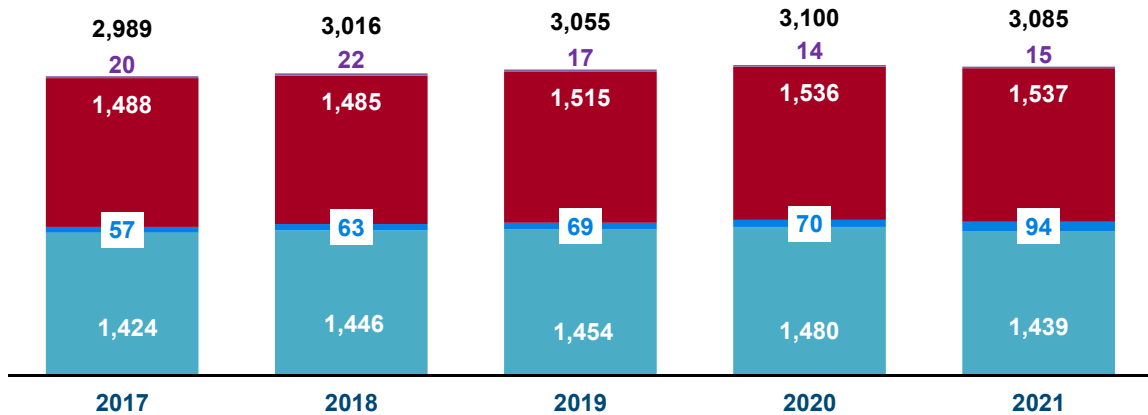


This work product was prepared solely for the City and the System for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties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

Section I - Executive Summary Membership

There are four basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a right to benefits but have not yet started collecting, (3) active employees who have met the eligibility requirements for membership, and (4) members who have elected to participate in the DROP but have not yet retired.

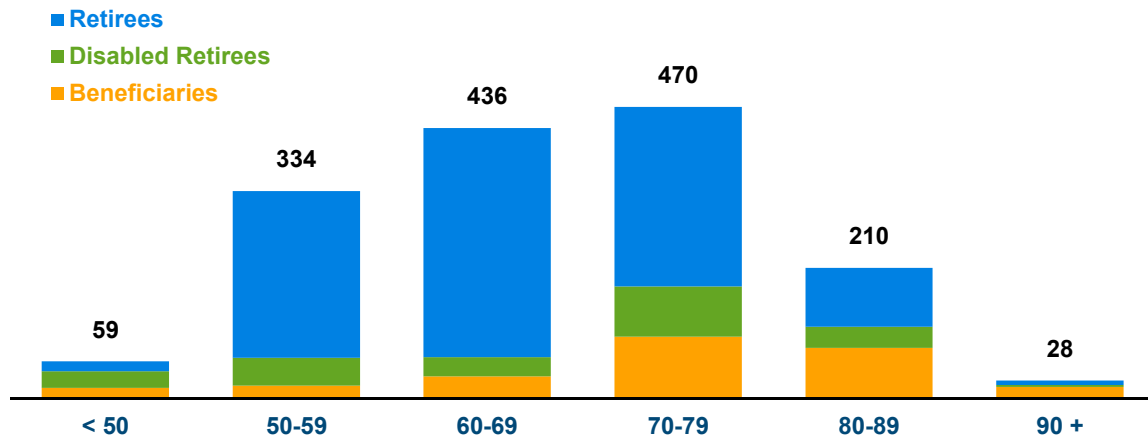
- Terminated Members
- Members in Pay Status
- Active Members in DROP Program
- Active Members Not In DROP Program



Members in Pay Status on January 1, 2021

Retirees	1,047	Average Age	68.2
Disabled Retirees	221	Total Annual Benefit	\$81,463,846
Beneficiaries	<u>269</u>	Average Annual Benefit	53,002
Total	1,537		

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



Section I - Executive Summary Membership (continued)

Terminated Vested Members on January 1, 2021

Count	8
Average Age	47.2
Total Annual Benefit	\$324,478
Average Annual Benefit	25,291

Nonvested Members Due Refunds on January 1, 2021

Count	7
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Active Members Not In DROP Program on January 1, 2021

	Police		Fire		Total
	Tier I & II	Tier III	Tier I & II	Tier III	
Count	464	340	465	170	1,439
Average Age	45.6	34.6	46.2	32.9	41.7
Average Service	17.4	4.9	17.2	3.9	12.8
Covered Payroll (\$ millions)	\$47.5	\$29.3	\$49.4	\$14.4	\$140.6
Average Payroll	102,450	86,115	106,234	84,508	97,694

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25	15							15
25-29	110	23						133
30-34	108	64	24					196
35-39	50	48	141	21				260
40-44	26	20	113	87	38			284
45-49	8	13	58	90	117	2		288
50-54	6	3	23	49	109	4		194
55-59			7	12	35			54
60-64			2	2	11			15
65+								0
Total	323	171	368	261	310	6	0	1,439

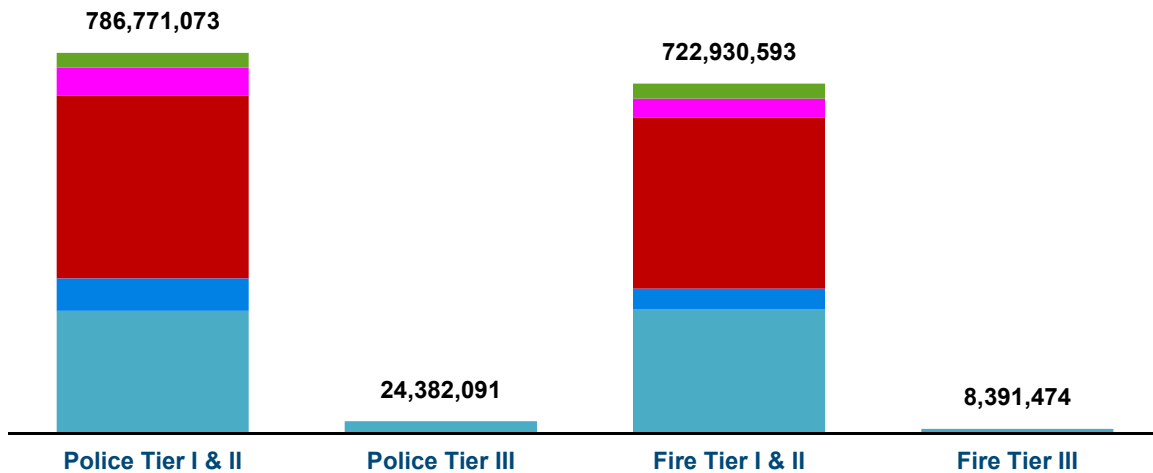
Active Members in DROP Program on January 1, 2021

Count	94
Average Age	53.6
Average Service	27.4
Covered Payroll (\$ millions)	\$10.028
Average Payroll	106,681
Total DROP Account Balance (\$ millions)	\$15.664
Average Account Balance	166,640

Section I - Executive Summary Accrued Liability

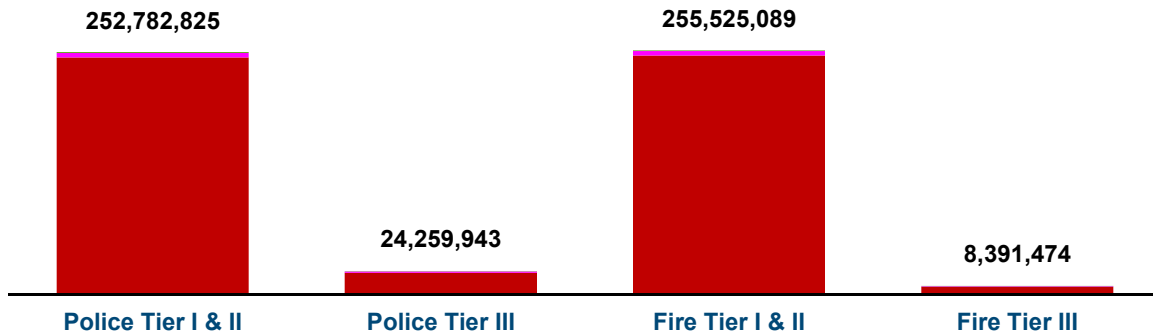
The total Accrued Liability as of January 1, 2021 equals \$1,542,475,231, which consists of the following pieces:

- Beneficiaries = \$61.3 million
- Disabled Retirees = \$97.3 million
- Retirees = \$731.2 million
- Terminated Members = \$2.0 million
- Active Members in DROP Program = \$109.6 million
- Active Members Not In DROP Program = \$541.0 million



The Accrued Liability for active members who are not in the DROP program can be broken down further by the different types of benefits provided by the plan:

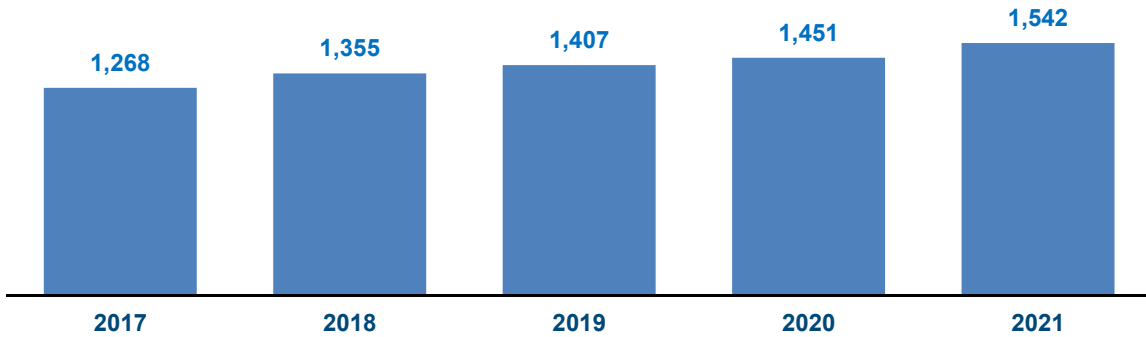
- Preretirement Death = \$1.9 million
- Disability = \$11.6 million
- Retirement = \$527.4 million
- Termination = \$0.0 million



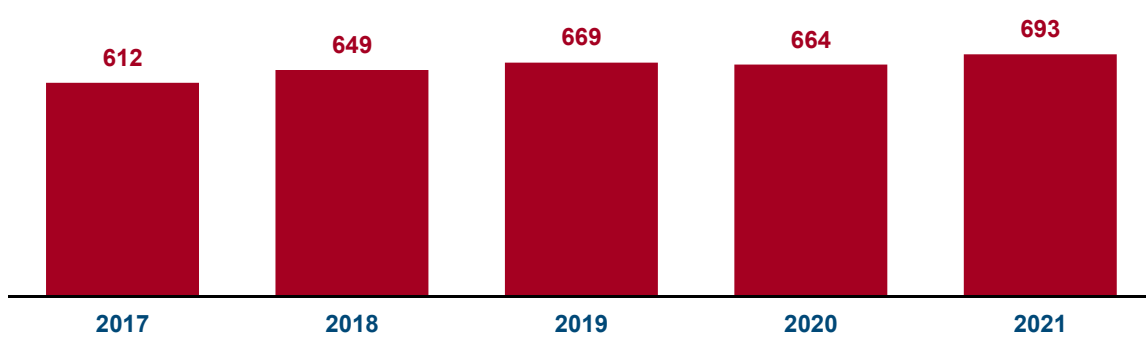
Section I - Executive Summary Funded Status

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.

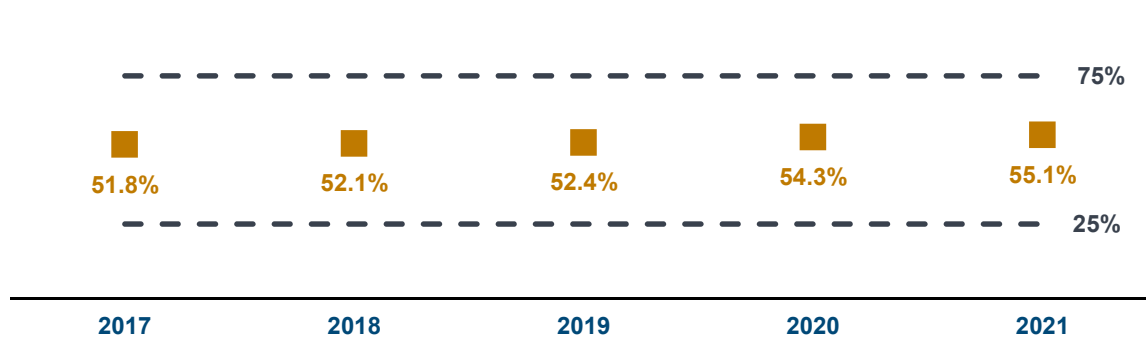
Accrued Liability (\$ millions)



Unfunded Accrued Liability (\$ millions)



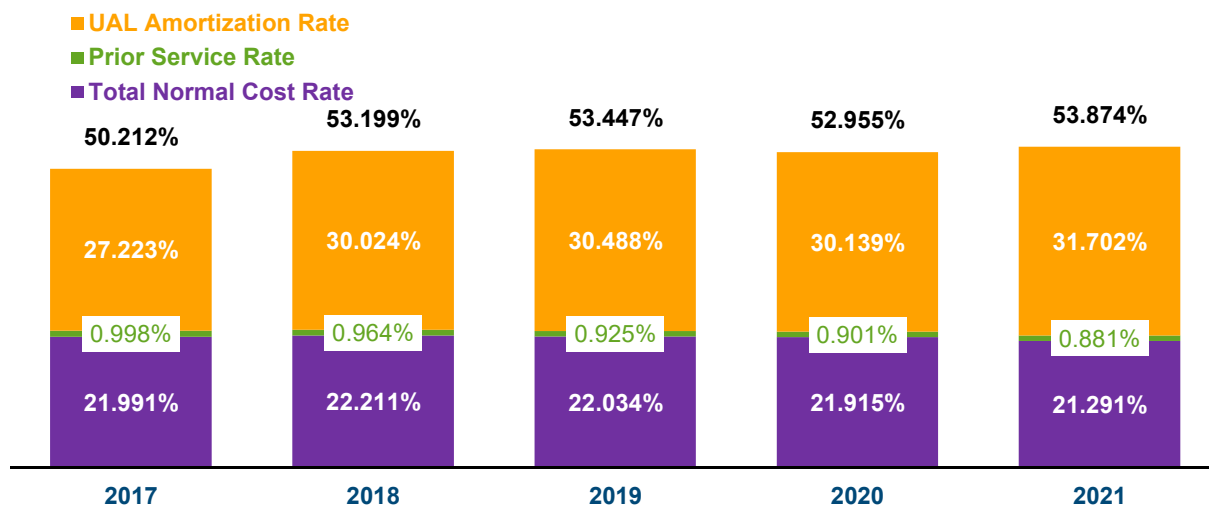
Funded Ratio



Section I - Executive Summary

Actuarially Determined Total Contribution

The Actuarially Determined Total Contribution consists of three pieces: a Normal Cost payment to fund the benefits earned each year, a special fixed series of small "prior service" City payments through 2028, and an amortization payment to gradually fund the remainder of the Unfunded Accrued Liability (UAL) over a period of years. These figures are first calculated as dollar amounts. The dollar amounts are then divided by the expected payroll for active members to arrive at a contribution rate. The Actuarially Determined Total Contribution Rate for the current valuation and the prior four valuations are shown below.



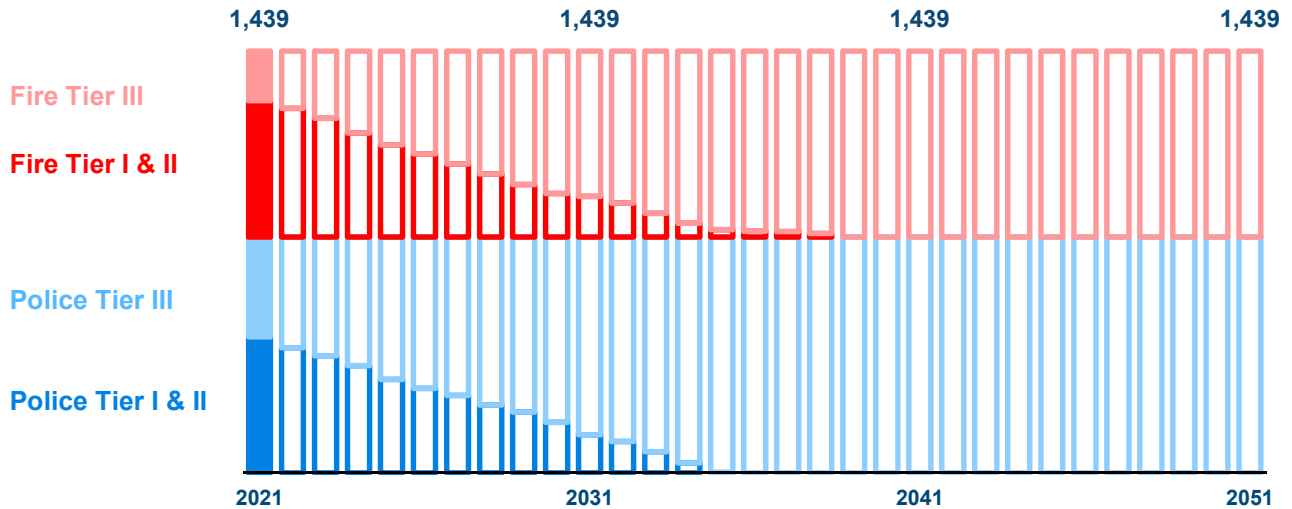
The Actuarially Determined Employer Contribution is equal to the Actuarially Determined Total Contribution less the amounts that are contributed by the active members. Per Ordinance Section 22-73(b), the City contributes a specified percentage of each active member's pensionable earnings plus the Prior Service Payments. In any given year, these fixed City contributions may be more or less than the Actuarially Determined Employer Contribution:

	2020	2021
Total Normal Cost Rate	21.915%	21.291%
Prior Service Rate	0.901%	0.881%
UAL Amortization Rate	<u>30.139%</u>	<u>31.702%</u>
Actuarially Determined Total Contribution Rate	52.955%	53.874%
Less Employee Contribution Rate	<u>-16.554%</u>	<u>-16.576%</u>
Actuarially Determined Employer Contribution Rate	36.401%	37.298%
City Ordinance Contribution Rate	33.781%	33.768%
Prior Service Rate	<u>0.901%</u>	<u>0.881%</u>
Bargained City Contribution Rate	34.682%	34.649%
Contribution Rate (Shortfall)/Margin	-1.719%	-2.649%

Section I - Executive Summary Long-Range Forecast

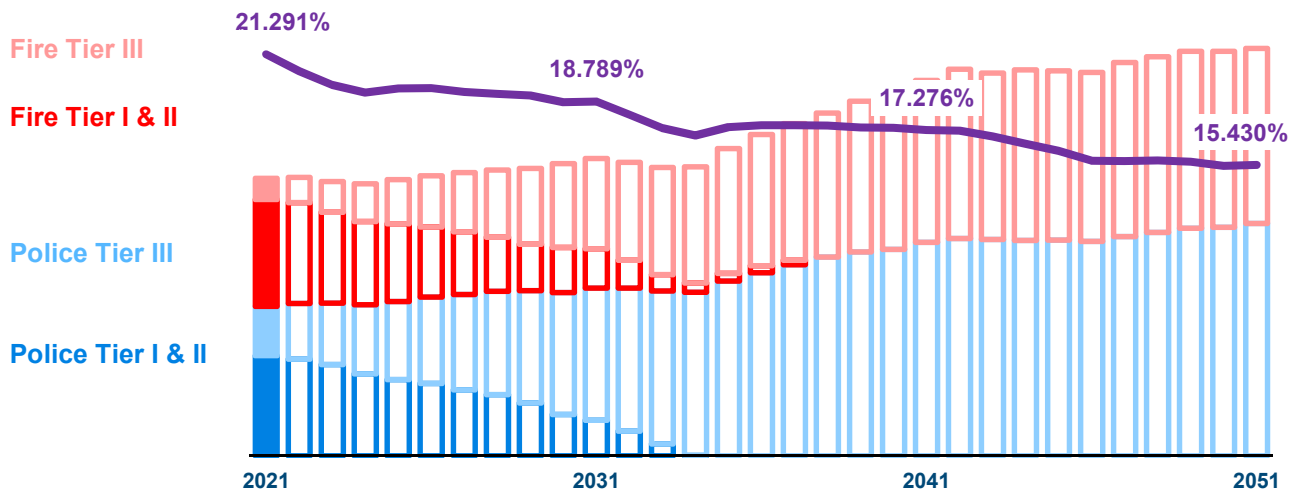
For purposes of our long-range forecast, we assume that the overall number of active members remains constant. However, over time the composition of the active membership will change, as terminating and retiring Tier I and Tier II members are replaced with employees who are covered by the lower cost Tier III. This shift is illustrated in the graph below.

Projected Active Member Count



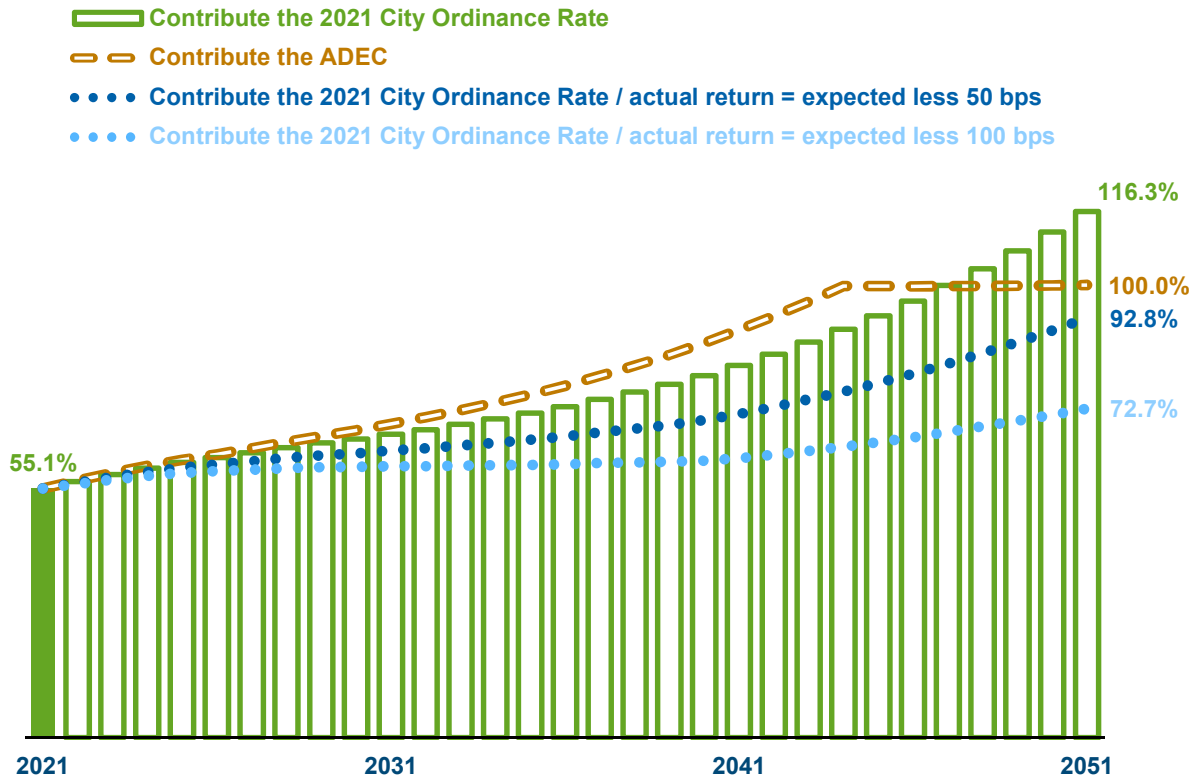
The Normal Cost Rate component of the Actuarially Determined Contribution will reflect this shift, as Tier I & II active members with higher Normal Costs are gradually replaced by Tier III active members with lower Normal Costs. Note that each individual active member's Normal Cost (in dollars) is expected to go up over time with salary growth, so for the plan as a whole the Normal Cost (in dollars) is projected to increase over the long term while the Normal Cost Rate (the purple line below) is expected to decline.

Projected Normal Cost (\$ millions)



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 Employer Contribution each year, or if the investments persistently earn less than the assumed interest rate, then the plan's funded status would suffer. The impact on the plan's funded ratio of contributing an amount different than the ADC 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, 2021
Active Members Not In DROP Program	1,480	1,439
Active Members in DROP Program	70	94
Terminated Members	14	15
Members in Pay Status	<u>1,536</u>	<u>1,537</u>
Total Count	3,100	3,085

Assets and Liabilities as of	January 1, 2020	January 1, 2021
Market Value of Assets	\$800,871,242	\$868,912,882
Actuarial Value of Assets	787,558,791	849,308,716
Accrued Liability for Active Members Not In DROP Program	505,971,211	540,959,331
Accrued Liability for Active Members in DROP Program	79,323,797	109,575,871
Accrued Liability for Terminated Members	2,068,140	2,079,256
Accrued Liability for Members in Pay Status	<u>864,089,684</u>	<u>889,860,773</u>
Total Accrued Liability	1,451,452,832	1,542,475,231
Unfunded Accrued Liability	663,894,041	693,166,515
Funded Ratio	54.3%	55.1%

Contribution Rate for Fiscal Year	2020	2021
Total Normal Cost Rate	21.915%	21.291%
Prior Service Rate	0.901%	0.881%
UAL Amortization Rate	<u>30.139%</u>	<u>31.702%</u>
Actuarially Determined Total Contribution Rate	52.955%	53.874%
Employee Contribution Rate	<u>-16.554%</u>	<u>-16.576%</u>
Actuarially Determined Employer Contribution Rate	36.401%	37.298%
City Ordinance Contribution Rate	33.781%	33.768%
Prior Service Rate	<u>0.901%</u>	<u>0.881%</u>
Bargained City Contribution Rate	34.682%	34.649%
Contribution Rate (Shortfall)/Margin	-1.719%	-2.649%

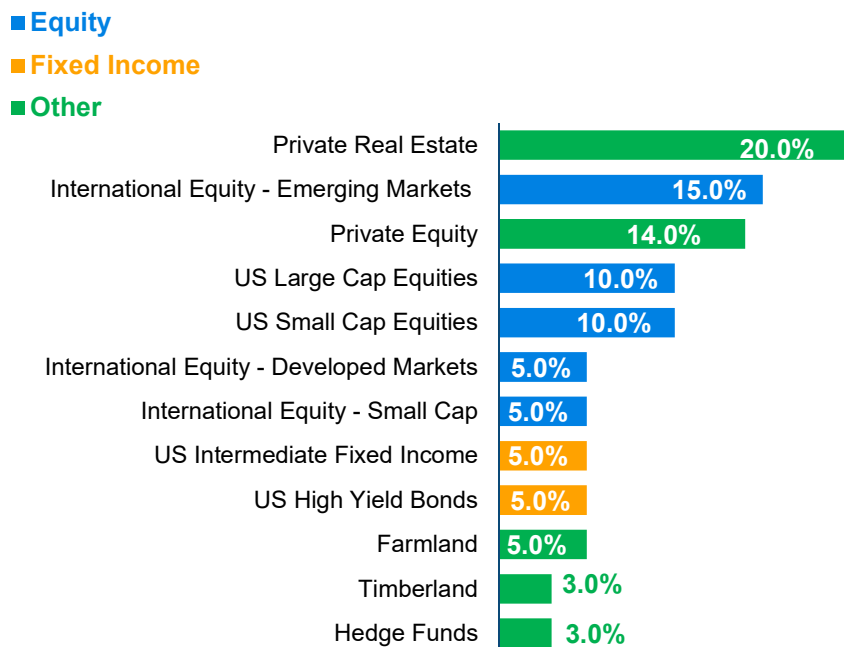
Section II - Plan Assets

A. Summary of Fund Transactions

Market Value as of January 1, 2020	\$800,871,242
City Contributions	51,858,647
Member Contributions	24,318,151
Net Investment Income	73,649,012
Benefit Payments	(81,784,170)
Market Value as of December 31, 2020	868,912,882
Expected Return on Market Value of Assets	61,839,636
Market Value (Gain)/Loss	(11,809,376)
Approximate Rate of Return *	9.23%

* 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, 2020



Section II - Plan Assets

B. Development of Actuarial Value of Assets

In order to minimize the impact of market fluctuations on the contribution level, we use an Actuarial Value of Assets that recognizes gains and losses asymptotically over a four year period. The Actuarial Value of Assets as of January 1, 2021 is determined below.

1.	Expected Actuarial Value of Assets:	
	a. Actuarial Value of Assets as of January 1, 2020	\$787,558,791
	b. City and Member Contributions	76,176,798
	c. Benefit Payments	(81,784,170)
	d. Expected Earnings Based on 7.75% Interest	<u>60,822,575</u>
	e. Expected Actuarial Value of Assets as of January 1, 2021	842,773,994
2.	Market Value of Assets as of January 1, 2021	868,912,882
3.	Unrecognized Gains/(Losses): (2) - (1e)	26,138,888
4.	Amount Recognized as of January 1, 2021: 25% of (3)	6,534,722
5.	Preliminary Actuarial Value of Assets as of January 1, 2021: (1e) + (4)	849,308,716
6.	Preliminary Actuarial Value of Assets as a % of Market Value: (5) / (2)	97.7%
7.	Actuarial Value of Assets as of January 1, 2021: (5), within +/- 20% of (2)	849,308,716
8.	Actual Earnings on Actuarial Value of Assets: (7) - [(1a) + (1b) + (1c)]	67,357,297
9.	Approximate Rate of Return on Actuarial Value of Assets	8.58%
10.	Actuarial Value (Gain)/Loss: (1d) - (8)	(6,534,722)

Section III - Development of Contribution

A. Actuarial Balance Sheet

The Actuarial Balance Sheet sets forth the value in today's dollars of all benefits that are expected to be paid from the Plan over the course of the current members' combined lifetimes. It also identifies the sources of assets that are available or will be required in future years in order to fully fund all of the benefits.

	January 1, 2020	January 1, 2021
Liabilities: Present Value of Future Benefits		
Active Members Not In DROP Program	\$776,129,464	\$777,417,105
Active Members in DROP Program	79,323,797	109,575,871
Terminated Vested Members	2,035,463	1,957,108
Nonvested Members Due Refunds	32,677	122,148
Retirees	770,988,001	731,247,014
Disabled Retirees	93,101,683	97,348,375
Beneficiaries	<u>incl. with retirees</u>	<u>61,265,384</u>
Total Liabilities	1,721,611,085	1,778,933,005

Assets

Actuarial Value of Current Assets (see Section II B)	\$787,558,791	\$849,308,716
Present value of future employer normal costs	**	48,139,853
Present value of future employee contributions	**	188,317,921
Present value of future prior service payments	8,698,960	7,995,044
Present value of future UAL amortization payments	<u>655,195,081</u>	<u>685,171,471</u>
Total Assets	1,721,611,085	1,778,933,005

** breakdown not available; total is \$270,158,253

Per Ordinance Section 22-73(b), the City contributes a specified percentage of each active member's pensionable earnings, which is designed to fund the employer portion of the normal cost plus the UAL amortization payments. If the present value of future City contributions per these specified rates is lower than the present value of future UAL amortization payments plus the present value of future employer normal costs shown above, then the Plan may experience a shortfall of Assets relative to Liabilities. Based on the January 1, 2021 valuation, the City's Ordinance Contribution Rate is lower than the Actuarially Determined Employer Contribution Rate by 2.649%, indicating that such a shortfall may occur.

Section III - Development of Contribution

B. Unfunded Accrued Liability

Section III A set forth the Plan's Present Value of Future Benefits. The actuarial cost method used to calculate the Actuarially Determined Contribution is the Entry Age Normal Cost Method. Under this method, the Present Value of Future Benefits for each active member is allocated as a level percentage of earnings to past years of service (the Accrued Liability), the current year (the Normal Cost), and future years. That is, the Accrued Liability for active members is equal to the portion of the Present Value of Future Benefits that will not be funded through future Normal Cost payments. For each non-active member, the Accrued Liability is equal to the Present Value of Future Benefits. The Actuarial Value of Assets is subtracted from the Accrued Liability to determine the Unfunded Accrued Liability. And as a final step, the present value of future Prior Service payments is subtracted to arrive at the amount that must be funded through future UAL amortization payments.

	January 1, 2020	January 1, 2021
1. Present Value of Future Benefits (see Section III A)	\$1,721,611,085	\$1,778,933,005
2. Present Value of Future Normal Costs	270,158,253	236,457,774
3. Accrued Liability		
Active Members Not In DROP Program	505,971,211	540,959,331
Active Members in DROP Program	79,323,797	109,575,871
Terminated Vested Members	2,035,463	1,957,108
Nonvested Members Due Refunds	32,677	122,148
Retirees	770,988,001	731,247,014
Disabled Retirees	93,101,683	97,348,375
Beneficiaries	<u>incl. with retirees</u>	<u>61,265,384</u>
Total = (1) - (2)	1,451,452,832	1,542,475,231
4. Actuarial Value of Assets (see Section II B)	787,558,791	849,308,716
5. Unfunded Accrued Liability: (3) - (4)	663,894,041	693,166,515
6. Funded Ratio: (4) / (3)	54.3%	55.1%
7. Prior Service Payments	1,327,600	1,327,600
8. Remaining Years of Prior Service Payments	9	8
9. Present Value of Prior Service Payments	8,698,960	7,995,044
10. Adjusted Unfunded Accrued Liability to be funded with UAL Amortization Payments: (5) - (9)	655,195,081	685,171,471

Section III - Development of Contribution

C. UAL Amortization Payments

The Unfunded Accrued Liability developed in Section III B (UAL) is amortized as follows. An initial base with the UAL as of January 1, 2018 is amortized over a closed period of 26 years. A new base is created in each subsequent year based on any change in the Unfunded Accrued Liability that arises from actual experience being different than is expected based on the actuarial method and assumptions; this amount is amortized as a level percent over a closed 20-year period. If assumption changes are made, a separate base is established based on the resulting change in the Unfunded Accrued Liability; this amount is amortized as a level percent over a closed period selected by the Board.

1. Amortization Bases Established in Prior Years

Date Established	(a) Outstanding Balance January 1, 2021	Years Remaining January 1, 2021	(b) Annual Amortization Payment
January 1, 2018	\$655,959,130	23	\$45,488,990
January 1, 2019	14,543,315	18	1,176,239
January 1, 2020	<u>(10,612,003)</u>	19	<u>(828,335)</u>
Total	659,890,442		45,836,894
2. Unfunded Accrued Liability as of January 1, 2021 (see Section III B)			685,171,471
3. New Amortization Base Established January 1, 2021: (2) - (1a Total)			25,281,029
4. Amortization Period for New Amortization Base			20
5. Amortization Growth Rate			3.25%
6. Amortization Payment for January 1, 2021: (3) amortized over (4)			1,909,505
7. Total UAL Amortization Payments: (1b Total) + (6)			47,746,399
8. Covered Payroll for Active and DROP Members			150,609,022
9. UAL Amortization Payment Rate: (7) ÷ (8)			31.702%
10. Prior Service Payments (see Section III B)			1,327,600
11. Prior Service Payment Rate: (10) ÷ (8)			0.881%

Section III - Development of Contribution

D. Normal Cost

The Normal Cost is the portion of the Present Value of Future Benefits that is allocated to the current year for active members.

	2020	2021
1. Total Normal Cost by Type of Benefit		
Retirement		\$25,078,453
Termination		898,178
Preretirement Death		565,189
Disability		<u>2,884,946</u>
Total	30,643,540	29,426,766
2. Total Normal Cost by Group and Tier		
Police Tier I & II		10,608,896
Police Tier III		5,254,516
Fire Tier I & II		11,320,304
Fire Tier III		<u>2,243,050</u>
Total	30,643,540	29,426,766
3. Expected Payroll for Active and DROP Members		
Police Tier I & II		47,648,611
Police Tier III		27,914,162
Fire Tier I & II		48,899,400
Fire Tier III		<u>13,752,225</u>
Total	139,827,256	138,214,398
4. Total Normal Cost Rate: (2) ÷ (3)		
Police Tier I & II		22.265%
Police Tier III		18.824%
Fire Tier I & II		23.150%
Fire Tier III		16.310%
Total	21.915%	21.291%

Section III - Development of Contribution

E. Employee Contributions

A portion of the Normal Cost is funded through employee contributions from active members, including members in the DROP Program.

	2020	2021
1. Employee Contribution Rate		
Police Tier I & II	16.100%	16.100%
Police Tier III	16.100%	16.100%
Fire Tier I & II	17.150%	17.150%
Fire Tier III	17.150%	17.150%
2. Expected Payroll for Active and DROP Members		
Police Tier I & II		\$47,648,611
Police Tier III		27,914,162
Fire Tier I & II		48,899,400
Fire Tier III		<u>13,752,225</u>
Total		138,214,398
3. Expected Employee Contributions in Current Year: (1) x (2)		
Police Tier I & II		7,671,426
Police Tier III		4,494,180
Fire Tier I & II		8,386,247
Fire Tier III		<u>2,358,507</u>
Total		22,910,360
4. Blended Employee Contribution Rate: (3 Total) ÷ (2 Total)	16.554%	16.576%

Section III - Development of Contribution

F. City Contributions Per Ordinance

Per Ordinance Section 22-73(b), the City contributes a specified percentage of each active member's pensionable earnings (including members in the DROP Program), which is designed to fund the employer portion of the Normal Cost plus the UAL amortization payments.

	2020	2021
1. City Contribution Rate Per Ordinance		
Police Tier I & II	34.420%	34.420%
Police Tier III	34.420%	34.420%
Fire Tier I & II	32.965%	32.965%
Fire Tier III	32.965%	32.965%
2. Covered Payroll for Active and DROP Members		
Police Tier I & II		53,864,683
Police Tier III		29,279,130
Fire Tier I & II		53,098,873
Fire Tier III		<u>14,366,336</u>
Total		150,609,022
3. Expected City Contribution Dollars: (1) x (2)		
Police Tier I & II		18,540,224
Police Tier III		10,077,877
Fire Tier I & II		17,504,043
Fire Tier III		<u>4,735,863</u>
Total		50,858,007
4. City Contribution Rate Per Ordinance: (3 Total) ÷ (2 Total)	33.781%	33.768%

Section III - Development of Contribution

G. Actuarially Determined Contribution

	2020	2021
In Dollars		
1. Actuarially Determined Total Contribution		
a. Total Normal Cost (see Section III D)		\$29,426,766
b. Prior Service Payment (see Section III C)		1,327,600
c. UAL Amortization Payment (see Section III C)		47,746,399
d. Total		78,500,765
2. Expected Employee Contributions (see Section III E)		22,910,360
3. Actuarially Determined Employer Contributions: (1) - (2)	\$55,078,027	55,590,405
4. City Contributions per Ordinance (see Section III F)	49,759,893	50,858,007
5. Total City Contributions: (4) + (1b)	51,087,493	52,185,607
6. Contribution (Shortfall) / Margin: (5) - (3)	(3,990,534)	(3,404,798)

As a Percentage of Payroll

1. Actuarially Determined Total Contribution Rate		
a. Total Normal Cost Rate (see Section III D)	21.915%	21.291%
b. Prior Service Payment Rate (see Section III C)	0.901%	0.881%
c. UAL Amortization Rate (see Section III C)	30.139%	31.702%
d. Total	52.955%	53.874%
2. Expected Employee Contribution Rate (see Section III E)	16.554%	16.576%
3. Actuarially Determined Employer Contribution Rate: (1) - (2)	36.401%	37.298%
4. City Contribution Rate per Ordinance (see Section III F)	33.781%	33.768%
5. Total City Contribution Rate: (4) + (1b)	34.682%	34.649%
6. Contribution Rate (Shortfall) / Margin: (5) - (3)	-1.719%	-2.649%

Section III - Development of Contribution H. Long Range Forecast

This forecast is based on the results of the January 1, 2021 actuarial valuation and assumes that the City will pay the City Ordinance Rate plus the Prior Service Payments, 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. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets. Amounts are shown in millions.

Valuation Date	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio	Fiscal Year	City Contributions	Member Contributions	Benefit Payments	Net Cash Flows
1/1/2021	\$1,542.5	\$849.3	\$693.2	55.1%	2021	\$52.2	\$22.9	(\$88.0)	(\$12.9)
1/1/2022	1,602.7	907.0	695.7	56.6%	2022	53.5	24.0	(91.3)	(13.8)
1/1/2023	1,664.3	967.2	697.1	58.1%	2023	54.9	24.5	(97.5)	(18.1)
1/1/2024	1,723.8	1,026.9	696.9	59.6%	2024	56.1	24.8	(110.5)	(29.5)
1/1/2025	1,773.6	1,078.6	695.1	60.8%	2025	56.8	24.9	(118.7)	(37.0)
1/1/2026	1,818.9	1,126.0	692.9	61.9%	2026	57.1	25.3	(122.4)	(40.0)
1/1/2027	1,864.0	1,173.5	690.4	63.0%	2027	58.2	25.8	(122.3)	(38.3)
1/1/2028	1,913.4	1,226.2	687.2	64.1%	2028	59.6	26.2	(132.8)	(47.1)
1/1/2029	1,955.7	1,273.6	682.2	65.1%	2029	59.4	26.4	(142.1)	(56.3)
1/1/2030	1,991.7	1,314.8	677.0	66.0%	2030	60.4	27.4	(136.9)	(49.2)
1/1/2031	2,036.9	1,366.4	670.5	67.1%	2031	61.9	27.8	(148.3)	(58.5)
1/1/2032	2,074.3	1,412.1	662.2	68.1%	2032	63.3	28.5	(145.7)	(53.8)
1/1/2033	2,117.1	1,466.1	651.0	69.3%	2033	64.9	29.2	(155.6)	(61.5)
1/1/2034	2,152.2	1,516.3	636.0	70.5%	2034	66.5	29.9	(159.9)	(63.5)
1/1/2035	2,185.2	1,568.1	617.1	71.8%	2035	68.3	31.0	(162.9)	(63.7)
1/1/2036	2,219.3	1,623.8	595.6	73.2%	2036	70.5	32.2	(160.0)	(57.3)
1/1/2037	2,260.9	1,690.3	570.6	74.8%	2037	73.1	33.3	(177.1)	(70.7)
1/1/2038	2,289.0	1,748.1	540.9	76.4%	2038	75.4	34.4	(183.8)	(74.0)
1/1/2039	2,313.6	1,806.8	506.8	78.1%	2039	78.0	35.8	(185.2)	(71.4)
1/1/2040	2,340.2	1,872.8	467.4	80.0%	2040	80.8	36.8	(169.2)	(51.5)

Section III - Development of Contribution

H. Long Range Forecast (continued)

This forecast is based on the results of the January 1, 2021 actuarial valuation and assumes that the City will pay the City Ordinance Rate plus the Prior Service Payments, 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. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets. Amounts are shown in millions.

Valuation Date	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio	Fiscal Year	City Contributions	Member Contributions	Benefit Payments	Net Cash Flows
1/1/2041	\$2,387.3	\$1,964.4	\$422.9	82.3%	2041	\$83.2	\$38.2	(\$169.5)	(\$48.1)
1/1/2042	2,439.0	2,066.8	372.2	84.7%	2042	86.0	39.4	(168.2)	(42.7)
1/1/2043	2,497.3	2,182.7	314.6	87.4%	2043	88.7	39.7	(178.3)	(49.8)
1/1/2044	2,549.2	2,300.1	249.1	90.2%	2044	90.1	41.0	(176.8)	(45.7)
1/1/2045	2,607.1	2,430.9	176.2	93.2%	2045	92.6	41.8	(184.8)	(50.5)
1/1/2046	2,660.9	2,566.9	94.0	96.5%	2046	94.8	43.1	(184.1)	(46.3)
1/1/2047	2,719.5	2,717.8	1.7	99.9%	2047	97.3	44.2	(189.4)	(47.8)
1/1/2048	2,777.9	2,878.8	(100.9)	103.6%	2048	100.0	44.8	(202.4)	(57.6)
1/1/2049	2,827.7	3,042.0	(214.3)	107.6%	2049	102.0	45.6	(207.8)	(60.3)
1/1/2050	2,876.3	3,215.2	(338.9)	111.8%	2050	103.9	46.3	(212.2)	(62.0)

This forecast has 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. For those unions whose new employees are eligible to participate in this plan, members who are projected to leave active employment 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. The forecasts assume the current blended member and City contribution rates remain fixed during the projection period.

Section III - Development of Contribution

I. History of Funded Status

Valuation Date	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
January 1, 2011	\$456,158,774	\$1,028,866,353	\$572,707,579	44.3%
January 1, 2012	467,375,458	1,077,607,299	610,231,841	43.4%
January 1, 2013	495,847,234	1,108,874,778	613,027,544	44.7%
January 1, 2014	548,360,223	1,170,967,753	622,607,530	46.8%
January 1, 2015	590,191,585	1,189,002,221	598,810,636	49.6%
January 1, 2016	621,403,975	1,223,966,110	602,562,135	50.8%
January 1, 2017	656,171,797	1,267,909,175	611,737,378	51.8%
January 1, 2018	706,595,615	1,355,429,537	648,833,922	52.1%
January 1, 2019	737,383,005	1,406,832,664	669,449,659	52.4%
January 1, 2020	787,558,791	1,451,452,832	663,894,041	54.3%
January 1, 2021	849,308,716	1,542,475,231	693,166,515	55.1%

Section III - Development of Contribution

J. History of City Contributions

Fiscal Year	Actuarially Determined Contribution	Actual City Contribution	Covered Payroll	Actual Contribution as a Percent of Covered Payroll
2011	\$49,945,979	\$30,775,568	\$105,025,610	29.3%
2012	54,310,693	35,302,037	110,027,537	32.1%
2013	52,895,180	43,838,750	116,056,740	37.8%
2014	43,524,890	41,851,986	124,051,668	33.7%
2015	41,910,737	42,138,403	126,843,763	33.2%
2016	42,468,180	43,235,242	129,633,658	33.4%
2017	45,939,660	46,608,741	133,044,481	35.0%
2018	50,677,368	48,796,603	137,647,929	35.5%
2019	51,822,865	49,779,284	143,575,171	34.7%
2020	55,078,027	51,858,647	147,301,421	35.2%
2021	55,590,405	TBD	150,609,022	TBD

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 Not In DROP Program	Active Members in DROP Program	Terminated Vested Members	Nonvested Members Due Refunds	Retirees	Disabled Retirees	Beneficiaries	Total
Count on January 1, 2020	1,480	70	8	6	1,027	224	285	3,100
Terminated, return of contributions due	(4)	-	-	4	-	-	-	-
Terminated, paid refund	(8)	-	-	(1)	-	-	-	(9)
Terminated, vested benefits due	(3)	-	3	-	-	-	-	-
Entered DROP program	(31)	31	-	-	-	-	-	-
Normal retirement	(27)	(7)	(2)	-	36	-	-	-
Disability retirement	(7)	-	(1)	-	-	8	-	-
Died with beneficiary	-	-	-	-	(6)	(8)	14	-
Died with no beneficiary	-	-	-	-	(10)	(3)	(27)	(40)
Benefits expired	-	-	-	-	-	-	-	-
New member	37	-	-	-	-	-	-	37
Rehired	2	-	-	(2)	-	-	-	-
New Alternate Payee	-	-	-	-	-	-	-	-
Correction	-	-	-	-	-	-	(3)	(3)
Count on January 1, 2021	1,439	94	8	7	1,047	221	269	3,085

Section IV - Membership Data

B. Statistics of Active Membership Not in DROP Program

		As of January 1, 2020	As of January 1, 2021
Count	Police Tier I & II	497	464
	Police Tier III	351	340
	Fire Tier I & II	500	465
	Fire Tier III	<u>132</u>	<u>170</u>
	Total	1,480	1,439
Average Age	Police Tier I & II		45.6
	Police Tier III		34.6
	Fire Tier I & II		46.2
	Fire Tier III		32.9
	Total	41.4	41.7
Average Service	Police Tier I & II		17.4
	Police Tier III		4.9
	Fire Tier I & II		17.2
	Fire Tier III		3.9
	Total	12.6	12.8
Covered Payroll	Police Tier I & II		\$47,536,657
	Police Tier III		29,279,130
	Fire Tier I & II		49,398,890
	Fire Tier III		<u>14,366,336</u>
	Total	N/A	140,581,013
Average Covered Payroll	Police Tier I & II		\$91,411
	Police Tier III		82,100
	Fire Tier I & II		98,147
	Fire Tier III		80,895
	Total	N/A	90,146

Section IV - Membership Data

C. Distribution of Active Police Members as of January 1, 2021

Police Tier I & II

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34			6					6
35-39			78	21				99
40-44			43	57	19			119
45-49			23	34	60	2		119
50-54			10	27	50	2		89
55-59			3	5	19			27
60-64			2	1	2			5
65+								0
Total	0	0	165	145	150	4	0	464

Police Tier III

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25	8							8
25-29	60	15						75
30-34	71	37	12					120
35-39	31	27	10					68
40-44	18	10	16					44
45-49	5	7	5					17
50-54	4	2	2					8
55-59								0
60-64								0
65+								0
Total	197	98	45	0	0	0	0	340

Section IV - Membership Data

D. Distribution of Active Fire Members as of January 1, 2021

Fire Tier I & II

Age	Years of Service						Total
	0-4	5-9	10-14	15-19	20-24	25-29	
< 25							0
25-29		3					3
30-34		11	6				17
35-39		10	53				63
40-44		2	54	30	19		105
45-49		3	30	56	57		146
50-54			11	22	59	2	94
55-59			4	7	16		27
60-64				1	9		10
65+							0
Total	0	29	158	116	160	2	465

Fire Tier III

Age	Years of Service						Total
	0-4	5-9	10-14	15-19	20-24	25-29	
< 25	7						7
25-29	50	5					55
30-34	37	16					53
35-39	19	11					30
40-44	8	8					16
45-49	3	3					6
50-54	2	1					3
55-59							0
60-64							0
65+							0
Total	126	44	0	0	0	0	170

Section IV - Membership Data

E. Statistics of Active Membership in DROP Program

		As of January 1, 2020	As of January 1, 2021
Count	Police Tier I & II		61
	Police Tier III		0
	Fire Tier I & II		33
	Fire Tier III		<u>0</u>
	Total	70	94
Average Age	Police Tier I & II		53.7
	Police Tier III		0.0
	Fire Tier I & II		53.4
	Fire Tier III		0.0
	Total	53.7	53.6
Average Service	Police Tier I & II		27.8
	Police Tier III		0.0
	Fire Tier I & II		26.7
	Fire Tier III		0.0
	Total	N/A	27.4
Covered Payroll	Police Tier I & II		\$6,328,026
	Police Tier III		0
	Fire Tier I & II		3,699,983
	Fire Tier III		<u>0</u>
	Total	N/A	10,028,009
DROP Account Balances*	Police Tier I & II		\$10,578,388
	Police Tier III		0
	Fire Tier I & II		5,085,799
	Fire Tier III		<u>0</u>
	Total	N/A	15,664,187

*Balances are as of the valuation date and do not include interest for the prior calendar year that may have been credited after the valuation date.

Section IV - Membership Data

F. Statistics of Inactive Membership

	As of January 1, 2020	As of January 1, 2021
Terminated Vested Members		
Number	8	8
Total Annual Benefit	\$172,044	\$324,478
Average Annual Benefit	21,506	40,560
Average Age	49.1	47.2
Nonvested Members Due Refunds		
Number	6	7
Retirees		
Number	1,027	1,047
Total Annual Benefit	\$62,761,356	\$65,146,136
Average Annual Benefit	61,111	62,222
Average Age	66.5	66.9
Disabled Retirees		
Number	224	221
Total Annual Benefit	\$8,489,664	\$9,203,941
Average Annual Benefit	37,900	41,647
Average Age	67.9	67.6
Beneficiaries		
Number	285	269
Total Annual Benefit	\$6,930,480	\$7,113,769
Average Annual Benefit	24,317	26,445
Average Age	72.6	73.5

Section IV - Membership Data
G. Distribution of Inactive Members as of January 1, 2021

	Age	Number	Annual Benefits
Terminated Vested Members	< 50	6	\$162,245
	50 - 59	2	40,084
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	8	202,329
Retirees	< 50	16	\$1,016,736
	50 - 59	269	19,383,133
	60 - 69	370	25,887,578
	70 - 79	290	15,030,088
	80 - 89	95	3,614,534
	90 +	<u>7</u>	<u>214,067</u>
	Total	1,047	65,146,136
Disabled Retirees	< 50	27	\$1,172,929
	50 - 59	45	2,201,258
	60 - 69	31	1,381,627
	70 - 79	81	3,011,547
	80 - 89	34	955,518
	90 +	<u>3</u>	<u>42,778</u>
	Total	221	8,765,658
Beneficiaries	< 50	16	\$387,070
	50 - 59	20	747,398
	60 - 69	35	1,448,881
	70 - 79	99	2,723,345
	80 - 89	81	1,587,000
	90 +	<u>18</u>	<u>220,075</u>
	Total	269	7,113,769

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 H for more information on the basis for the projected results shown on the following pages.

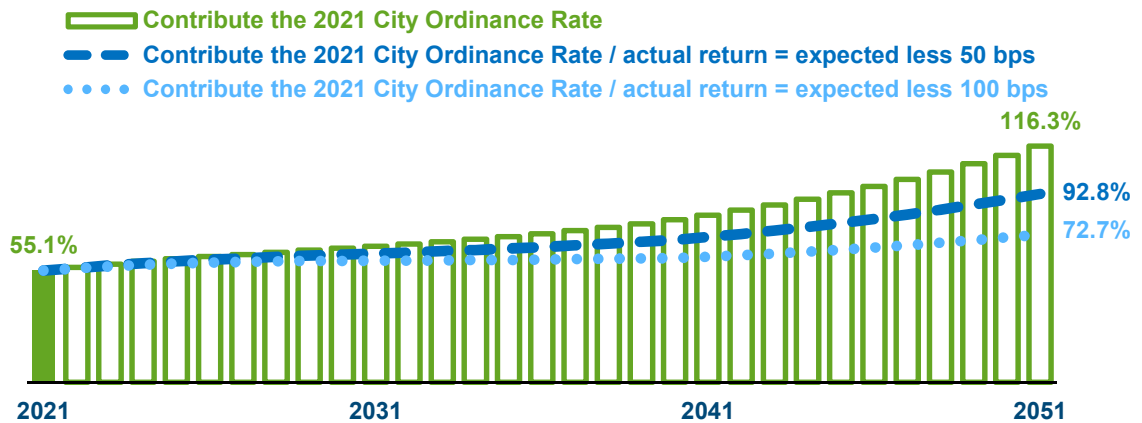
Section V - Analysis of Risk

B. Risk Identification and Assessment

Investment Risk

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

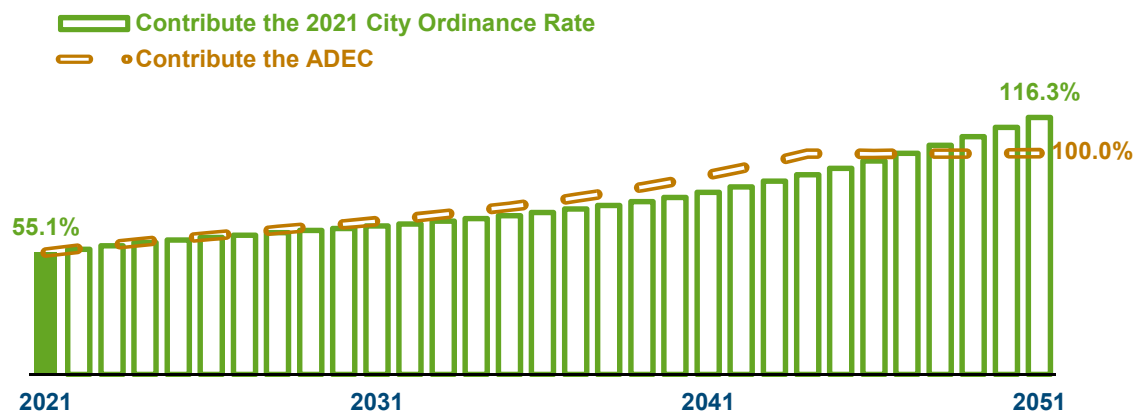
Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. The consequences of persistent underperformance on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



Contribution Risk

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

Identification: Over the past 10 years, actual City contributions (in dollars) have been 88.9% of the Actuarially Determined Contribution in total. The consequences of contributing an amount different than the Actuarially Determined Contribution on future funded ratio 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.

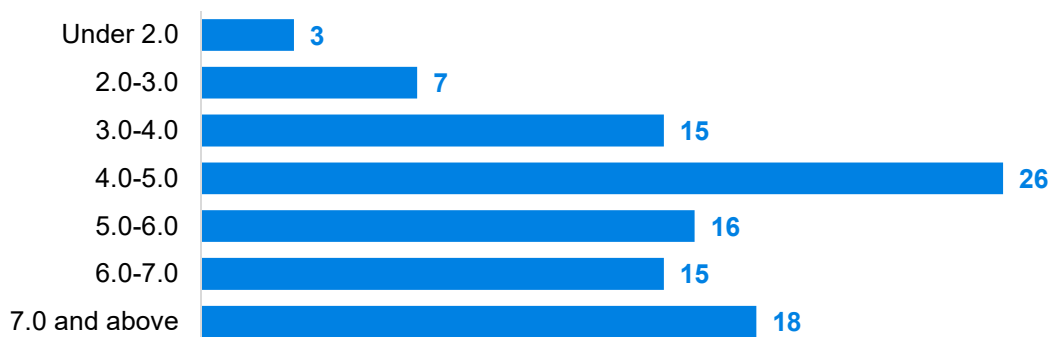
Identification: In 2020, the plan had negative cash flow, with city and member contributions to the plan of \$76,176,798 compared to \$81,784,170 of benefit payments paid out of the plan. We suggest that you consult with your investment advisors with respect to the liquidity characteristics of the plan's investment holdings.

Maturity Risk

Definition: This is the potential for total plan liabilities to become more heavily weighted toward inactive liabilities over time, and for plan assets and/or liabilities to become larger relative to the active member liability.

Identification: The plan is subject to maturity risk because as plan assets and liabilities continue to grow, the dollar impact of any gains or losses on the assets or liabilities also becomes larger.

Assessment: As of January 1, 2021, the plan's Asset Volatility Ratio (the ratio of the market value of plan assets to Covered Payroll) is 5.8. According to Milliman's 2020 Public Pension Funding Study, the 100 largest US public pension plans have the following range of Asset Volatility Ratios:



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 provides for some postretirement benefit increases, but the increases are not directly tied to each year's rate of actual inflation; this leaves members bearing some inflation risk.

Section V - Analysis of Risk

B. Risk Identification and Assessment

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.

Retirement Risk

Definition: This is the potential for members to retire and receive subsidized benefits that are more valuable than expected.

Identification: This plan permits members with long service to retire at relatively young ages. If members retire at earlier ages than are anticipated by the actuarial assumptions, this will put upward pressure on subsequent Actuarially Determined Contributions. This plan also permits members to elect to participate in a DROP program. If usage of the DROP program is different than is anticipated by the actuarial assumptions, this may put upward pressure on subsequent Actuarially Determined Contributions.

Pensionable Earnings Risk

Definition: This is the potential for active members to add items to their pensionable earnings and receive pension benefits that are higher than expected.

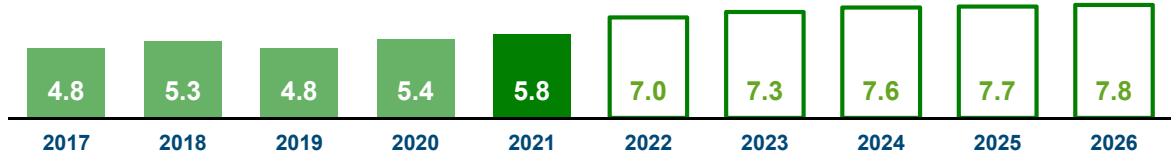
Identification: This plan allows for some overtime pay for some members to be included in pensionable earnings. If members retire with higher pensionable earnings than are anticipated by the actuarial assumptions, this will put upward pressure on subsequent Actuarially Determined Contributions.

Section V - Analysis of Risk

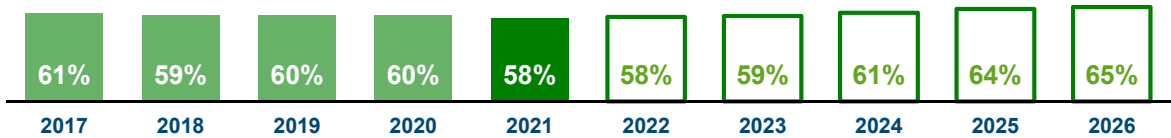
C. Maturity Measures

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.

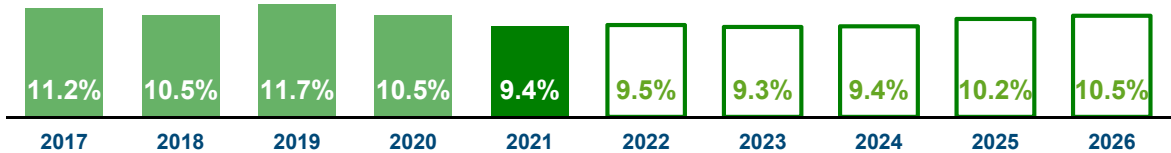
Asset Volatility Ratio: Market Value of Assets compared to Payroll



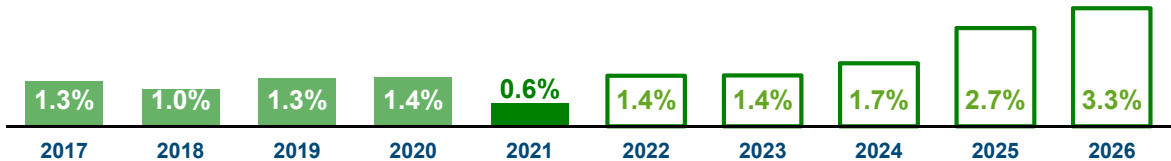
Accrued Liability for members in pay status compared to total Accrued Liability



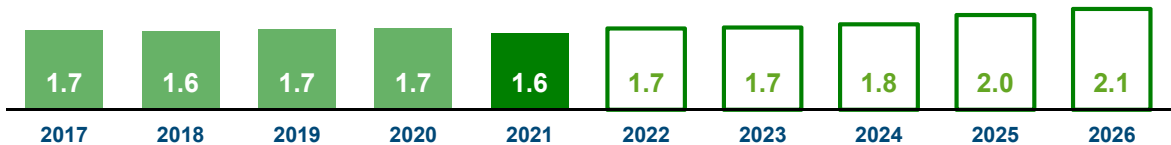
Benefit Payments compared to Market Value of Assets



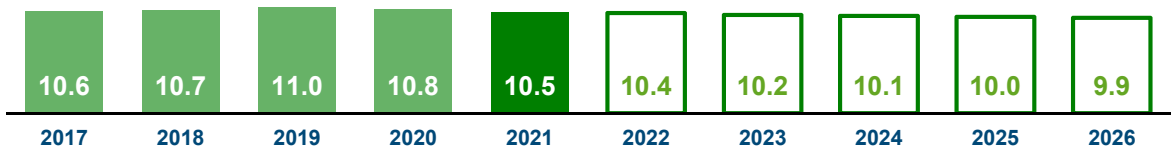
Net Cash Flows compared to Market Value of Assets



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 Employer Contribution consists of three pieces: a Normal Cost, plus a special fixed series of "prior service" City payments through 2028, plus an amortization payment to gradually eliminate the Unfunded Accrued Liability (UAL) over a period of years. Amounts contributed by active members are netted out of this amount.

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 of earnings 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. The initial base was funded as a level percent over a 26-year closed period that began January 1, 2018. A new base is created in each subsequent year based on any change in the Unfunded Accrued Liability that arises from actual experience being different than is expected based on the actuarial method and assumptions; this amount is amortized as a level percent over a closed 20-year period. If assumption changes are made, a separate base is established based on the resulting change in the Unfunded Accrued Liability; this amount is amortized as a level percent over a closed period selected by the Board.

The Actuarial Value of Assets is determined by recognizing market gains and losses asymptotically over a four year period, with the result constrained to within +/- 20% of the Market Value of Assets.

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. For those unions whose new employees are eligible to participate in this plan, members who are projected to leave active employment 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. The forecasts assume the current blended member and City contribution rates remain fixed during the projection period.

Appendix B - Actuarial Assumptions

The actuarial assumptions used herein were adopted by the Board based on an experience study prepared by Cavanaugh Macdonald Consulting LLC for the period ending December 31, 2015. We are unable to judge the reasonableness of the assumptions or methods without performing a substantial amount of additional work beyond the scope of the assignment, and have not done so. We will perform an experience study in the near future and will report the results of that analysis when it is complete.

Interest Rate 7.75%

Inflation 2.50%

Amortization Growth Rate 3.25%

Salary Increases Annual increases consisting of 2.50% inflation, 0.75% productivity, and merit/longevity that reflect length of service; combined impact of these factors are per the table below:

Service	Police	Fire
0	15.25%	8.25%
1	13.25%	8.25%
2	12.25%	8.25%
3	9.25%	8.25%
4	8.25%	8.00%
5	7.25%	7.75%
6	6.50%	7.50%
7	6.50%	7.25%
8	6.50%	6.25%
9	5.25%	5.25%
10	4.45%	4.25%
11	4.21%	4.25%
12	4.00%	4.25%
13	3.75%	4.25%
14	3.75%	4.25%
15	3.75%	4.25%
16	3.75%	4.25%
17	3.75%	3.25%
18	3.75%	3.25%
19	3.75%	3.25%
20	3.75%	3.25%
21	3.50%	3.25%
22	3.50%	3.25%
23	3.50%	3.25%
24 or more	3.25%	3.25%

COTA Adjustment Members are assumed to retire with their current COTA.

Appendix B - Actuarial Assumptions

Decrement Timing Middle of year.

Mortality RP-2000 Tables with generational projection per Scale AA. Employee Table and Healthy Annuitant Table are set forward one year. Disabled Annuitant Table is set forward five years. This assumption includes a margin for future improvements in longevity.

85% of active deaths are assumed to occur in the line of duty.

Spouse Age Difference Husbands are assumed to be three years older than wives.

Percent Married 75% of members are assumed to be married at death or retirement.

Turnover Rates based on length of service per the following table:

Service	Police	Fire
0-1	3.0%	1.5%
2-3	1.8%	1.5%
4-9	1.8%	0.5%
10-15	0.8%	0.5%
16-19	0.3%	0.3%
20 or more	0.0%	0.0%

Disability Rates based on age; sample rates are shown in the following table:

Age	Rate
20	0.17%
30	0.19%
40	0.33%
50	0.61%
60	0.92%

85% of disabilities are assumed to occur in the line of duty.

The liability for current and future disabled members is increased by 5% to reflect medical expenses for disabilities that are incurred in the line of duty.

Appendix B - Actuarial Assumptions

Retirement

Police Tier I & II

Age	Service						
	19	20	21	22	23	24	25+
45	0%	0%	0%	0%	0%	0%	0%
45	0%	3%	3%	10%	10%	10%	100%
46	0%	3%	3%	10%	10%	10%	100%
47	0%	3%	3%	10%	10%	10%	100%
48	0%	3%	3%	10%	10%	10%	100%
49	0%	3%	3%	10%	10%	10%	100%
50	0%	3%	3%	10%	10%	10%	100%
51	0%	3%	3%	10%	10%	10%	100%
52	0%	3%	3%	10%	10%	10%	100%
53	0%	3%	3%	10%	10%	10%	100%
54	0%	3%	3%	10%	10%	10%	100%
55	0%	3%	3%	10%	10%	10%	100%
56	0%	3%	3%	10%	10%	10%	100%
57	0%	3%	3%	10%	10%	10%	100%
58	0%	3%	3%	10%	10%	10%	100%
59	0%	3%	3%	10%	10%	10%	100%
60	0%	3%	3%	10%	10%	10%	100%
61	0%	3%	3%	10%	10%	10%	100%
62+	0%	100%	100%	100%	100%	100%	100%

Fire Tier I & II

Age	Service						
	19	20	21	22	23	24	25+
45	0%	0%	0%	0%	0%	0%	100%
46	0%	0%	0%	0%	0%	0%	100%
47	0%	0%	0%	0%	0%	0%	100%
48	0%	0%	0%	0%	0%	0%	100%
49	0%	0%	0%	0%	0%	0%	100%
50	0%	15%	15%	15%	15%	15%	100%
51	0%	15%	15%	15%	15%	15%	100%
52	0%	15%	15%	15%	15%	15%	100%
53	0%	15%	15%	15%	15%	15%	100%
54	0%	15%	15%	15%	15%	15%	100%
55	0%	15%	15%	15%	15%	15%	100%
56	0%	15%	15%	15%	15%	15%	100%
57	0%	15%	15%	15%	15%	15%	100%
58	0%	15%	15%	15%	15%	15%	100%
59	0%	15%	15%	15%	15%	15%	100%
60	0%	15%	15%	15%	15%	15%	100%
61	0%	15%	15%	15%	15%	15%	100%
62+	0%	100%	100%	100%	100%	100%	100%

Appendix B - Actuarial Assumptions

Retirement (continued)	Police Tier III and Fire Tier III
	100% are assumed to retire at the earlier of age 50 with 30 years of service or age 55 with 10 years of service.
DROP Participation	75% of retirement-eligible members are assumed to enter DROP.
DROP Period	5 years but not beyond age 60.
DROP Interest	4% per year
Interest on Member Contributions	4% per year

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.

Effective Date of the Plan	7/1/1961
Eligibility	All current, probationary, and regular uniformed personnel of the police and fire departments of the City are eligible at date of hire.
Tier I	<p>Police members hired prior to 1/1/2010 with 20+ years of service as of 9/19/2010</p> <p>Fire members hired prior to 1/1/2013 with 15+ years of service as of 1/1/2013</p>
Tier II	<p>Police members hired prior to 1/1/2010 with less than 20 years of service as of 9/19/2010</p> <p>Fire members hired prior to 1/1/2013 with less than 15 years of service as of 1/1/2013</p>
Tier III	<p>Police members hired on or after 1/1/2010</p> <p>Fire members hired on or after 1/1/2013</p>
Compensation	Included pay types for pensionable pay are defined in the Omaha City Ordinance and listed in an Appendix of the latest collective bargaining agreements. Certain overtime pay is excluded.
Final Average Compensation	<p>Police</p> <p>Highest 26 pay periods out last 130 pay periods of service for members hired prior to 1/1/2010 who were at least age 45 with at least 20 years of service as of 9/19/2010. Highest 78 pay periods out of last 130 pay periods divided by 3 for all others.</p> <p>Fire</p> <p>Highest 26 pay periods out last 130 pay periods of service for members hired prior to 1/1/2013 who were at least age 45 with at least 25 years of service (or age 50 with at least 20 years of service) as of 1/2/2013. Highest 78 pay periods out of last 130 pay periods divided by 3 for all others.</p> <p>An additional amount, the Career Overtime Average (COTA), is included in the Final Average Compensation for Tier I & II members. COTA is calculated by adding up all hours a member earns for overtime from their date of hire or 1/1/1991 (whichever is later) and dividing by the number of years the employee worked after 12/31/1990 and multiplying that balance by the member's average hourly rate.</p>

Appendix C - Summary of Plan Provisions

Service	Elapsed time from date of hire or appointment (in qualifying position) to last date of employment. Breaks greater than 2 pay periods will reduce service unless for authorized military leave.
Member Contributions	Police 16.10% of each member's pensionable earnings. Fire 17.15% of each member's pensionable earnings.
Interest on Member Contributions	The interest rate on member contributions is set annually by the Board with a minimum of 1% and a maximum of 5%. Interest is calculated annually and member's that terminate and receive a refund with a half year's worth of interest on current contributions.
Interest on DROP Accounts	The interest rate on member contributions is set annually by the Board between 0% and 7%. The rate chosen can be no more than 50% of the annual return on the trust's assets for the prior year (i.e. if the trust earns 8%, the max rate to credit interest would be 4%).
City Contributions	Police 34.420% of each member's pensionable earnings. Fire 33.965% of each member's pensionable earnings. In addition, the City shall make contributions of \$1,327,600 annually through the year 2028.
Service Retirement Eligibility	Police Tier I & II members are eligible to retire at the earlier of age 55 with 10 years of service or age 45 with 20 years of service. Tier III members are eligible to retire at the earlier of age 50 with 20 years of service or age 55 with 10 years of service. Fire Tier I & II members are eligible to retire at the earlier of age 55 with 10 years of service or age 45 with 25 years of service. Tier III members are eligible to retire at the earlier of age 50 with 20 years of service or age 55 with 10 years of service.

Appendix C - Summary of Plan Provisions

Service Retirement Benefit A percentage of Final Average Compensation based on years of service per the table below:

Years of Service	Tier I Police/ Fire	Tier II Police/ Fire	Tier III Police	Tier III Fire
10-14	20.0%	20.0%	20.0%	20.0%
15-19	30.0%	30.0%	30.0%	30.0%
20	55.0%	50.0%	50.0%	45.0%
21	59.0%	54.0%	53.0%	45.0%
22	63.0%	58.0%	56.0%	45.0%
23	67.0%	62.0%	59.0%	45.0%
24	71.0%	66.0%	62.0%	45.0%
25	75.0%	70.0%	65.0%	55.0%
26	75.0%	72.0%	67.0%	57.0%
27	75.0%	74.0%	69.0%	59.0%
28	75.0%	74.0%	71.0%	61.0%
29	75.0%	74.5%	73.0%	63.0%
30 or more	75.0%	75.0%	75.0%	65.0%

Members earn a pro-rata percentage towards the total multiplier for each additional six months of service as follows:

- Tier I Police/Fire - after 20 years up to 25 years.
- Tier II Police/Fire - after 20 years up to 27 years.
- Tier II Police - after 20 years up to 30 years.

Tier III members retiring with less than 30 years of service have a 7% benefit reduction applied for each year prior to age 55.

Deferred Retirement Option Program (DROP) Members may participate in the DROP for three to five years once they reach retirement eligibility with a minimum of 25 years of service. A member continues to make contributions during the DROP period. During the DROP period, a member account is credited with the benefits that would have been paid if the member had retired at the start of the DROP period, along with interest accrued at the end of each year. At the end of the DROP period, the member ends employment, receives the DROP account balance, and begins to receive monthly benefits that would have been paid if the member had retired at the start of the DROP period.

Disability Benefits (Service Related) Less than 20 years of service: 50% of Final Average Compensation.

20 or more years of service: service retirement benefit calculated as of the disability date without reduction for early commencement.

This work product was prepared solely for the City and the System 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.

Appendix C - Summary of Plan Provisions

**Disability Benefits
(Non-Service Related)**

A percentage of Final Average Compensation based on years of service per the table below:

Years of Service	Benefit
0-9	10%
10-14	20%
15-19	30% or a service retirement benefit without
20 or more	45% reduction for early commencement, if greater

**Preretirement Surviving Spouse's Benefit
(Service Related;
Pre-Retirement Eligible)**

Less than 25 years of service: 49% of Final Average Compensation (52% for certain Fire* members).

25 or more years of service: 69% of Final Average Compensation (72% for certain Fire* members).

**Preretirement Surviving Spouse's Benefit
(Non-Service Related;
Pre-Retirement Eligible)**

A percentage of Final Average Compensation based on years of service per the table below:

Years of Service	Certain Members*	All Others
3-10	38.0%	35.0%
11	39.4%	36.4%
12	40.8%	37.8%
13	42.2%	39.2%
14	43.6%	40.6%
15	45.0%	42.0%
16	46.4%	43.4%
17	47.8%	44.8%
18	49.2%	46.2%
19	50.6%	47.6%
20-25	52.0%	49.0%
25+	72.0%	69.0%

*Fire members who were age 45 with 25 years of service or age 50 with 20 years of service as of most recent contract date.

**Surviving Spouse's Benefit
(Retirement Eligible
Or After Retirement)**

A percentage of the benefit the member was eligible to receive at the time of death per the table below:

Police Tier I & II	75%
Police Tier III	50%
Fire Tier I & II retired before 7/1/2007	75%
Fire Tier I & II retired after 7/1/2007	90%
Fire Tier III	50%

Benefits cease upon remarriage.

Appendix C - Summary of Plan Provisions

Children's Benefits

Upon the death of an active or retired member, the following benefits are due to surviving children until they reach age 18:

Number of Dependents	% of Final Average Compensation
1	15%
2	30%
3	45%
4 or more	50%

Lump Sum Death Benefits

For active members who are eligible for retirement, with a surviving spouse or child(ren), a lump sum equal to one year's salary.

For retired members with a surviving spouse or child(ren), \$1,000 (\$5,000 for Fire members who retired after 6/30/2005) or remaining contributions with interest, whichever is greater.

For active or retired members with no surviving spouse or child(ren), \$500 or remaining contributions with interest, whichever is greater.

Vesting

10 years of service.

Termination Benefit

Members with less than 10 years of service receive a refund of their accumulated contributions.

Members with at least 10 years of service who have not met the requirements for service retirement may elect a monthly benefit commencing at age 55 equal to a percentage of Final Average Compensation per the table below:

Years of Service	Benefit
10-14	20%
15-19	30%
20-24	55%
25 or more	75%

The schedules shown under service retirement apply to all Tier II and III Police and Fire members.

Cost of Living Adjustments

Monthly pension benefits shall be increased by the lesser of 3% or \$50 (\$65 for Fire retirements after 6/30/2007). The increase will be made annually, beginning in the 13th month of retirement.

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 Employer Contribution (“ADEC”) - 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.

Covered Payroll - This is the total projected pensionable earnings for all active members.

Expected Payroll - This is the total projected pensionable earnings for active members who have not yet reached the age where 100% are assumed to retire.

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.