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Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri

Actuarial Valuation Report
as of April 30, 2021

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September 23, 2021

The Board of Trustees
Civilian Employees' Retirement System
of the Police Department of Kansas City, Missouri
9701 Marion Park Drive, B
Kansas City, MO 64137

Dear Members of the Board:

At your request, we have performed the annual actuarial valuation of the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri as of April 30, 2021 for the purpose of determining the actuarial required contribution for the fiscal year beginning May 1, 2022 and ending April 30, 2023. The major findings of the valuation are contained in this report, which reflects the benefit provisions in effect as of April 30, 2021. There were no changes in the benefit provisions or actuarial methods since the prior valuation, but there was one change to the actuarial assumptions used in this valuation. Due to recent favorable investment experience, the Board chose to accelerate the scheduled step-down in the investment return assumption at their meeting on September 9, 2021. As a result, the investment return assumption decreased from 7.40% to 7.10%. The net impact of this change was an increase in both the unfunded actuarial accrued liability and the actuarial required contribution.

In preparing this report, we relied, without audit, on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, member data and financial information. Although we found this information to be reasonably consistent and comparable with information reported in prior years, the data has not been audited by Cavanaugh Macdonald Consulting. 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 System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System.

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In order to prepare the results in this report, we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. 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 status); 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. While we find the actuarial assumptions to be reasonable, the Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

As we prepare this report, the world is recovering from the COVID-19 pandemic. We have considered available information, but do not believe there is sufficient data yet to warrant the modification of any of our assumptions. We will continue to monitor the situation and advise the Board in the future of any adjustment we believe would be appropriate.

Actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. 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. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in separate reports.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

We would like to express our appreciation to the System's staff, who gave substantial assistance in supplying the data on which this report is based.

We herewith submit the following report and look forward to discussing it with you.

Respectfully submitted,

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Bryan K. Hoge, FSA, EA, FCA, MAAA
Consulting Actuary

OVERVIEW

This report presents the results of the actuarial valuation of the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri as of April 30, 2021. The primary purposes of performing a valuation are to:

- Determine the city contribution required to fund the System on an actuarial basis,
- Disclose asset and liability measures as of the valuation date,
- Assess and disclose the key risks associated with funding the System,
- Determine the experience of the System since the last valuation date, and
- Analyze and report on trends in System contributions, assets, and liabilities over the past several years.

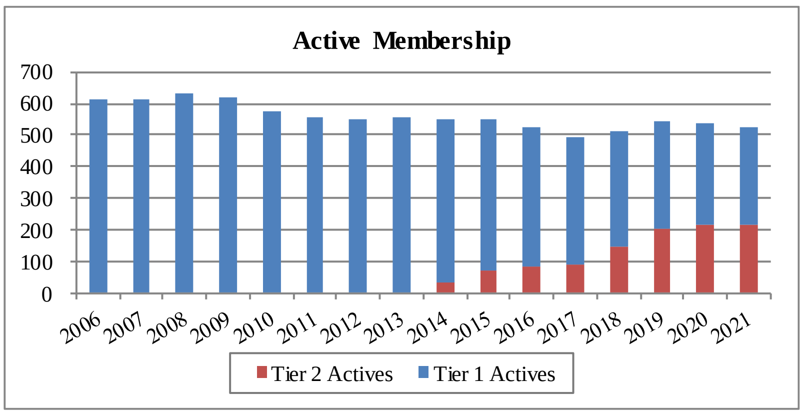
The benefit provisions and actuarial methods are unchanged from the last actuarial valuation. However, there was one change to the actuarial assumptions in this valuation. Based on the results of the last experience study, the Board's intention has been to decrease the investment return assumption incrementally over time. The initial plan was to decrease the assumption by 0.05% each year, beginning with the 2018 valuation, until reaching an assumption of 7.25% in the April 30, 2023 valuation. Over the last few years, it has become clear that the ultimate target for the investment return assumption needs to be lower than 7.25%. The strong return for fiscal year 2021 provided an opportunity to accelerate the reduction in the investment return assumption this year. As a result, the Board adopted the use of an investment return assumption of 7.10% in the 2021 valuation instead of 7.35%, as scheduled. The Board's intention is to continue to lower the investment return assumption by at least 0.05% per year until the next experience study is performed in 2023. The decrease in the investment return assumption resulted in an increase in the actuarial accrued liability of $7.8 million and $0.8 million in the City contribution amount for the fiscal year ending April 30, 2023.

The valuation results provide a "snapshot" view of the System's financial condition on April 30, 2021. The unfunded actuarial accrued liability (UAAL) increased from the prior valuation by $3.9 million (from $42.8 million to $46.7 million). The investment return on the market value of assets for fiscal year 2021 was 21.7%, but due to the asset smoothing method and deferred investment experience, the return on the actuarial value of assets was 8.4%. Since this return is greater than the assumed rate of return (7.40% for the twelve month period beginning May 1, 2020), there was an experience gain on assets of $1.5 million. Net demographic experience resulted in an experience gain of $2.7 million on liabilities, primarily due to cost of living increases that were lower than expected based on the assumption (0% actual versus 2.5% assumed) and actual salary increases that were lower than assumed. A detailed analysis of the change in the UAAL from April 30, 2020 to April 30, 2021 is shown on page 4.

MEMBERSHIP

As the graph on the following page shows, over this period, the number of active members in the valuation has generally decreased. When the number of active members declines, the actuarial contribution rate is negatively impacted. While the normal cost rate is unaffected, the contribution rate for the amortization of the unfunded actuarial accrued liability assumes that covered payroll will increase 3.0% each year. A decline in the number of active members usually results in lower covered payroll than the assumed increase. As a result, the UAAL amortization payment is divided by a smaller payroll amount and the UAAL contribution rate increases. However, the dollar amount of the UAAL payment is unchanged. The number of active members decreased from 537 in the 2020 valuation to 522 in the 2021 valuation, a decrease of 2.8%. Covered payroll increased 0.8% compared to the prior year, which had a negative impact on the UAAL contribution rate, as the actual payroll increase was below the assumed growth rate of 3.0%.

The 2013 session of the Missouri General Assembly passed legislation that modified the benefit provisions for members hired on or after August 28, 2013 (called Tier II). As a result, the normal cost rate for this group of members is lower than the normal cost rate for members hired before that date. As of April 30, 2021, there were 219 members in Tier II out of a total of 522 active members (about 42% of total actives). The Tier II portion of total estimated payroll is lower at about 33% of total payroll. Over time, as Tier I members retire or leave covered employment and are replaced by members covered by the Tier II benefit structure, the normal cost rate for the System is expected to decline. How quickly the decrease unfolds depends on the turnover in the active group and the number of active members. To the extent the size of the active group declines, it will take longer for the cost savings to materialize. With a stable size group, it will likely take another ten to fifteen years before a noticeable difference is observed in the valuation results.



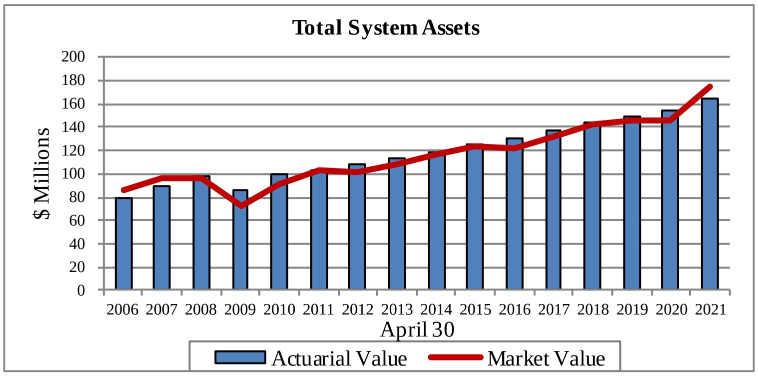
ASSETS

As of April 30, 2021, the System had total assets, when measured on a market value basis, of $174.2 million. This was an increase of $28.8 million from the April 30, 2020 figure of $145.4 million. The market value of assets is not used directly in the calculation of the actuarial contribution and funded status. An asset valuation method which smoothes the effect of market fluctuations is used to determine the value of assets used in the valuation, called the "actuarial value of assets." The current smoothing method recognizes the dollar amount of the difference between the actual and expected return on the market value of assets evenly over a five-year period.

A summary of the asset experience follows:

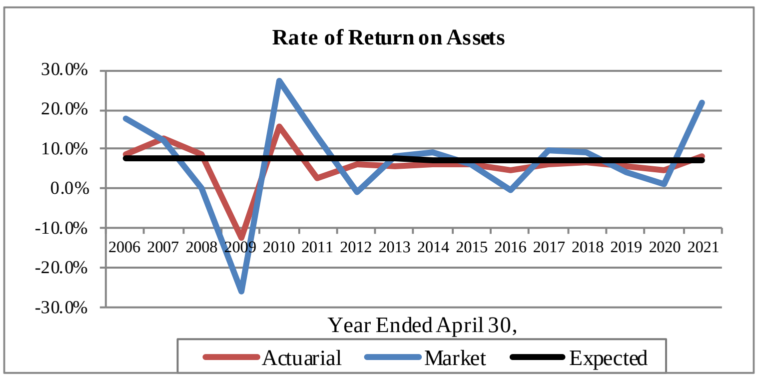
	Market Value ($M)	Actuarial Value ($M)
Assets, April 30, 2020	$145.4	$154.6
• City and Member Contributions	6.9	6.9
• Benefit Payments and Refunds	(9.4)	(9.4)
• Administrative Expenses	(0.1)	(0.1)
• Investment Income (net of expenses)	31.4	12.7
Assets, April 30, 2021	$174.2	$164.7
Estimated Net Rate of Return	21.7%	8.4%

The annualized dollar-weighted rate of return, measured on the market value of assets, was 21.7%. However, due to the use of an asset smoothing method, the rate of return on the actuarial value of assets was 8.4%. Since this return was greater than 7.40% (the assumed rate of return for the twelve-month period beginning May 1, 2020), there was an actuarial gain of about $1.5 million, which decreased the unfunded actuarial accrued liability. Historical asset information is shown in the following two graphs:



The actuarial value of assets has been both above and below the market value during this period. This is to be expected when using an asset smoothing method.

Note: Results for years before 2011 were prepared by the prior actuary



Rates of return on the market value of assets have been very volatile. The return on the actuarial value of assets has lagged the assumption in the last decade.

Note: Results for years before 2011 were prepared by the prior actuary

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the asset value at the same date is referred to as the unfunded actuarial accrued liability (UAAL) if the actuarial accrued liability exceeds the asset value. The unfunded actuarial accrued liability will be reduced if the city's contributions exceed the employer normal cost for the year, after allowing for interest on the previous balance of the unfunded actuarial accrued liability. Benefit improvements, experience gains and losses, and changes in actuarial assumptions and methods will also impact the total actuarial accrued liability and the unfunded portion thereof.

The Actuarial Accrued Liability and Unfunded Actuarial Accrued Liability for the System as of April 30, 2021 are:

Actuarial Accrued Liability	$211,461,019
Actuarial Value of Assets	(164,724,673)
Unfunded Actuarial Accrued Liability	$ 46,736,346

Between April 30, 2020 and April 30, 2021, the change in the unfunded actuarial accrued liability for the System was as follows (in millions):

	$ millions
UAAL, April 30, 2020	42.8
• expected change due to amortization method	0.7
• (gain)/loss from investment return on actuarial assets	(1.5)
• demographic experience[1]	(2.7)
• assumption changes	7.8
• all other experience	(0.4)
UAAL, April 30, 2021	46.7

[1] Liability gain is 1.26% of total actuarial liability

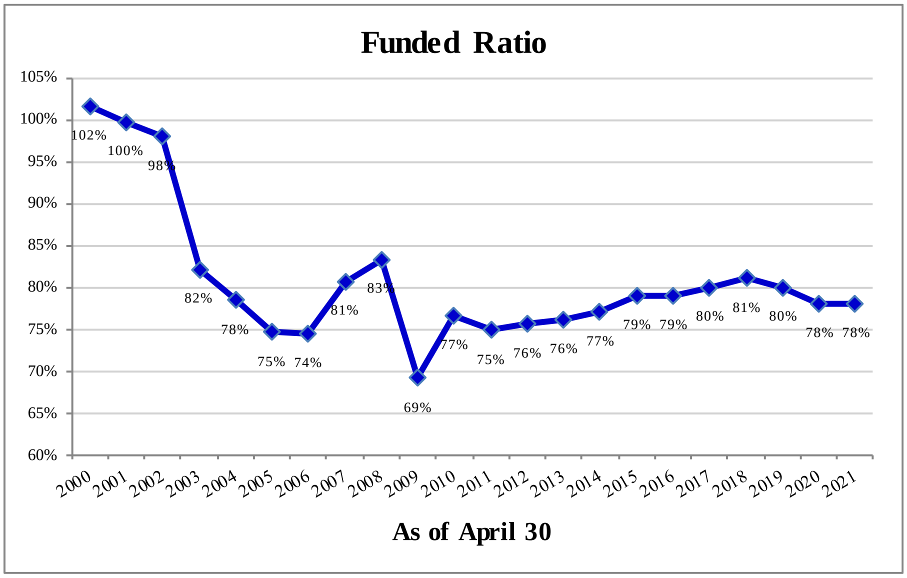
The aggregate experience for the plan year was an increase in UAAL of $3.9 million, primarily the result of an increase in liabilities of $7.8 million due to the change in assumed investment return. The liability gain on demographic experience was primarily the result of cost of living increases that were lower than expected, based on the assumption, lower than assumed salary increases, and fewer retirements than expected.

Analysis of the unfunded actuarial accrued liability strictly as a dollar amount can be misleading. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial accrued liability. This information for recent years is shown in the following table (in millions). Historical information is shown in the graph on the following page.

	4/30/2017	4/30/2018	4/30/2019	4/30/2020	4/30/2021
Actuarial Value of Assets ($M)	$137.2	$144.2	$150.1	$154.6	$164.7
Actuarial Accrued Liability ($M)	$171.2	$177.1	$188.5	$197.4	$211.5
Funded Ratio (Assets/Liability)	80%	81%	80%	78%	78%

The funded ratio does not indicate whether or not the System could settle current liabilities, nor does it, by itself, indicate what the future funding requirements will be. In addition, if the market value of assets was used, the funded ratios would be different.

The following graph shows the System's historical funded ratio. The funded ratio was near 100% in the early years of this period, but has declined due to benefit changes, assumption changes, actual experience that was less favorable than expected based on the actuarial assumptions, and contributions below the actuarial rate for many years prior to 2014. Over the more recent past, the funded ratio has stabilized around 80%.



The decline in the funded ratio since 2000 is a reflection of actual contributions significantly below the actuarial required contributions prior to 2014, coupled with investment returns that were lower than the actuarial assumed rate. The System's funded status will continue to be heavily dependent on actual investment returns in the future as well as the City's contribution policy. Plan changes passed by the 2013 Missouri General Assembly, which included changes to both the benefit structure and contributions, are expected to improve the System's funded status over the long term, if all actuarial assumptions are met. While these changes have improved the outlook for the long-term financial health of the System, the actual investment returns will continue to be a critical factor in the health of the System over time. Given the volatility inherent in the investments of the portfolio, there is a wide range of potential expected returns in any given year so the funded ratio and the actuarial contribution should be expected to change, perhaps significantly from year to year.

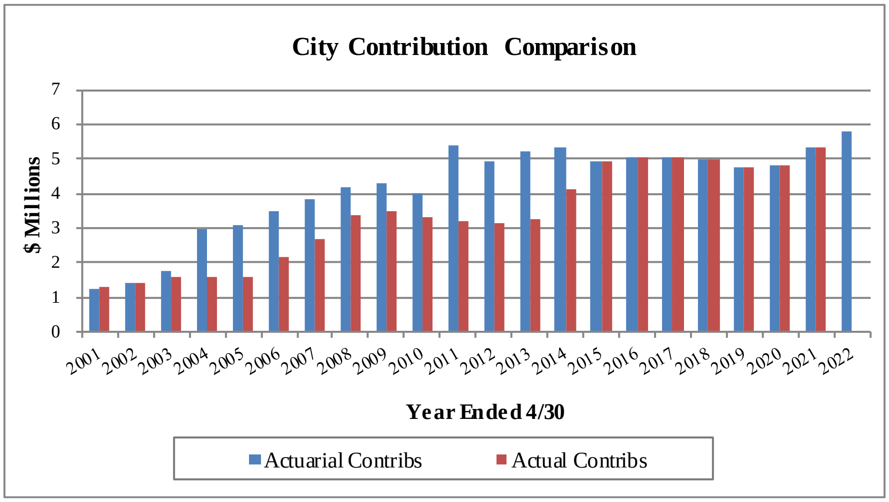
CONTRIBUTION RATES

Generally, contributions to the System consist of:

- A "normal cost" for the portion of projected liabilities allocated to service of members during the year following the valuation date, by the actuarial cost method, and administrative expenses,
- An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

Contribution rates are computed with the objective of developing costs that are level as a percentage of covered payroll over time. The actuarial contribution rate for fiscal year beginning May 1, 2022 and ending April 30, 2023 is computed based on the results of the April 30, 2021 actuarial valuation. The City's actuarial contribution rate equals the employer normal cost, including administrative expenses, and an amortization payment on the unfunded actuarial accrued liability. The City's actuarial contribution rate for May 1, 2022 through April 30, 2023 is 21.22% of payroll (employer normal cost rate of 11.02% and an UAAL payment of 10.20%) or $6,441,244.

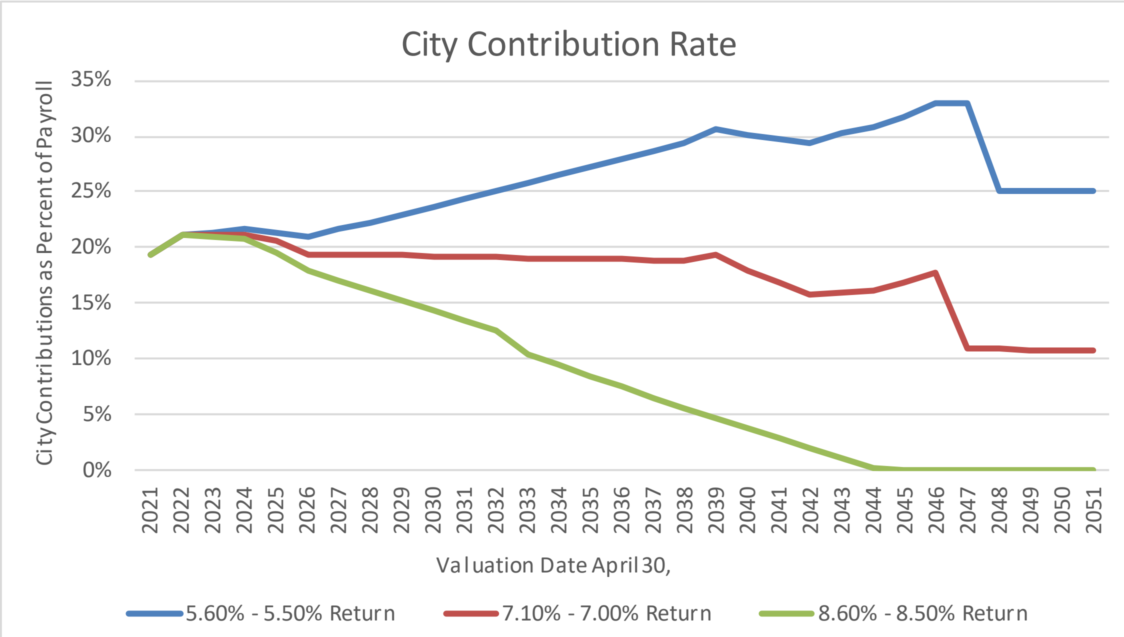
The following graph shows the actuarial contributions for the City compared to the amount actually contributed by the City in each year. With the legislative changes in 2013, the City has been contributing the full amount of the actuarially determined contribution. Effective with the April 30, 2017 valuation, the UAAL at April 30, 2017 is amortized over a closed 30-year period (26 years remaining as of April 30, 2021). Any new piece of unfunded actuarial accrued liability, generated as a result of actuarial experience or assumption changes in subsequent years, creates a new layer which is then amortized over a closed 20-year period. Under this funding policy, the System's funded ratio is expected to slowly improve from its current level and ultimately reach full funding at the end of the amortization period.



FINANCIAL PROJECTIONS

The April 30, 2021 valuation results indicate the System's financial status at a single point in time, but do not provide any insight into future trends in contributions or funded status. In addition, the investment return assumption is expected to decrease 0.05% per year until reaching 7.00% with the April 30, 2023 valuation. In order to assist the Board in understanding the dynamics of pension funding and the potential impact of deferred investment experience and the anticipated decrease in the investment return assumption, a projection model was prepared in conjunction with the 2021 valuation.

Projections that model a change in one key variable can provide insight and understanding into the longer term trend of that experience on projected City contributions, the funded status (ratio of actuarial assets over liabilities), and the unfunded actuarial accrued liability (actuarial accrued liability minus actuarial assets). Certain projections, using investment return scenarios selected for purposes of sensitivity analysis, are included in Section 6 of this report. To illustrate the importance of actual investment returns on City contributions as a percentage of payroll, the following graph is included here. Please note that the baseline projections reflect the "step down" in the investment return assumption to 7.00% over the next two years and reflect actual returns equal to the assumed return in each year (7.10% for the twelve-month period beginning May 1, 2021, 7.05% for the twelve-month period beginning May 1, 2022 and 7.00% thereafter). The alternate scenarios (actual returns that are 1.5% higher and 1.5% lower than assumed) also reflect the step down in the assumed rates so the actual rates modeled are 5.60% grading down to 5.50% over two years and 8.60% grading down to 8.50% over two years. Note that a 1.50% variance in actual versus expected returns over a 30-year period is a material difference and the significant impact on the City's contribution rate is not unexpected. These alternate projections do not reflect any change to the plan provisions or assumptions that might occur if either of these scenarios were to actually occur.



COMMENTS

In recent years, the System has systematically been lowering the investment return assumption based on input from their investment consultant and actuary. In 2018, the Board adopted an incremental approach, decreasing the assumption by 0.05% each year until reaching an assumption of 7.25% in the April 30, 2023 valuation. Over the last few years, it has become clear that the ultimate target for the investment return assumption needs to be lower than 7.25%. The strong return for fiscal year 2021 provided an opportunity to accelerate the reduction in the investment return assumption this year. As a result, the Board adopted an investment return assumption of 7.10% in the 2021 valuation instead of 7.35%, as scheduled. The Board's intention is to continue to lower the investment return assumption by at least 0.05% per year until the next experience study is performed in 2023. Contributions made on this basis will strengthen the System's funding outlook as it increases the probability of meeting/exceeding the investment return assumption in future years, thereby reducing the likelihood and magnitude of actuarial losses from investment experience.

As of April 30, 2021, the actuarial accrued liability was $211.5 million and the actuarial value of assets was $164.7 million, resulting in an unfunded actuarial accrued liability (UAAL) of $46.7 million. The funded ratio remained around 78% and the UAAL increased by $3.9 million as a result of change to the investment return assumption and actual experience during the period May 1, 2020 to April 30, 2021.

Retirement plans use several mechanisms to create stability in the contribution rates. These mechanisms include an asset smoothing method, which averages the peaks and valleys of investment returns, and the amortization of actuarial gains and losses, including investment experience, over a number of years. The System utilizes an asset smoothing method that recognizes the difference between the actual and expected return on the market value of assets evenly over a five-year period. The return on the market value of assets was 21.7%, but due to the asset smoothing method only part of the investment experience for the year ended April 30, 2021 is recognized in the current valuation along with a portion of the investment experience in the prior four years. As a result, the return on the actuarial value of assets was 8.4%, which resulted in a decrease in the UAAL since it was greater than the assumed rate of return for the twelve-month period beginning May 1, 2020 and ending April 30, 2021 of 7.40%. There was an actuarial gain from actual demographic experience that was more favorable than expected, based on the actuarial assumptions, largely due to actual cost of living increases that were lower than assumed and lower than assumed salary increases.

A typical retirement plan faces many different risks. The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. Actuarial Standard of Practice Number 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions. Risk evaluation is an important part of managing a defined benefit plan. Please see Section 7 of this report for an in-depth discussion of the specific risks facing the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri.

The long-term financial health of this retirement system is heavily dependent on two key items: (1) investment returns and (2) contributions to the System. Over the last ten years, the actual investment returns on the market value of assets have been lower than the assumed rate of return and actual contributions to the System were below the actuarial contributions for part of that period. Beginning September 1, 2013, the City began to contribute the full dollar amount of the Actuarial Required Contribution as shown on Table 12. Based on the funding policy adopted by the Board in November 2016, the UAAL at April 30, 2017 is amortized over a closed 30-year period (26 years remaining as of April 30, 2021). Any new unfunded actuarial accrued liability generated as a result of actuarial experience or assumption changes in subsequent years are layered and amortized over a new, closed 20-year period. As a result, City contributions to the System will be sufficient to fully fund the UAAL over time and the System's funding status over the long-term is expected to improve if the assumptions are met.

At their November 12, 2020 meeting, the Board adopted a revised Cost of Living Adjustment Policy. Based on the Board's policy, an ad hoc cost of living adjustment may be granted if the definition of "actuarially sound," which requires the following condition, is met based on the results of the annual actuarial funding valuation:

(1) The plan's funded ratio (actuarial value of assets/actuarial accrued liability) is at least 75% and such ratio will not fall below that level as the result of any specific COLA amount granted.

In an effort to maintain the actuarial soundness of the System, the Board's policy also requires the following items be considered when determining the System's ability to grant an ad hoc cost of living adjustment:

(1) The actuarial impact on the System's liabilities, if any specific COLA amount is granted.

(2) The current COLA matrix, prepared by the System's actuary, when determining the amount of the COLA that can be supported given the return on the actuarial value of assets and the current funded ratio.

The adoption of this new policy did not affect actuarial assumptions, which assume future ad hoc COLAs of 2.50% (simple COLA) are granted in all future years.

We have not reviewed any legal aspects related to granting the ad hoc COLA. We are not attorneys and cannot give legal advice on such issues. Therefore, we suggest that you review this policy with your legal counsel.

We conclude this Board Summary with the following exhibit which compares the principal results of the current and prior actuarial valuation.

SUMMARY OF PRINCIPAL RESULTS

1. MEMBER DATA	4/30/2021 Valuation	4/30/2020 Valuation	% Change
Number of:			
Active members			
- Tier 1	303	321	(5.6%)
- Tier 2	219	216	1.4%
- Total	522	537	(2.8%)
Retired Members and Beneficiaries	303	290	4.5%
Inactive Vested Members	45	46	(2.2%)
Total Members	870	873	(0.3%)
Annual Projected Salaries of Active Members	$ 29,470,477	$ 29,224,300	0.8%
Annual Retirement Payments for Retired Members and Beneficiaries*	$ 8,344,690	$ 7,972,653	4.7%
*Does not include supplemental benefits			
2. ASSETS AND LIABILITIES			
Total Actuarial Accrued Liability	$211,461,019	$197,399,029	7.1%
Market Value of Assets	174,187,753	145,364,743	19.8%
Actuarial Value of Assets	164,724,673	154,613,128	6.5%
Unfunded Actuarial Accrued Liability	$ 46,736,346	$ 42,785,901	9.2%
Funded Ratio (Actuarial Value)	78%	78%	0.0%
Funded Ratio (Market Value)	82%	74%	10.8%
3. CITY CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Total Normal Cost	16.02%	14.91%	7.4%
Member Contribution Rate	(5.00%)	(5.00%)	0.0%
Employer Normal Cost	11.02%	9.91%	11.2%
Amortization of Unfunded Actuarial Accrued Liability	10.20%	9.36%	9.0%
City Contribution Rate	21.22%	19.27%	10.1%
4. CITY CONTRIBUTION FOR FOLLOWING FISCAL YEAR	$ 6,441,244	$ 5,800,468	11.0%

SECTION 2 – SCOPE OF THE REPORT

This report, prepared at the request of the System's Board of trustees, presents the results of the actuarial valuation of the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri as of April 30, 2021. There were no changes to the benefit provisions or the actuarial methods from those used in the prior valuation. However, there was one change to the actuarial assumptions used in this valuation. The investment return assumption was decreased from 7.40% to 7.10%.

Please pay particular attention to our cover letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings, which result from this valuation, is presented in the previous section. Section 3 describes the assets and investment experience of the System. Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use. Section 6 includes 30-year financial projections of the system under various investment return scenarios. Section 7 discloses key maturity measurements and the key risks associated with funding the System. Section 8 includes other historical information.

This report includes several appendices:

- Appendix A Schedules of valuation data classified by various categories of members.
- Appendix B A summary of the current benefit structure, as determined by the provisions of governing law on April 30, 2021.
- Appendix C A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D A glossary of actuarial terms.

This report also includes the System's Funding Policy, which is shown after Appendix D.

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is April 30, 2021. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System (the present value of future expected benefit payments), which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the City in the future to balance the System assets and liabilities.

Market Value of Assets

The current market value represents the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time. Table 1 is a comparison, at market values, of System assets as of April 30, 2021 and April 30, 2020, in total and by investment category. Table 2 summarizes the change in the market value of assets from April 30, 2020 to April 30, 2021.

Actuarial Value of Assets

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book values of assets, representing the cost of investments, may be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. The Board adopted a new asset smoothing method effective with the April 30, 2011 valuation. Under this asset smoothing methodology, the difference between the actual and assumed investment returns on the market value of assets is recognized evenly over a five-year period. The method was implemented by resetting the actuarial value of assets at April 30, 2011 to the market value of assets.

TABLE 1

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

STATEMENT OF NET PLAN ASSETS AT MARKET VALUE

	Market Value	
	April 30, 2021	**April 30, 2020**
Cash & Equivalents	2,088,387	1,208,991
Receivables	432,201	389,240
Stocks:		
Common & Preferred Corporate	24,105,543	27,124,886
World Equities	33,446,591	19,720,869
Foreign	11,792,849	8,018,666
Bonds:		
U.S. Government	11,096,209	10,417,022
Corporate	23,024,760	21,062,372
Asset Backed Securities	490,491	698,269
Real Estate	20,597,472	18,261,433
Partnerships and Hedge Funds	47,518,882	38,993,977
Total Assets	$174,593,385	$145,895,725
Accounts Payable	(405,632)	(530,982)
Net Assets Available for Benefits	$174,187,753	$145,364,743

TABLE 2

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

STATEMENT OF CHANGES IN NET ASSETS
DURING YEAR ENDED APRIL 30, 2021

(Market Value)

1. Market Value of Assets as of April 30, 2020	$	145,364,743
2. Contributions:		
a. Members	$	1,514,076
b. City		5,358,552
c. Miscellaneous		0
d. Total	$	6,872,628
3. Investment Income		
a. Interest and Dividends	$	3,153,021
b. Net Securities Lending Income		33,249
c. Investment Expenses		(843,781)
d. Net Appreciation in Fair Value		29,166,393
e. Net Investment Income	$	31,508,882
4. Deductions		
a. Refunds of Member Contributions	$	226,726
b. Benefits Paid:		
(1) Retirement Benefits		8,652,643
(2) Death Benefits		7,000
(3) Partial Lump Sums		540,014
c. Administrative Expenses		132,117
d. Total	$	9,558,500
5. Net Change [2d] + [3e] - [4d]	$	28,823,010
6. Market Value of Assets as of April 30, 2021 [1] + [5]	$	174,187,753

TABLE 3

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

Under the current asset smoothing method, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five-year period. The method was implemented by resetting the actuarial value of assets at April 30, 2011 equal to the market value of assets.

	Plan Year End			
	4/30/2018	4/30/2019	4/30/2020	4/30/2021
1. Market Value of Assets, Beginning of Year	$ 132,565,840	$ 142,605,109	$ 146,187,834	$ 145,364,743
2. Contributions During Year	6,265,874	6,194,531	6,266,450	6,872,628
3. Benefits and Expenses During Year	7,913,332	8,333,044	8,532,080	9,558,500
4. Assumed Rate of Return	7.50%	7.50%	7.45%	7.40%
5. Expected Net Investment Income	9,881,775	10,616,639	10,808,115	10,659,387
6. Expected Value of Assets, End of Year	140,800,157	151,083,235	154,730,319	153,338,258
7. Market Value of Assets, End of Year	142,605,109	146,187,834	145,364,743	174,187,753
8. Excess/(Shortfall) of Net Investment Income	$ 1,804,952	$ (4,895,401)	$ (9,365,576)	$ 20,849,495

TABLE 3
(continued)

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

1. Excess/(Shortfall) of Investment Income		
a. Year ending 4/30/2021	$	20,849,495
b. Year ending 4/30/2020		(9,365,576)
c. Year ending 4/30/2019		(4,895,401)
d. Year ending 4/30/2018		1,804,952
e. Total	$	8,393,470
2. Deferral of Excess/(Shortfall) of Investment Income		
a. Year ending 4/30/2021 (80%)	$	16,679,596
b. Year ending 4/30/2020 (60%)		(5,619,346)
c. Year ending 4/30/2019 (40%)		(1,958,160)
d. Year ending 4/30/2018 (20%)		360,990
e. Total	$	9,463,080
3. Market Value End of Year	$	174,187,753
4. Actuarial Value End of year (3) - (2e)	$	164,724,673
5. Ratio of Actuarial Value to Market Value		94.6%
6. Difference Between Actuarial & Market Value	$	(9,463,080)
7. Rate of Return on Actuarial Value of Assets		8.4%
8. Rate of Return on Market Value of Assets		21.7%

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date, April 30, 2021. In this section, the discussion will focus on the commitments (future benefit payments) of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries. The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes the measurement of both benefits already earned and future benefits to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and for the lives of the surviving beneficiaries.

All liabilities reflect the benefit provisions in place as of April 30, 2021, with one exception. When certain criteria are met, the Board has discretion to grant a COLA (it is not part of the statutory benefit structure). Even though the COLA is not guaranteed to be paid, the liabilities reflect a 2.5% annual "simple cost-of-living adjustment" for all future years as it better reflects the expected long-term liabilities.

Actuarial Accrued Liability

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to perform this allocation, it is necessary for the funding method to "break down" the present value of future benefits into two components:

(1) That which is attributable to the past and

(2) That which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability." The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost." Table 5 contains the calculation of the actuarial accrued liability for the System. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.

TABLE 4

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

PRESENT VALUE OF FUTURE BENEFITS (PVFB) AS OF APRIL 30, 2021

1. Active employees		
a. Retirement Benefit	$	134,506,875
b. Pre-Retirement Death Benefit		1,078,690
c. Withdrawal Benefit		2,770,762
d. Disability Benefit		4,849,185
e. Supplemental Benefit		4,034,655
f. Total	$	147,240,167
2. Inactive Vested Members		
a. Retirement Benefit	$	3,653,701
b. Supplemental Benefit		136,900
c. Total	$	3,790,601
3. In Pay Members		
a. Retirees	$	89,879,336
b. Disabled Members		1,228,261
c. Beneficiaries		3,539,044
d. Supplemental Benefit		4,715,670
e. Partial Lump Sum Payable		216,278
f. Total	$	99,578,589
4. Total Present Value of Future Benefits		
[1f] + [2c] + [3f]	$	250,609,357

TABLE 5

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

ACTUARIAL ACCRUED LIABILITY AS OF APRIL 30, 2021

1. Active employees		
a. Present Value of Future Benefits	$	147,240,167
b. Present Value of Future Normal Costs		39,148,338
c. Actuarial Accrued Liability [1a] - [1b]	$	108,091,829
2. Inactive Vested Members	$	3,790,601
3. In Pay Members		
a. Retirees	$	89,879,336
b. Disabled Members		1,228,261
c. Beneficiaries		3,539,044
d. Supplemental Benefit		4,715,670
e. Partial Lump Sum Payable		216,278
f. Total	$	99,578,589
4. Total Actuarial Accrued Liability [1c] + [2] + [3f]	$	211,461,019

TABLE 6

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

DERIVATION OF SYSTEM EXPERIENCE GAIN/(LOSS)

Liabilities		
1. Actuarial accrued liability as of May 1, 2020	$	197,399,029
2. Normal cost for year		3,849,917
3. Assumed interest on (1) & (2)		14,892,422
4. Benefit payments during FYE 2021		(9,426,383)
5. Interest on benefit payments		(342,552)
6. Assumption Changes		7,751,730
7. Expected actuarial accrued liability as of April 30, 2021	$	214,124,163
8. Actuarial accrued liability as of April 30, 2021	$	211,461,019
Assets		
9. Actuarial value of assets as of May 1, 2020	$	154,613,128
10. Actual contributions		6,872,628
11. Benefit payments and expenses during FYE 2021		(9,558,500)
12. Interest on items (9), (10) and (11)		11,343,768
13. Expected actuarial value of assets as of April 30, 2021	$	163,271,024
14. Actual actuarial value of assets as of April 30, 2021	$	164,724,673
Gain / (Loss)		
15. Expected unfunded actuarial accrued liability / (surplus) (7) – (13)	$	50,853,139
16. Actual unfunded actuarial accrued liability / (surplus) (8) – (14)	$	46,736,346
17. Actuarial Gain / (Loss) (15) – (16)	$	4,116,793
18. Actuarial Gain / (Loss) on actuarial assets (14) – (13)	$	1,453,649
19. Actuarial Gain / (Loss) on actuarial accrued liability (7) – (8)	$	2,663,144

TABLE 7

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

ACTUARIAL GAIN/(LOSS) ANALYSIS BY SOURCE

Source of Gain/(Loss)	Gain/(Loss) ($M)
Retiree Mortality	0.4
Withdrawal	(0.3)
Retirement	0.8
Disability	0.0
Active Mortality	(0.2)
Salary	0.7
New actives	(0.3)
Actual vs Expected COLA	1.5
Other	0.1
Total Liability Gain/(Loss)	2.7
Asset Gain/(Loss)	1.5
Total Gain/(Loss)	4.1

Note: Numbers may not add due to rounding

TABLE 8

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

PROJECTED BENEFIT PAYMENTS

The chart below shows estimated benefits expected to be paid over the next twenty years, based on the assumptions used in this valuation. The "Actives" column shows benefits expected to be paid to members currently active on April 30, 2021. The "Retirees" column shows benefits expected to be paid to all other members. This includes those who, as of April 30, 2021, are receiving benefit payments and inactive vested members who are entitled to a future benefit. No future members are reflected.

Retirement, Survivor, Withdrawal and Supplemental Benefits

Year Ending April 30	Actives	Retirees	Total
2022	$ 635,000	$ 8,813,000	$ 9,448,000
2023	1,445,000	8,830,000	10,275,000
2024	2,213,000	8,830,000	11,043,000
2025	2,925,000	8,817,000	11,742,000
2026	3,686,000	8,843,000	12,529,000
2027	4,433,000	8,803,000	13,236,000
2028	5,212,000	8,757,000	13,969,000
2029	6,028,000	8,678,000	14,706,000
2030	6,874,000	8,591,000	15,465,000
2031	7,711,000	8,548,000	16,259,000
2032	8,591,000	8,471,000	17,062,000
2033	9,470,000	8,332,000	17,802,000
2034	10,320,000	8,203,000	18,523,000
2035	11,228,000	8,022,000	19,250,000
2036	12,186,000	7,802,000	19,988,000
2037	13,113,000	7,573,000	20,686,000
2038	14,059,000	7,333,000	21,392,000
2039	15,004,000	7,052,000	22,056,000
2040	15,919,000	6,787,000	22,706,000
2041	16,839,000	6,488,000	23,327,000

The previous two sections were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the present value of future benefits (total liability). This is expected in all but a completely closed fund, where no further contributions are anticipated. In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will deal with this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term “fully funded” is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

Description of Contribution Rate Components

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member’s year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses.

In general, contributions are computed in accordance with a level percent-of-payroll funding objective although the City contributes the dollar amount from the valuation. The contribution rate based on the April 30, 2021 actuarial valuation will be used to determine the dollar amount of the actuarial required city contribution (contribution rate times expected payroll) to the Civilian Employees’ Retirement System of the Police Department of Kansas City, Missouri for the fiscal year ending April 30, 2023. In this context, the term “contribution rate” means the percentage which is applied to a particular active member payroll to determine the actual city contribution amount (i.e., in dollars) for the group.

As of April 30, 2021, the actuarial accrued liability was greater than the valuation assets so an unfunded actuarial accrued liability (UAAL) exists. The UAAL as of April 30, 2017 is amortized as a level percent of payroll, over a closed 30-year period (26 years remaining as of April 30, 2021). Any new unfunded actuarial accrued liability generated as a result of actuarial experience in subsequent years will be layered and amortized over a closed 20-year period. Active member payroll is assumed to increase 3.00% per year. Note that the use of closed amortization periods will result in the System being fully funded at the end of the amortization period, if all actuarial assumptions are met.

Contribution Rate Summary

In Table 9, the UAAL is projected to May 1, 2022. Table 10 shows the amortization of the UAAL bases as well as develops the UAAL Amortization Payment Rate. Table 11 develops the actuarial contribution rate for the System. A historical summary of the actual and actuarial contribution rates for the City is shown in Table 12.

The contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C.

TABLE 9

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

PROJECTED UAAL AT MAY 1, 2022

1. Actuarial Accrued Liability as of April 30, 2021	$	211,461,019
2. Actuarial Value of Assets	$	164,724,673
3. Unfunded Actuarial Accrued Liability as of April 30, 2021	$	46,736,346
4. Total Contribution Rate for FYE 2022*		24.27%
5. Normal Cost Rate		16.02%
6. Contribution Rate Applied to Fund the UAAL for FYE 2022 (4) - (5)		8.25%
7. Expected Payroll for FYE 2022	$	29,470,477
8. Projected UAAL on May 1, 2022 $[(3) * 1.071] - [(6) * (7) * 1.071^{.5}]$	$	47,538,480

* Reflects member contributions of 5.00% and City contributions of 19.27%

TABLE 10

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

AMORTIZATION OF THE UAAL

Amortization Base	Original Amount	Remaining Payments	Projected May 1, 2022 Balance	Annual Payment*
2017 Legacy UAAL	$ 34,657,789	26	$ 36,559,902	$ 2,271,832
2018 Experience	(1,972,752)	17	(1,945,204)	(158,898)
2019 Assumption Changes	4,563,192	18	4,519,030	354,726
2019 Experience	603,545	18	597,705	46,917
2020 Assumption Changes	1,311,242	19	1,306,489	98,841
2020 Experience	2,755,565	19	2,745,576	207,713
2021 Assumption Changes	8,302,103	20	8,302,103	606,951
2021 Experience	(4,547,121)	20	(4,547,121)	(332,431)
Total			**$ 47,538,480**	**$ 3,095,651**

* Payment amount reflects mid-year timing.

1. Total UAAL Amortization Payments	$	3,095,651
2. Expected Payroll for FYE 2023	$	30,354,591
3. UAAL Amortization Payment Rate		10.20%

TABLE 11

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

CITY CONTRIBUTION RATES

	Valuation Date*	
	4/30/2021	**4/30/2020**
Normal Cost		
Service pensions	12.47%	11.45%
Pre-retirement death pensions	0.14%	0.13%
Disability pensions	0.72%	0.67%
Termination benefits	1.92%	1.90%
Supplemental retirement benefit	0.27%	0.26%
Administrative expenses	0.50%	0.50%
Total Normal Cost	16.02%	14.91%
Total UAAL Amortization payment	10.20%	9.36%
Total Actuarial Contribution Rate	26.22%	24.27%
Member Portion	5.00%	5.00%
City Portion	21.22%	19.27%

* The valuation results are used to determine the city contribution rate for the fiscal year ending two years later.

TABLE 12
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
COMPUTED AND ACTUAL CITY CONTRIBUTIONS COMPARATIVE STATEMENT

			Fiscal Year Contributions				
			As a % of Projected Pay		$ Contributions		
Fiscal Year Beginning May 1	Valuation Date April 30	Projected Annual Payroll	Annual Required Contribution	Reported FY City Contribution	Annual Required Contribution	Projected FY City Contribution	Actual Dollar Contribution
1998	1998	$15,295,680	6.80 %	4.38 %	$1,040,673	$ 669,951	$ 674,228
1999	1999	15,430,846	7.47	5.76	1,152,018	888,817	944,475
2000	2000	17,786,369	7.08	7.14	1,259,454	1,269,947	1,286,166
2001	2001	18,831,325	7.49	7.14	1,410,466	1,344,557	1,420,668
2002	2002	21,688,988	8.12	7.14	1,761,146	1,548,594	1,567,833
2003 *	2003	22,931,521	12.84	7.14	2,944,407	1,637,311	1,601,243
2004	2003	23,963,439	12.84	7.14	3,076,906	1,710,990	1,612,080
2005 #	2004	24,088,026	14.45	9.14	3,480,720	2,201,646	2,175,167
2006	2005	24,285,644	15.87	11.14	3,854,132	2,705,421	2,681,732
2007	2006	26,073,120	16.12	13.14	4,202,987	3,426,008	3,372,411
2008	2007	26,618,596	16.24	13.14	4,322,860	3,497,684	3,470,682
2009	2008	28,127,592	14.27	13.14	4,013,807	3,695,966	3,329,727
2010	2009	28,684,028	18.87	13.14	5,412,676	3,769,081	3,185,041
2011	2010	27,181,807	18.19	13.14	4,944,371	3,571,689	3,146,124
2012 *	2011	26,248,238	19.82	13.14	5,202,401	3,449,018	3,283,458
2013	2012	26,265,640	20.40 **	16.33 **	5,358,191	4,289,179	4,122,375
2014 *#	2013	27,453,706	17.96	17.96	4,930,686	4,930,686	4,930,686
2015	2014	28,092,195	17.97	17.97	5,048,167	5,048,167	5,048,167
2016	2015	28,932,802	17.50	17.50	5,063,240	5,063,240	5,063,240
2017	2016	28,183,922	17.72	17.72	4,994,191	4,994,191	4,994,191
2018	2017	26,578,719	17.98	17.98	4,778,854	4,778,854	4,778,854
2019	2018	28,278,182	17.15	17.15	4,849,708	4,849,708	4,849,708
2020 *	2019	29,687,268	18.05	18.05	5,358,552	5,358,552	5,358,552
2021 *	2020	30,101,029	19.27	19.27	5,800,468	5,800,468	
2022 *	2021	30,354,591	21.22		6,441,244		

* After changes in actuarial assumptions or methods.

** Effective September 1, 2013, the actuarial contribution rate was revised to 22.93% and the City began contributing the full city actuarial contribution rate of 17.93%.

\# After changes in benefits.

Note: For years prior to 2011, information is shown from the prior actuary's report.

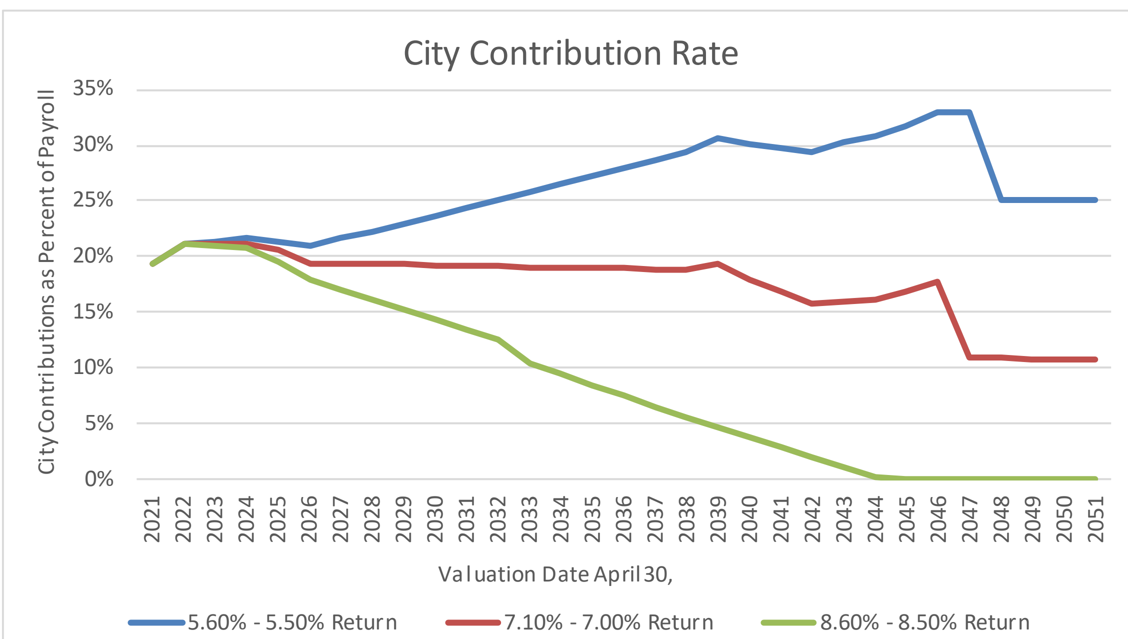
While the April 30, 2021 valuation results indicate the System's financial status at a single point in time, projections are used to identify trends and to compare various scenarios rather than predicting some future state of events. The projections model a change in one key variable to provide insight into the longer term trend of (1) the projected City contributions; (2) the projected System funded status (ratio of actuarial assets over liabilities); and (3) the unfunded actuarial accrued liability (actuarial accrued liability minus actuarial assets). The projections also show how sensitive the results are to the key variable being modeled. The projections do not predict the System's financial condition or its ability to pay benefits in the future and do not provide any guarantee of future financial soundness of the System. Over time, a defined benefit plan's total cost will depend on a number of factors, including the amount of benefits paid, the number of people paid benefits, plan expenses, and the amount of earnings on assets invested to pay benefits. These amounts and other variables are uncertain and unknowable at the time the projections were prepared. Because not all of the assumptions will unfold exactly as expected, actual results will differ from the projections shown.

The following three actual investment return scenarios are modeled (note the underlying assumption does not change):

(1) Returns grading down by 0.05% each year from 7.10% for May 1, 2021 through April 30, 2022 to 7.00% for May 1, 2023 through April 30, 2024 (current assumption),
(2) Returns of 1.50% higher than the current assumption (8.60% grading down to 8.50%), and
(3) Returns of 1.50% lower than the current assumption (5.60% grading down to 5.50%).

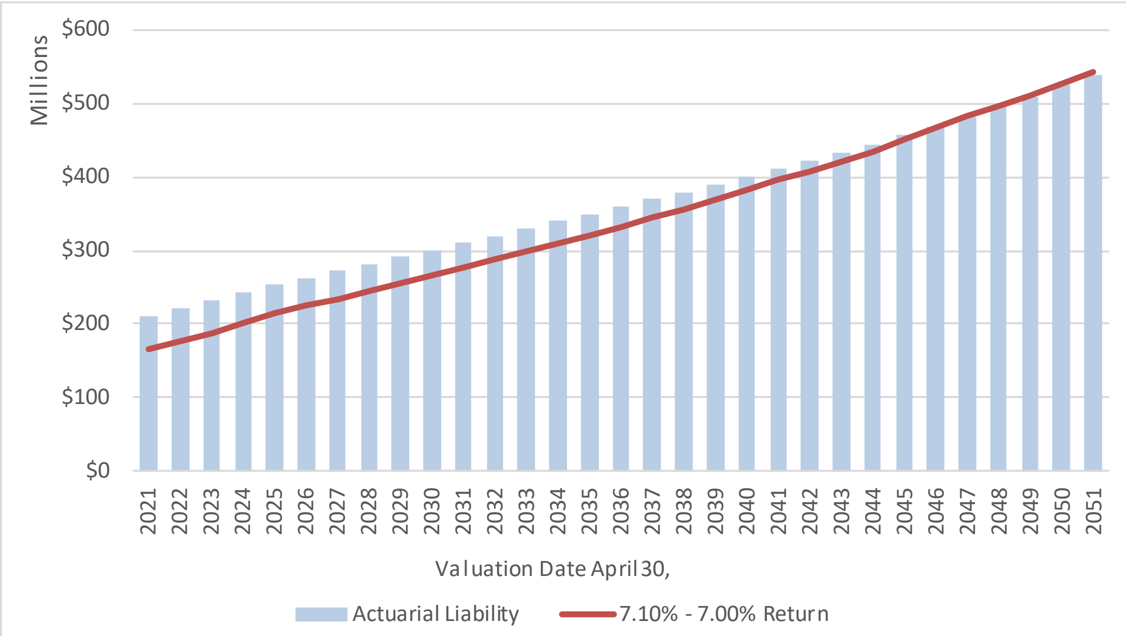
The projections assume that all actuarial assumptions, other than investment return, are met in all future years and that the City makes contributions equal to the full amount of the actuarially determined contribution as calculated by the System's actuary, based on the Board's Funding Policy (including closed amortization periods). Note that the 2.5% COLA is assumed to be granted in all years even when the Board's criteria is not met. These projections include estimates of future valuation results, including the unfunded actuarial accrued liability and funded ratio. It should be noted that these actuarial measurements do not indicate the sufficiency of plan assets to settle the plan's obligations nor do they, on their own, indicate future funding requirements.

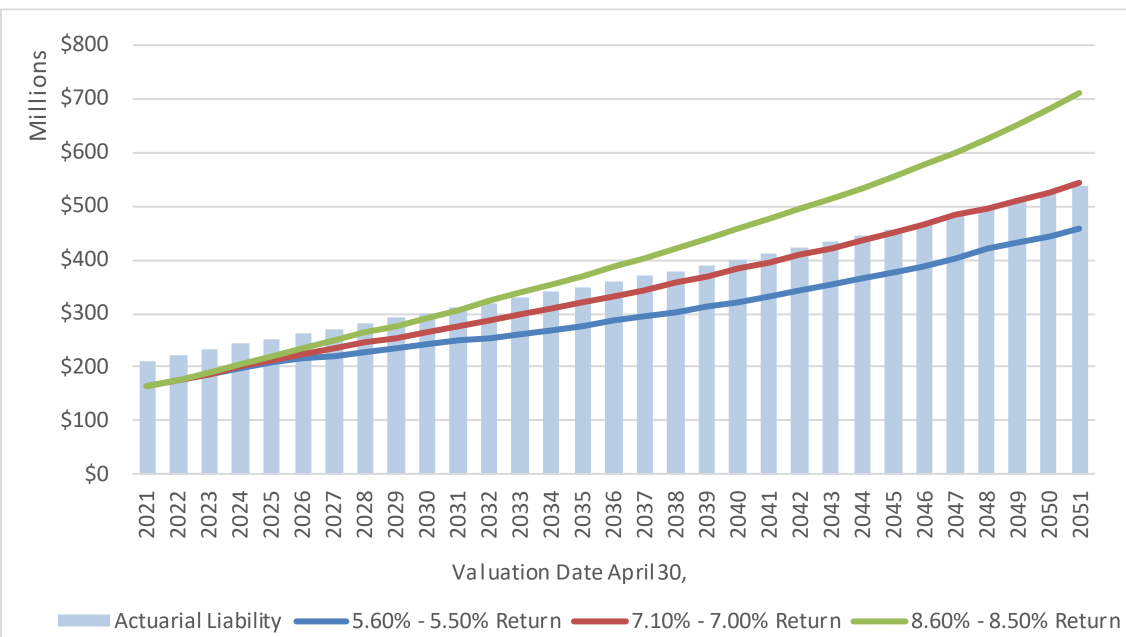
Effect of Various Returns on City Contribution Rate



Comparison of Projected Actuarial Assets to Actuarial Liability

The following graphs compare the actuarial value of assets (red line) to the System's actuarial accrued liabilities (light blue bars) on the valuation date in future years. The first graph shows the baseline case, while the second graph shows the sensitivity of the results to variation in the actual rate of return.





Funded Ratio

The following graph shows the projected System funded ratio (ratio of actuarial value of assets to actuarial accrued liabilities) under each of the scenarios described earlier. The years shown in the chart are valuation dates (April 30 of each year).

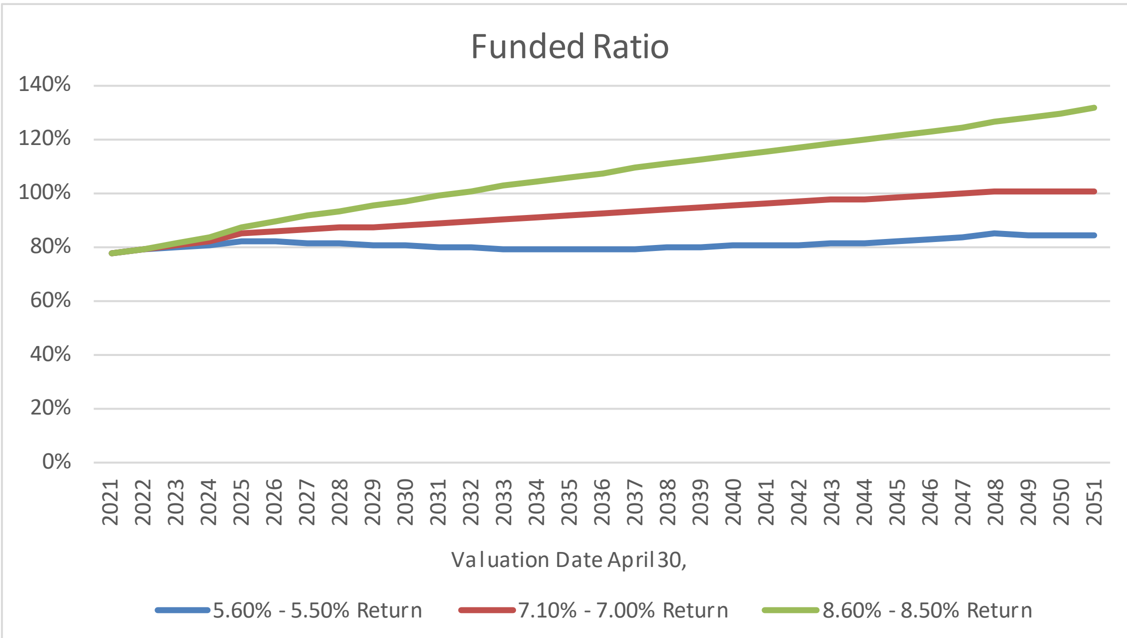


TABLE 13

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

PROJECTION OF VALUATION RESULTS

Projection Based on April 30, 2021 Actuarial Valuation
7.10% Step Down to 7.00% Investment Return
Amounts in thousands

Valuation as of April 30, (1)	Covered Payroll at Valuation (2)	Actuarial Accrued Liability (AAL) (3)	Actuarial Value of Assets (AVA) (4)	Unfunded AAL (5)	Funded Ratio Using AVA (6)	UAAL Amortization Payment Rate (7)	Normal Cost Rate (8)	Actuarial Contribution Rate (9)	Member Contribution Rate (10)	City Actuarial Contribution Rate (11)	Dollar Amount of City Contribution* (12)
2021	$29,470	$211,461	$164,725	$46,736	77.9%	10.20%	16.02%	26.22%	5.00%	21.22%	$6,441
2022	29,992	222,388	176,018	46,370	79.1%	9.99%	16.15%	26.14%	5.00%	21.14%	6,530
2023	30,630	233,519	187,624	45,895	80.3%	9.89%	16.31%	26.20%	5.00%	21.20%	6,688
2024	31,345	243,201	200,155	43,046	82.3%	9.25%	16.27%	25.52%	5.00%	20.52%	6,625
2025	32,168	252,906	214,722	38,185	84.9%	8.19%	16.23%	24.42%	5.00%	19.42%	6,434
2026	33,000	262,523	224,979	37,543	85.7%	8.18%	16.20%	24.38%	5.00%	19.38%	6,587
2027	33,893	272,154	235,020	37,135	86.4%	8.15%	16.17%	24.32%	5.00%	19.32%	6,745
2028	34,784	281,827	245,200	36,627	87.0%	8.13%	16.14%	24.27%	5.00%	19.27%	6,904
2029	35,751	291,532	255,516	36,017	87.6%	8.10%	16.12%	24.22%	5.00%	19.22%	7,078
2030	36,718	301,255	265,974	35,281	88.3%	8.07%	16.10%	24.17%	5.00%	19.17%	7,250
2031	37,746	310,962	276,544	34,418	88.9%	8.04%	16.08%	24.12%	5.00%	19.12%	7,434
2032	38,791	320,640	287,241	33,399	89.6%	8.00%	16.05%	24.05%	5.00%	19.05%	7,611
2033	39,882	330,362	298,137	32,225	90.2%	7.96%	16.04%	24.00%	5.00%	19.00%	7,805
2034	41,083	340,163	309,266	30,897	90.9%	7.91%	16.03%	23.94%	5.00%	18.94%	8,015
2035	42,192	350,051	320,666	29,385	91.6%	7.89%	16.02%	23.91%	5.00%	18.91%	8,218
2036	43,363	360,001	332,308	27,692	92.3%	7.85%	16.01%	23.86%	5.00%	18.86%	8,424
2037	44,562	370,048	344,271	25,777	93.0%	7.82%	16.01%	23.83%	5.00%	18.83%	8,643
2038	45,800	380,184	356,551	23,633	93.8%	8.33%	16.00%	24.33%	5.00%	19.33%	9,119
2039	47,110	390,459	369,218	21,242	94.6%	6.89%	15.99%	22.88%	5.00%	17.88%	8,676
2040	48,475	400,894	382,571	18,322	95.4%	5.78%	15.99%	21.77%	5.00%	16.77%	8,373
2041	49,909	411,524	395,725	15,799	96.2%	4.77%	15.98%	20.75%	5.00%	15.75%	8,097
2042	51,381	422,402	408,862	13,540	96.8%	5.01%	15.97%	20.98%	5.00%	15.98%	8,457
2043	52,934	433,601	422,031	11,570	97.3%	5.10%	15.97%	21.07%	5.00%	16.07%	8,762
2044	54,509	445,162	435,914	9,247	97.9%	5.79%	15.97%	21.76%	5.00%	16.76%	9,410
2045	56,143	457,103	450,484	6,618	98.6%	6.86%	15.97%	22.83%	5.00%	17.83%	10,311
2046	57,879	469,487	466,180	3,306	99.3%	-0.07%	15.97%	15.90%	5.00%	10.90%	6,498
2047	59,645	482,403	483,396	(993)	100.2%	-0.12%	15.97%	15.85%	5.00%	10.85%	6,666
2048	61,482	495,870	497,326	(1,456)	100.3%	-0.17%	15.97%	15.80%	5.00%	10.80%	6,839
2049	63,396	509,949	511,874	(1,925)	100.4%	-0.22%	15.98%	15.76%	5.00%	10.76%	7,026
2050	65,342	524,685	527,083	(2,398)	100.5%	-0.26%	15.99%	15.73%	5.00%	10.73%	7,222

* Amounts shown are contributions in the fiscal year ending two years after the valuation date.
Note: Investment return assumption is assumed to be 7.10% in 2021, 7.05% in 2022, and 7.00% thereafter.

TABLE 14

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

CITY CONTRIBUTIONS UNDER ALTERNATE SCENARIOS

Projection Based on April 30, 2021 Actuarial Valuation
Board's Funding Policy (Layered Amortization of UAAL)
Amounts in Thousands

Fiscal Year End	City Contribution Amounts at Various Investment Returns		
April 30,*	7.10%/7.00% Return	8.60%/8.50% Return	5.60%/5.50% Return
2023	$6,441	$6,441	$6,441
2024	6,530	6,490	6,571
2025	6,688	6,553	6,824
2026	6,625	6,334	6,909
2027	6,434	5,931	6,928
2028	6,587	5,802	7,342
2029	6,745	5,655	7,778
2030	6,904	5,485	8,233
2031	7,078	5,295	8,724
2032	7,250	5,083	9,228
2033	7,434	4,844	9,762
2034	7,611	4,179	10,312
2035	7,805	3,886	10,894
2036	8,015	3,584	11,514
2037	8,218	3,255	12,146
2038	8,424	2,917	12,805
2039	8,643	2,561	13,503
2040	9,119	2,189	14,482
2041	8,676	1,800	14,562
2042	8,373	1,403	14,809
2043	8,097	992	15,114
2044	8,457	561	16,014
2045	8,762	120	16,787
2046	9,410	0	17,831
2047	10,311	0	19,066
2048	6,498	0	19,649
2049	6,666	0	15,389
2050	6,839	0	15,857
2051	7,026	0	16,351
2052	7,222	0	16,852

*The Actuarially Determined Contribution (ADC) determined in the annual actuarial valuation is contributed in the following fiscal year. For example, the dollar amount of the ADC for fiscal year-end April 30, 2023 is based on the ADC calculated in the April 30, 2021 valuation.

Note: Projections assume a constant population and no actuarial gains and losses other than recognition of the deferred investment experience as of April 30, 2021.

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September, 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the April 30, 2019 actuarial valuation for the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri (System).

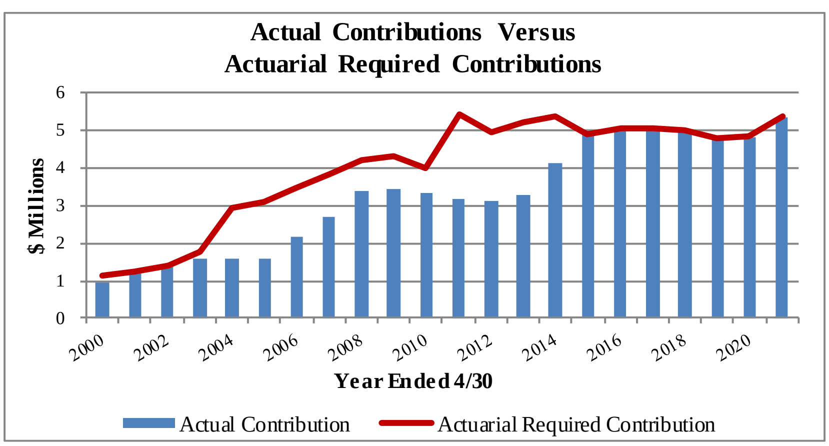
A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal and litigation risk or the plan could become "pay as you go". The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for volatility in contribution rates and
- external risks, such as the regulatory and political environment, are not included in ASOP 51.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial required contribution each year. As the following graph shows, the City failed to make contributions equal to the actuarial rate from 2003 to 2014, with large shortfalls in some years. Based on legislation passed in 2013, the City has contributed the full actuarial required contribution for the past 7 fiscal years.



One of the strongest factors regarding the future funding of the System is the City's statutory requirement to make the full actuarial required contribution, as determined by the System's actuary in the annual actuarial valuation. This is an important change from prior years when actual City contributions were far below the full actuarial contribution.

The most significant risk factor for most retirement systems, including the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri, is investment return risk because of the volatility of returns and the size of plan assets compared to payroll (see Table 15). As that Table illustrates, a difference of 10% between the actual return in a year and the assumed return results in an ultimate contribution rate increase of 4% of pay over a 20-year period. Given the System's target asset allocation and the associated standard deviation of the portfolio, a variance of 10% or more from the assumption in any given year is not unexpected (likely to occur in about one of every three years).

A key demographic risk for all retirement systems, including the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect small, continuous improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, as experienced with the COVID-19 pandemic. This type of event is also significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

Finally, the unfunded actuarial accrued liability is amortized as a level percentage of payroll. The underlying assumption used in developing the payment schedule for UAAL payments assumes an increasing covered payroll over time which is dependent on a stable employment level, i.e., active member count remains the same. When payroll does not grow as expected, the UAAL contribution rate will be higher than expected, even if the dollar amount of the payment is the same as scheduled. As Table 18 illustrates, the growth in covered payroll over the last 12 years has been minimal compared to expected increases over that period of 3.00% to 4.00%. This trend is due to the combined impact of a smaller number of active members and relatively low salary increases. While this is less critical for the Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri because the City contributes a dollar amount, not a percent of payroll, the lack of payroll growth does result in a payment schedule for the UAAL that allocates higher dollar amounts of contributions later in the period because it assumes payroll is increasing at a higher rate than is actually occurring.

Many of the public retirement systems in the United States were created shortly after World War II. The Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri was created in 1965 so it has been in existence for more than 50 years. In general, the aging of the population, including the retirement of the baby boomers, along with earlier retirement eligibility, has created a shift in the demographics of most retirement systems. This change is not unexpected and has, in fact, been anticipated in the funding of the retirement system. Even though it was anticipated, the demographic shift and maturing of the plans have increased the risk associated with funding the system. The following exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the natural maturing of the retirement system, including the percentage of liability attributable to retirees and the active to retiree ratio.

TABLE 15

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI HISTORICAL ASSET VOLATILITY RATIOS

As a retirement system matures, the size of the market value of assets typically increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Estimated Plan Year Payroll	Asset Volatility Ratio	Increase in ACR with a Return 10% Lower than Assumed*
4/30/2002	$60,493,794	$20,755,012	2.91	2.13%
4/30/2003	57,063,133	21,944,040	2.60	1.90%
4/30/2004	67,252,371	22,058,127	3.05	2.23%
4/30/2005	72,320,741	22,239,092	3.25	2.38%
4/30/2006	85,255,798	23,875,937	3.57	2.61%
4/30/2007	95,806,912	25,472,341	3.76	2.75%
4/30/2008	96,639,301	27,045,762	3.57	2.61%
4/30/2009	71,944,135	27,580,796	2.61	1.91%
4/30/2010	91,224,200	26,136,353	3.49	2.55%
4/30/2011	102,522,611	25,238,690	4.06	2.97%
4/30/2012	101,192,338	25,255,423	4.01	2.93%
4/30/2013	108,517,949	26,461,403	4.10	3.00%
4/30/2014	117,341,038	27,076,814	4.33	3.17%
4/30/2015	123,941,107	27,887,038	4.44	3.25%
4/30/2016	122,134,689	27,165,226	4.50	3.29%
4/30/2017	132,565,840	25,618,042	5.17	3.78%
4/30/2018	142,605,109	27,256,079	5.23	3.82%
4/30/2019	146,187,834	28,822,590	5.07	3.71%
4/30/2020	145,364,743	29,224,300	4.97	3.63%
4/30/2021	174,187,753	29,470,477	5.91	4.32%

Note: Years prior to 2011 were provided by the prior actuary.

*The impact of asset smoothing is not reflected in the impact on the Actuarial Contribution Rate (ACR). Current year assumptions are used for all years shown.

The amount of assets at April 30, 2021 is 5.91 times the covered payroll so underperforming the investment return assumption by 10.00% (i.e., earn -2.90% for one year) is equivalent to 59.1% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAAL, the magnitude of the ultimate contribution increase illustrates the risk associated with volatile investment returns.

TABLE 16
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
HISTORICAL CASH FLOWS

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. The System has had negative cash flows of around 1.00% to 1.50% for the last seven years, so it is not a current concern.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments and Expenses	Net Cash Flow	Net Cash Flow as a Percent of MVA
4/30/2002	$60,493,794	$2,423,357	$2,096,025	$327,332	0.54%
4/30/2003	57,063,133	2,667,081	2,147,212	519,869	0.91%
4/30/2004	67,252,371	2,848,500	2,651,461	197,039	0.29%
4/30/2005	72,320,741	2,800,644	2,963,573	(162,929)	(0.23%)
4/30/2006	85,255,798	3,437,464	3,217,247	220,217	0.26%
4/30/2007	95,806,912	3,894,133	3,716,364	177,769	0.19%
4/30/2008	96,639,301	4,658,280	3,762,233	896,047	0.93%
4/30/2009	71,944,135	4,808,862	4,221,420	587,442	0.82%
4/30/2010	91,224,200	4,641,690	4,906,758	(265,068)	(0.29%)
4/30/2011	102,522,611	4,568,520	5,122,993	(554,473)	(0.54%)
4/30/2012	101,192,338	4,370,860	5,087,225	(716,365)	(0.71%)
4/30/2013	108,517,949	4,580,421	5,639,934	(1,059,513)	(0.98%)
4/30/2014	117,341,038	5,436,191	6,377,546	(941,355)	(0.80%)
4/30/2015	123,941,107	6,253,747	6,433,277	(179,530)	(0.14%)
4/30/2016	122,134,689	6,335,555	7,347,870	(1,012,315)	(0.83%)
4/30/2017	132,565,840	6,316,287	7,305,494	(989,207)	(0.75%)
4/30/2018	142,605,109	6,265,874	7,913,332	(1,647,458)	(1.16%)
4/30/2019	146,187,834	6,194,531	8,333,044	(2,138,513)	(1.46%)
4/30/2020	145,364,743	6,266,450	8,532,080	(2,265,630)	(1.56%)
4/30/2021	174,187,753	6,872,628	9,558,500	(2,685,872)	(1.54%)

Note: Years prior to 2011 were provided by the prior actuary.

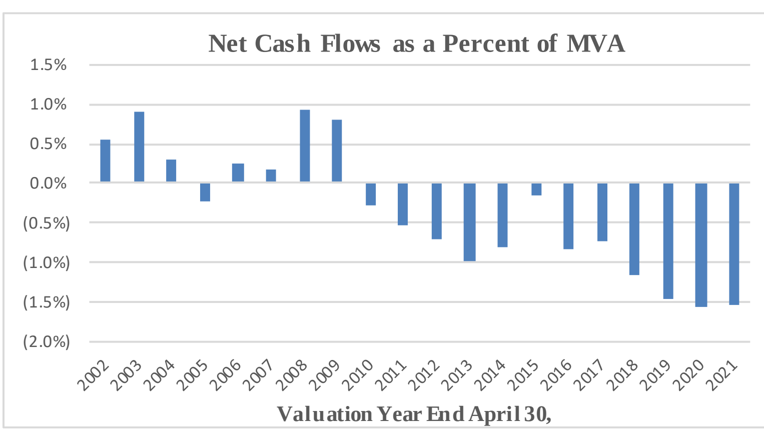


TABLE 17
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
LIABILITY MATURITY MEASUREMENTS

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations, and in some cases declining active populations, resulting in an increasing ratio of retirees to active members and a growing percentage of retiree liability. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs.

Projections provide the most effective way of analyzing the impact of these changes on future funding measures, but studying several key metrics from the valuation can also provide some valuable insight.

Year End	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a / b)
4/30/2002	$19,950,246	$67,814,254	29.4%
4/30/2003	23,457,419	83,044,509	28.2%
4/30/2004	26,402,483	89,141,414	29.6%
4/30/2005	32,330,097	97,103,806	33.3%
4/30/2006	34,786,783	105,928,172	32.8%
4/30/2007	36,754,725	110,394,115	33.3%
4/30/2008	40,458,961	117,626,995	34.4%
4/30/2009	43,984,225	124,990,468	35.2%
4/30/2010	51,740,006	131,222,564	39.4%
4/30/2011	55,401,727	137,040,461	40.4%
4/30/2012	56,978,299	142,907,530	39.9%
4/30/2013	61,173,449	148,662,779	41.1%
4/30/2014	65,924,948	155,264,022	42.5%
4/30/2015	69,298,850	160,470,682	43.2%
4/30/2016	73,396,064	165,081,932	44.5%
4/30/2017	81,260,182	171,188,191	47.5%
4/30/2018	83,042,411	177,116,999	46.9%
4/30/2019	88,625,831	188,505,176	47.0%
4/30/2020	93,349,361	197,399,029	47.3%
4/30/2021	99,578,589	211,461,019	47.1%

Note: Years prior to 2011 were provided by the prior actuary.

TABLE 17
(continued)

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

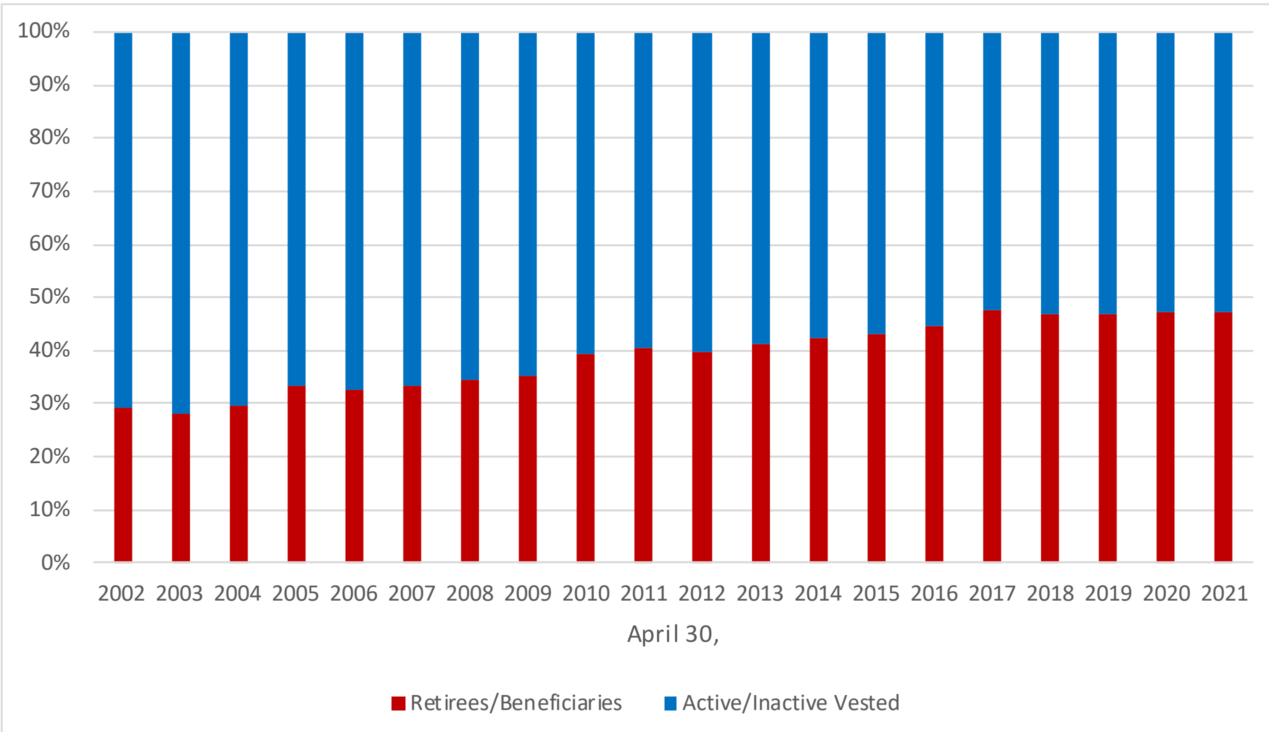


TABLE 18
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
HISTORICAL MEMBER STATISTICS

Valuation Date April 30,	Number of Active	Number of Retired	Active/ Retired
2002	599	117	5.12
2003	615	122	5.04
2004	595	123	4.84
2005	586	135	4.34
2006	610	140	4.36
2007	613	152	4.03
2008	630	158	3.99
2009	619	163	3.80
2010	575	186	3.09
2011	557	193	2.89
2012	549	199	2.76
2013	558	211	2.64
2014	552	224	2.46
2015	551	235	2.34
2016	526	248	2.12
2017	492	262	1.88
2018	511	272	1.88
2019	543	282	1.93
2020	537	290	1.85
2021	522	303	1.72

Note: Years prior to 2011 were provided by prior actuary.

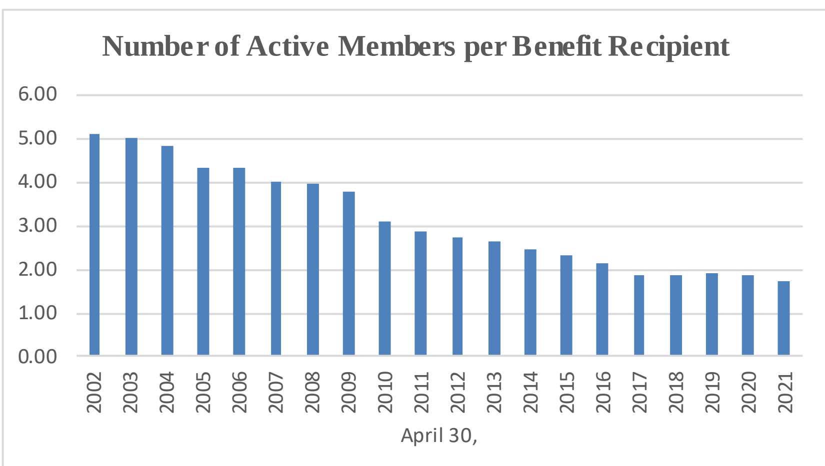


TABLE 18
(continued)

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

Valuation Date April 30,	Number of Active Members	Projected Payroll	Payroll % Incr.
2002	599	20,755,012	
2003	615	21,944,040	5.73%
2004	595	22,058,127	0.52%
2005	586	22,239,092	0.82%
2006	610	23,875,937	7.36%
2007	613	25,472,341	6.69%
2008	630	27,045,762	6.18%
2009	619	27,580,796	1.98%
2010	575	26,136,353	(5.24%)
2011	557	25,238,690	(3.43%)
2012	549	25,255,423	0.07%
2013	558	26,461,403	4.78%
2014	552	27,076,814	2.33%
2015	551	27,887,038	2.99%
2016	526	27,165,226	(2.59%)
2017	492	25,618,042	(5.70%)
2018	511	27,256,079	6.39%
2019	543	28,822,590	5.75%
2020	537	29,224,300	1.39%
2021	522	29,470,477	0.84%

Note: Years prior to 2011 were provided by prior actuary.

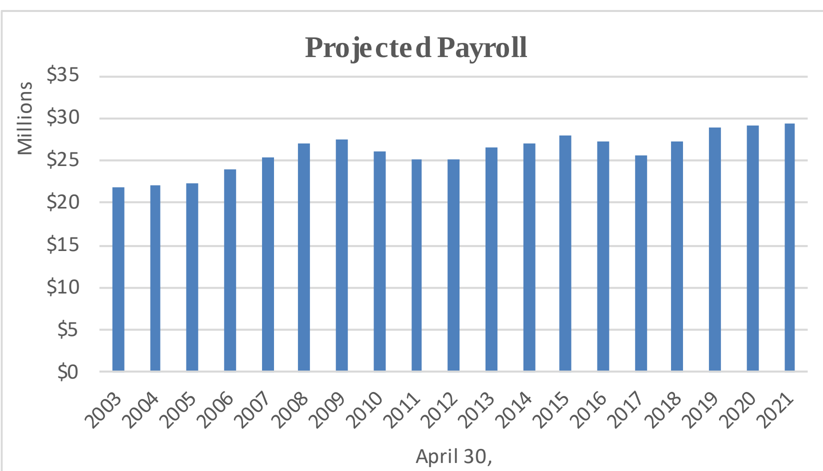


TABLE 19
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

COMPARISON OF VALUATION RESULTS UNDER ALTERNATE INVESTMENT RETURN ASSUMPTIONS
(Dollars in Thousands)

This exhibit compares the key April 30, 2021 valuation results under five (5) different investment return assumptions to illustrate the impact of different assumptions on the funding of the System. Note that only the investment return assumption is changed, as identified in the heading below. All other assumptions are unchanged for purposes of this analysis.

Investment Return Assumption	**6.60%**	**6.85%**	**7.10%**	**7.35%**	**7.60%**
Contributions					
Normal Cost Rate	18.16%	17.05%	16.02%	15.06%	14.17%
UAAL Contribution Rate	13.19%	11.69%	10.20%	8.71%	7.23%
Total Actuarial Contribution Rate	31.35%	28.74%	26.22%	23.77%	21.40%
Employee Contribution Rate	(5.00%)	(5.00%)	(5.00%)	(5.00%)	(5.00%)
City Contribution Rate	26.35%	23.74%	21.22%	18.77%	16.40%
City Contribution for Following Fiscal Year (Dollars in Thousands)	$7,998	$7,206	$6,441	$5,698	$4,978
Actuarial Accrued Liability	$225,172	$218,156	$211,461	$205,070	$198,967
Actuarial Value of Assets	164,725	164,725	164,725	164,725	164,725
Unfunded Actuarial Accrued Liability	$60,447	$53,431	$46,736	$40,345	$34,242
Funded Ratio	73%	76%	78%	80%	83%

Note: All other assumptions are unchanged for purposes of this sensitivity analysis.
Numbers may not add due to rounding.

The actuarial accrued liability is a measure intended to help the reader assess (i) a retirement plan's funded status on a going concern basis and (ii) progress being made toward accumulating the assets needed to pay benefits as due. Allocation of the actuarial present value of projected benefits between past and future service was based on service using the Entry Age Normal actuarial cost method. Assumptions, including projected pay increases, were the same as used to determine the System's level percent of payroll annual required contribution between entry age and assumed exit age. Entry age was established by subtracting credited service from current age on the valuation date. The Entry Age Normal actuarial accrued liability was determined as part of an actuarial valuation of the System as of April 30, 2021. The actuarial assumptions used in determining the actuarial accrued liability can be found in Appendix C.

TABLE 20

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

Valuation Date	April 30, 2021
Actuarial cost method	Entry Age Normal
Amortization method for unfunded actuarial accrued liabilities	Level-percent of payroll
Amortization period	30-year closed, beginning with the 2017 valuation for the Legacy UAAL base 20-year closed for experience bases
Asset valuation method	5-year smoothing of actual versus expected return on market value
Actuarial assumptions:	
Investment rate of return	7.10%, net of investment expenses
Projected salary increases including wage inflation at 3.00%	3.60% to 6.50%
Cost-of-living adjustments	2.50% simple

Membership of the plan consisted of the following at April 30, 2021, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	303
Terminated plan members entitled to but not yet receiving benefits	45
Active plan members	522
Total	870

TABLE 21

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date		Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Active Member Covered Payroll** (c)	UAAL as a Percentage of Active Member Covered Payroll [(b) - (a)] / (c)
4/30/1998		$41,835,057	$43,200,513	$1,365,456	97%	$15,295,680	9%
4/30/1999		47,593,329	48,627,168	1,033,839	98%	15,430,846	7%
4/30/2000		56,905,524	56,038,915	(866,609)	102%	17,786,369	(5%)
4/30/2001		61,895,208	62,097,908	202,700	100%	18,831,325	1%
4/30/2002		66,401,308	67,814,254	1,412,946	98%	20,755,012	7%
4/30/2003	*	68,182,691	83,044,509	14,861,818	82%	21,944,040	68%
4/30/2004	#	69,868,024	89,141,414	19,273,390	78%	22,058,127	87%
4/30/2005		72,382,548	97,103,806	24,721,258	75%	22,239,092	111%
4/30/2006		78,846,717	105,928,172	27,081,455	74%	23,875,937	113%
4/30/2007		89,110,860	110,394,115	21,283,255	81%	25,472,341	84%
4/30/2008		97,989,985	117,626,995	19,637,010	83%	27,045,762	73%
4/30/2009		86,332,962	124,990,468	38,657,506	69%	27,580,796	140%
4/30/2010		100,515,970	131,222,564	30,706,594	77%	26,136,353	117%
4/30/2011	*	102,522,611	137,040,461	34,517,850	75%	25,238,690	137%
4/30/2012		108,018,073	142,907,530	34,889,457	76%	25,255,423	138%
4/30/2013	*#	113,170,844	148,662,779	35,491,935	76%	26,461,403	134%
4/30/2014		119,075,893	155,264,022	36,188,129	77%	27,076,814	134%
4/30/2015		126,029,676	160,470,682	34,441,006	79%	27,887,038	124%
4/30/2016		130,604,532	165,081,932	34,477,400	79%	27,165,226	127%
4/30/2017		137,233,636	171,188,191	33,954,555	80%	25,618,042	133%
4/30/2018		144,206,976	177,116,999	32,910,023	81%	27,256,079	121%
4/30/2019	*	150,112,994	188,505,176	38,392,182	80%	28,822,590	133%
4/30/2020	*	154,613,128	197,399,029	42,785,901	78%	29,224,300	146%
4/30/2021	*	164,724,673	211,461,019	46,736,346	78%	29,470,477	159%

* After changes in actuarial assumptions or methods.

** For valuation years 2001 and prior, and 2007 and later, valuation payroll includes projected increases for year following valuation.
For valuation years 2002 through 2006, valuation payroll is payroll reported in data after annualization of pays for new hires.

\# After change in benefit provisions.

Note: Results for years prior to 2011 were taken from the prior actuary's report.

Analysis of the dollar amounts of actuarial value of assets, actuarial accrued liability, or unfunded actuarial accrued liability in isolation can be misleading. Expressing the actuarial value of assets as a percentage of the actuarial accrued liability provides one indication of the System's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the System is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan's funding. The unfunded actuarial accrued liability and annual covered payroll are both affected by inflation. Expressing the unfunded actuarial accrued liability as a percentage of covered payroll approximately adjusts for the effects of inflation and aids analysis of the progress being made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the plan's funding.

TABLE 22

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

SCHEDULE OF CITY CONTRIBUTIONS

Fiscal Year Ending April 30	Annual Required Contribution	Percent Contribution	Contribution Shortfall/(Excess)
1997	$ 465,004	90%	$ N/A
1998	1,035,180	44%	581,963
1999	1,040,673	65%	366,445
2000	1,152,018	82%	207,543
2001	1,259,454	102%	(26,712)
2002	1,410,461	101%	(10,207)
2003	1,761,146	89%	193,313
2004	2,944,407	54%	1,343,164
2005	3,076,906	52%	1,464,826
2006	3,480,720	62%	1,305,553
2007	3,854,132	70%	1,172,400
2008	4,202,987	80%	830,576
2009	4,322,860	80%	852,178
2010	4,013,807	83%	684,080
2011	5,412,676	59%	2,227,635
2012	4,944,371	64%	1,798,247
2013	5,202,401	63%	1,918,943
2014	5,358,191	77%	1,235,816
2015	4,930,686	100%	0
2016	5,048,167	100%	0
2017	5,063,240	100%	0
2018	4,994,191	100%	0
2019	4,778,854	100%	0
2020	4,849,708	100%	0
2021	5,358,552	100%	0

Note: For years prior to 2011, information shown is from the prior actuary's report.

TABLE 23

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

SOLVENCY TEST

Valuation Date April 30		Entry Age Actuarial Accrued Liabilities (1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Members (City Financed Portion)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Reported Assets (1)	(2)	(3)
2004	#	$ 8,218,260	$ 26,402,483	$ 54,520,671	$ 69,868,024	100 %	100 %	65 %
2005		8,641,718	32,330,097	56,131,991	72,382,548	100	100	56
2006		9,373,054	34,786,783	61,768,335	78,846,717	100	100	56
2007		9,972,284	36,754,725	63,667,106	89,110,860	100	100	67
2008		10,652,040	40,458,961	66,515,994	97,989,985	100	100	70
2009		11,220,613	43,984,225	69,785,630	86,332,962	100	100	45
2010		11,328,650	51,740,006	68,153,908	100,515,970	100	100	55
2011	*	12,057,814	55,401,727	69,580,920	102,522,611	100	100	50
2012		12,623,138	56,978,299	73,306,093	108,018,073	100	100	52
2013	*#	12,957,382	61,173,449	74,531,948	113,170,844	100	100	52
2014		13,366,753	65,924,948	75,972,321	119,075,893	100	100	52
2015		13,831,974	69,298,850	77,339,858	126,029,676	100	100	55
2016		14,009,918	73,396,064	77,675,950	130,604,532	100	100	56
2017		13,748,200	81,260,182	76,179,809	137,233,636	100	100	55
2018		13,993,612	83,042,411	80,080,976	144,206,976	100	100	59
2019	*	14,253,969	88,625,831	85,625,376	150,112,994	100	100	55
2020	*	14,626,343	93,349,361	89,423,325	154,613,128	100	100	52
2021	*	14,979,303	99,578,589	96,903,127	164,724,673	100	100	52

* After changes in actuarial assumptions or methods.
\# After changes in benefits
Note: Results for years before 2011 were prepared by the prior actuary.

MEMBER DATA RECONCILIATION

April 30, 2020 to April 30, 2021

The number of members included in the valuation, as summarized in the table below, is in accordance with the data submitted by the System for members as of the valuation date.

	Active Participants	Retirees	Disableds	Beneficiaries	Inactive Vested	Total
Members as of 04/30/2020	**537**	**263**	**6**	**21**	**46**	**873**
New Members*	47	0	0	0	(1)	46
Terminations						
Refunded	(41)	0	0	0	0	(41)
Refund Due	(3)	0	0	0	0	(3)
Inactive Vested	(4)	0	0	0	4	0
Retirements						
Service	(14)	18	0	0	(4)	0
Disability	0	0	0	0	0	0
Deaths						
Cashed Out/Payments Ended	0	0	0	0	0	0
With Beneficiary	0	(2)	0	2	0	0
Without Beneficiary	0	(5)	0	0	0	(5)
Data Adjustments	0	0	0	0	0	0
Members as of 04/30/2021	**522**	**274**	**6**	**23**	**45**	**870**

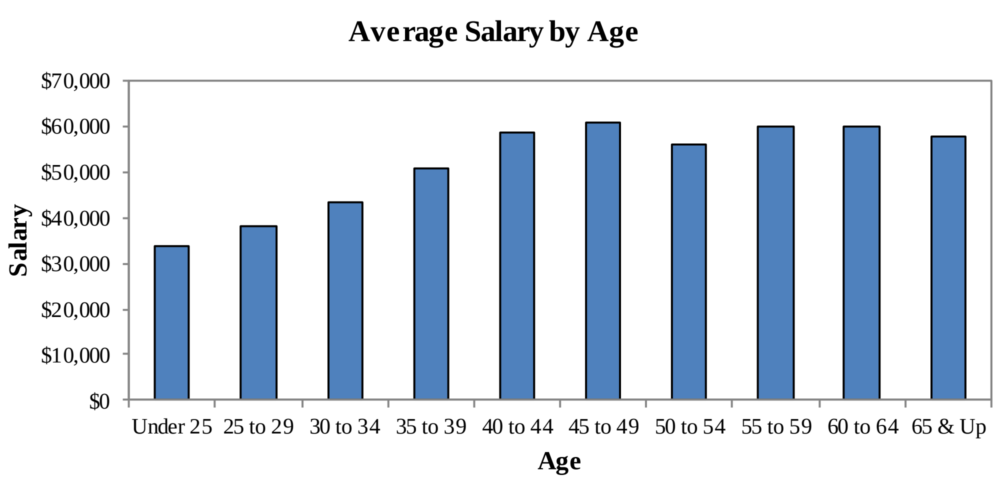
* Includes reappointments.

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF ACTIVE MEMBERS
as of April 30, 2021

Total

	Number			Annual Reported Compensation*		
Age	Male	Female	Total	Male	Female	Total**
Under 25	12	13	25	$ 392,754	$ 456,651	$ 849,405
25 to 29	17	32	49	617,338	1,260,331	1,877,669
30 to 34	18	32	50	758,376	1,405,953	2,164,330
35 to 39	16	37	53	915,802	1,782,788	2,698,590
40 to 44	22	51	73	1,219,076	3,068,957	4,288,033
45 to 49	19	45	64	1,382,855	2,505,996	3,888,850
50 to 54	15	49	64	887,084	2,708,223	3,595,307
55 to 59	27	31	58	1,783,617	1,696,943	3,480,560
60 to 64	19	39	58	1,289,194	2,196,807	3,486,001
65 & Up	5	23	28	352,684	1,264,136	1,616,819
Total**	170	352	522	$ 9,598,781	$ 18,346,784	$ 27,945,565

* Compensation reported in the valuation data for the prior plan year with annualization of pay for new hires.
** May not add due to rounding



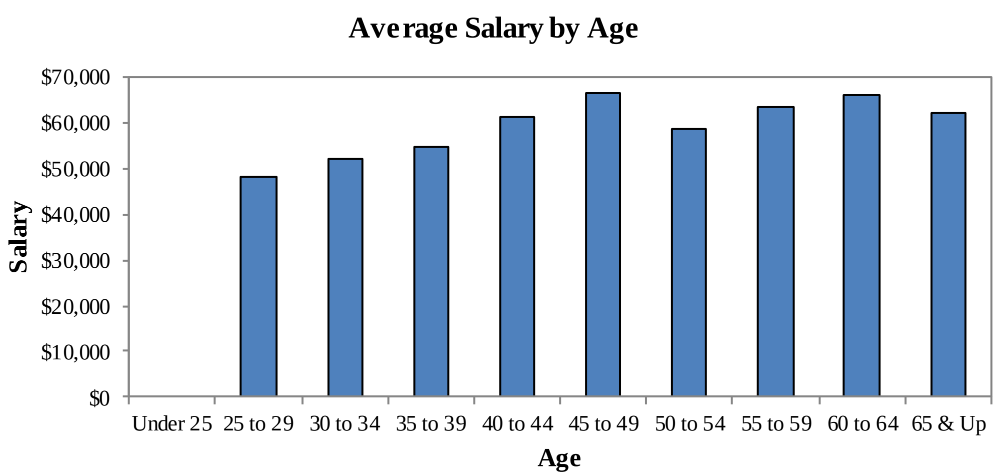
Average age:	45.2
Average service:	13.5
Average salary:	$53,536

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF ACTIVE MEMBERS
as of April 30, 2021

Tier 1

	Number			Annual Reported Compensation*		
Age	Male	Female	Total	Male	Female	Total**
Under 25	0	0	0	$ 0	$ 0	$ 0
25 to 29	1	1	2	48,321	48,174	96,495
30 to 34	3	4	7	154,026	209,877	363,904
35 to 39	9	23	32	528,503	1,221,468	1,749,971
40 to 44	15	39	54	923,807	2,384,551	3,308,358
45 to 49	17	32	49	1,307,723	1,945,983	3,253,706
50 to 54	10	39	49	672,315	2,203,946	2,876,262
55 to 59	22	20	42	1,436,445	1,235,372	2,671,817
60 to 64	15	31	46	1,124,326	1,913,081	3,037,407
65 & Up	4	18	22	301,578	1,061,093	1,362,671
Total**	96	207	303	$ 6,497,046	$ 12,223,546	$ 18,720,592

* Compensation reported in the valuation data for the prior plan year with annualization of pay for new hires.
** May not add due to rounding



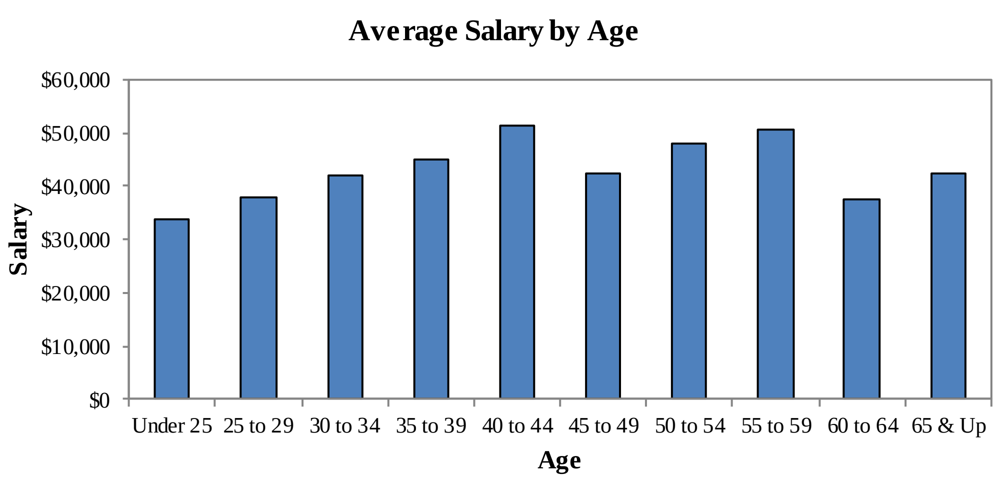
Average age:	50.5
Average service:	21.0
Average salary:	$61,784

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF ACTIVE MEMBERS
as of April 30, 2021

Tier 2

	Number			Annual Reported Compensation*		
Age	Male	Female	Total	Male	Female	Total**
Under 25	12	13	25	$ 392,754	$ 456,651	$ 849,405
25 to 29	16	31	47	569,017	1,212,157	1,781,174
30 to 34	15	28	43	604,350	1,196,076	1,800,426
35 to 39	7	14	21	387,299	561,320	948,619
40 to 44	7	12	19	295,269	684,406	979,674
45 to 49	2	13	15	75,132	560,013	635,145
50 to 54	5	10	15	214,769	504,276	719,045
55 to 59	5	11	16	347,172	461,571	808,743
60 to 64	4	8	12	164,868	283,726	448,594
65 & Up	1	5	6	51,105	203,043	254,148
Total**	74	145	219	$ 3,101,735	$ 6,123,238	$ 9,224,973

* Compensation reported in the valuation data for the prior plan year with annualization of pay for new hires.
** May not add due to rounding



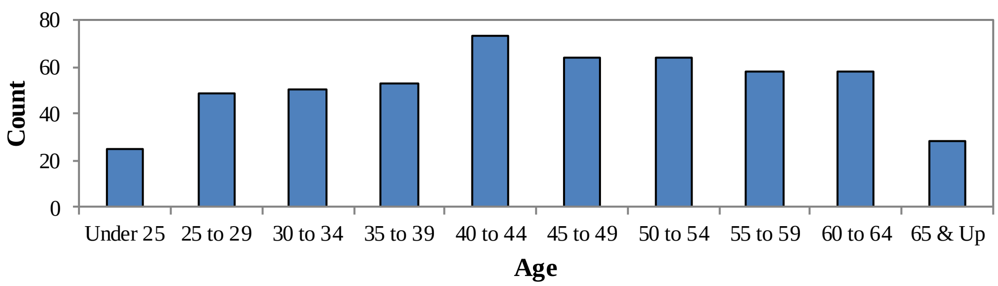
Average age:	37.9
Average service:	3.1
Average salary:	$42,123

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
DISTRIBUTION OF ACTIVE MEMBERS
As of April 30, 2021

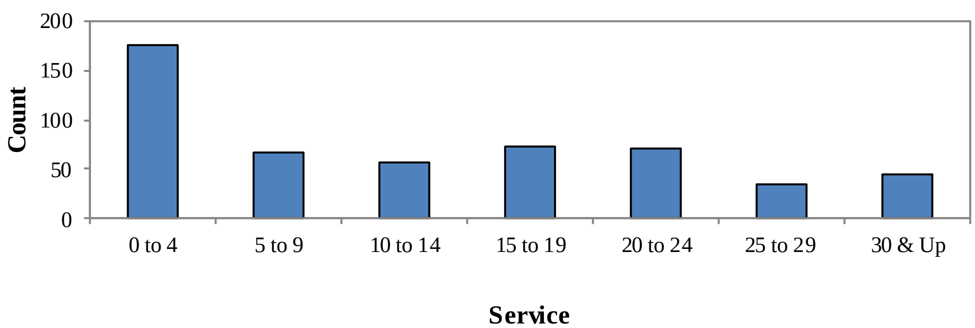
Total

	Years of Service							
Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	25	0	0	0	0	0	0	25
25 to 29	43	6	0	0	0	0	0	49
30 to 34	33	13	4	0	0	0	0	50
35 to 39	16	12	19	6	0	0	0	53
40 to 44	13	8	17	17	17	1	0	73
45 to 49	13	4	1	18	21	7	0	64
50 to 54	11	8	7	5	15	12	6	64
55 to 59	10	9	3	9	10	6	11	58
60 to 64	7	5	4	14	4	5	19	58
65 & Up	4	2	2	4	4	4	8	28
Total	175	67	57	73	71	35	44	522

Age Distribution



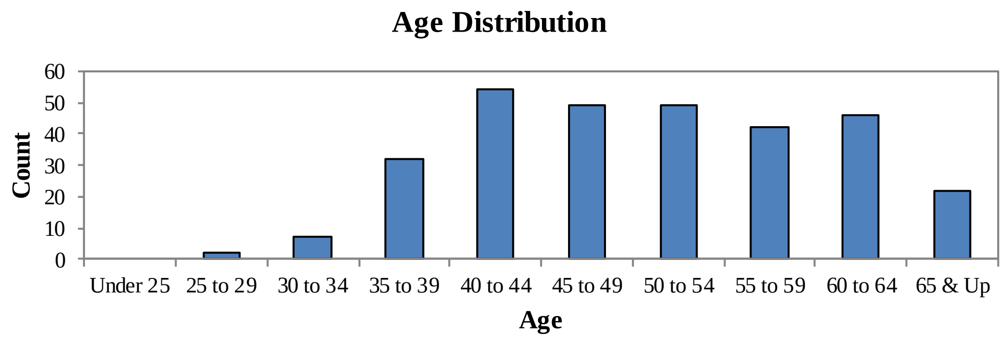
Service Distribution

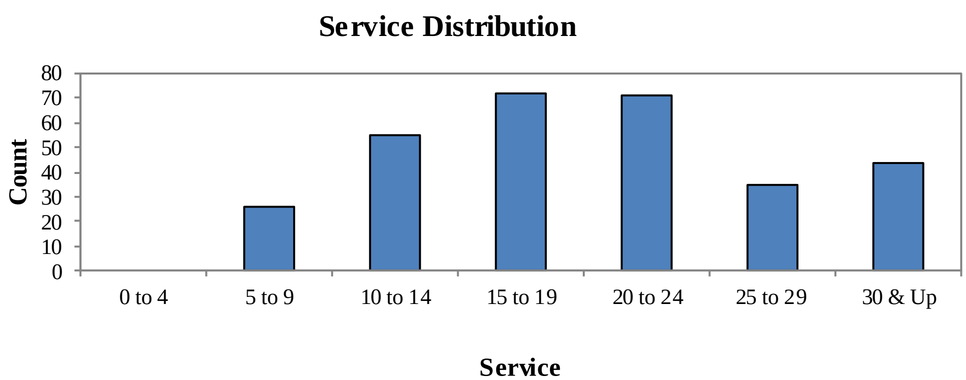


CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
DISTRIBUTION OF ACTIVE MEMBERS
As of April 30, 2021

Tier 1

	Years of Service							
Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	0	0	0	0	0	0	0	0
25 to 29	0	2	0	0	0	0	0	2
30 to 34	0	4	3	0	0	0	0	7
35 to 39	0	7	19	6	0	0	0	32
40 to 44	0	3	16	17	17	1	0	54
45 to 49	0	2	1	18	21	7	0	49
50 to 54	0	4	7	5	15	12	6	49
55 to 59	0	4	3	8	10	6	11	42
60 to 64	0	0	4	14	4	5	19	46
65 & Up	0	0	2	4	4	4	8	22
Total	0	26	55	72	71	35	44	303



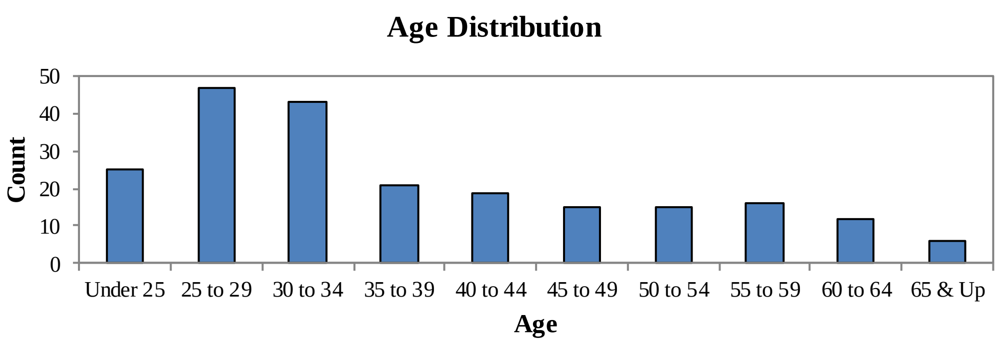


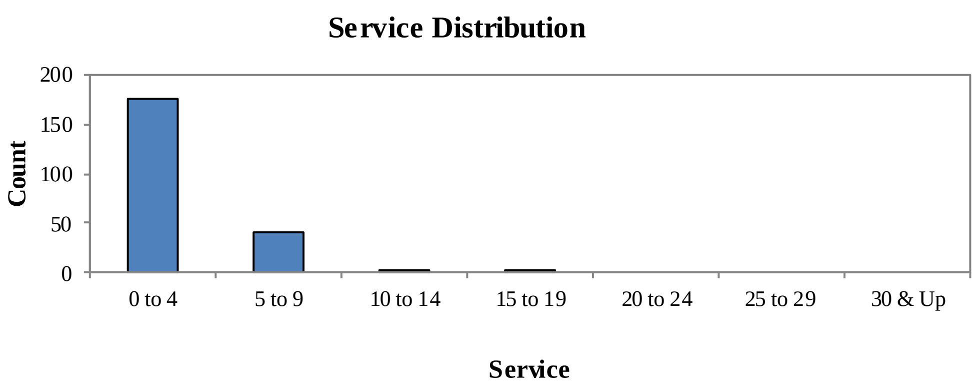
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI DISTRIBUTION OF ACTIVE MEMBERS

As of April 30, 2021

Tier 2

	Years of Service							
Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	25	0	0	0	0	0	0	25
25 to 29	43	4	0	0	0	0	0	47
30 to 34	33	9	1	0	0	0	0	43
35 to 39	16	5	0	0	0	0	0	21
40 to 44	13	5	1	0	0	0	0	19
45 to 49	13	2	0	0	0	0	0	15
50 to 54	11	4	0	0	0	0	0	15
55 to 59	10	5	0	1	0	0	0	16
60 to 64	7	5	0	0	0	0	0	12
65 & Up	4	2	0	0	0	0	0	6
Total	175	41	2	1	0	0	0	219



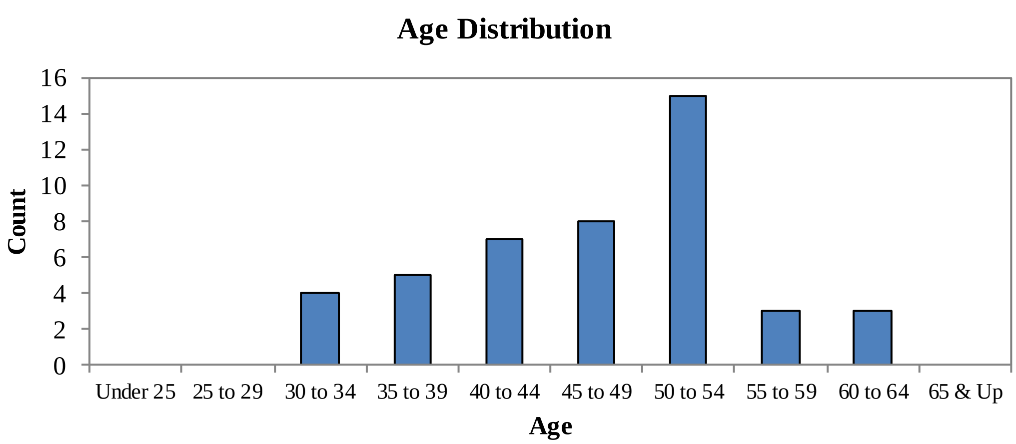


CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI SUMMARY OF INACTIVE VESTED MEMBERS as of April 30, 2021

	Number			Current Monthly Benefit at Retirement*		
Age	Male	Female	Total	Male	Female	Total**
Under 25	0	0	0	$ 0	$ 0	$ 0
25 to 29	0	0	0	0	0	0
30 to 34	0	4	4	0	1,988	1,988
35 to 39	3	2	5	1,427	1,078	2,505
40 to 44	2	5	7	2,460	3,460	5,920
45 to 49	2	6	8	2,231	5,946	8,177
50 to 54	6	9	15	5,905	13,359	19,264
55 to 59	2	1	3	1,141	3,164	4,305
60 to 64	2	1	3	902	246	1,148
65 & Up	0	0	0	0	0	0
Total**	17	28	45	$ 14,067	$ 29,240	$ 43,307

* Does not include supplemental benefits

** May not add due to rounding



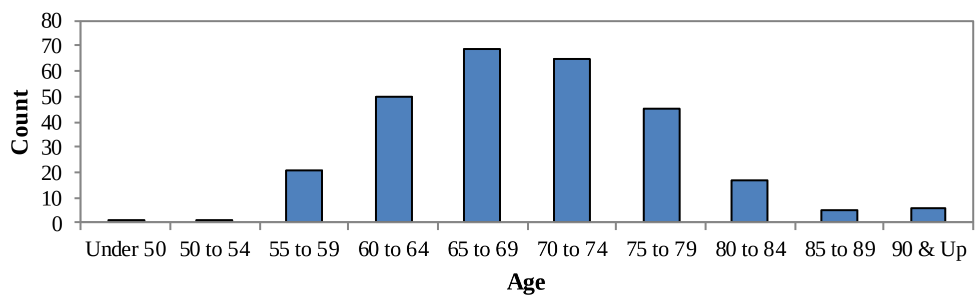
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF RETIRED MEMBERS
as of April 30, 2021

Healthy & Disabled Retirees

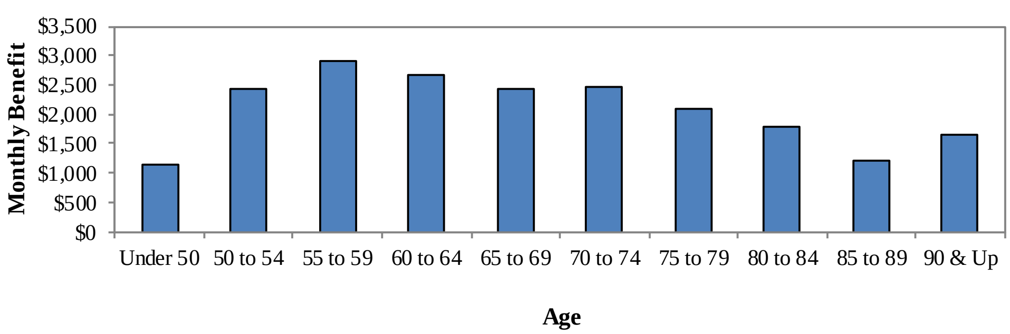
	Number			Monthly Benefit*		
Age	Male	Female	Total	Male	Female	Total**
Under 50	1	0	1	$ 1,137	$ 0	$ 1,137
50 to 54	1	0	1	2,436	0	2,436
55 to 59	7	14	21	25,109	35,929	61,038
60 to 64	17	33	50	50,794	82,574	133,368
65 to 69	20	49	69	50,314	116,632	166,946
70 to 74	27	38	65	75,022	85,160	160,182
75 to 79	22	23	45	56,090	37,582	93,672
80 to 84	4	13	17	9,384	20,913	30,297
85 to 89	2	3	5	3,316	2,803	6,119
90 & Up	5	1	6	9,314	521	9,835
Total**	106	174	280	$ 282,915	$ 382,114	$ 665,029

* Does not include supplemental benefits
** May not add due to rounding

Age Distribution



Average Benefit



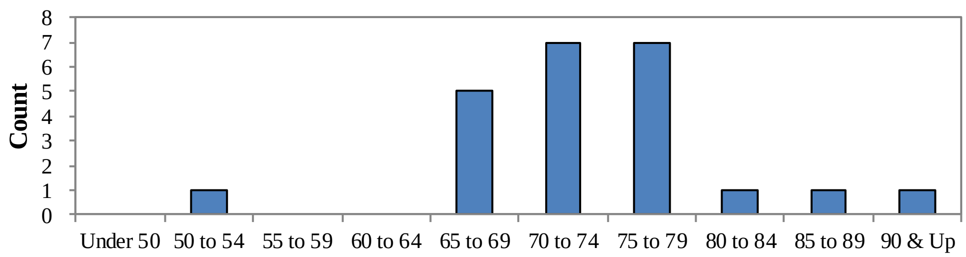
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF RETIRED MEMBERS
as of April 30, 2021

Beneficiaries

	Number			Monthly Benefit*		
Age	Male	Female	Total	Male	Female	Total**
Under 50	0	0	0	$ 0	$ 0	$ 0
50 to 54	0	1	1	0	1,206	1,206
55 to 59	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0
65 to 69	1	4	5	1,429	5,866	7,295
70 to 74	1	6	7	259	10,631	10,890
75 to 79	2	5	7	3,363	5,848	9,211
80 to 84	0	1	1	0	930	930
85 to 89	0	1	1	0	397	397
90 & Up	0	1	1	0	432	432
Total**	4	19	23	$ 5,050	$ 25,311	$ 30,362

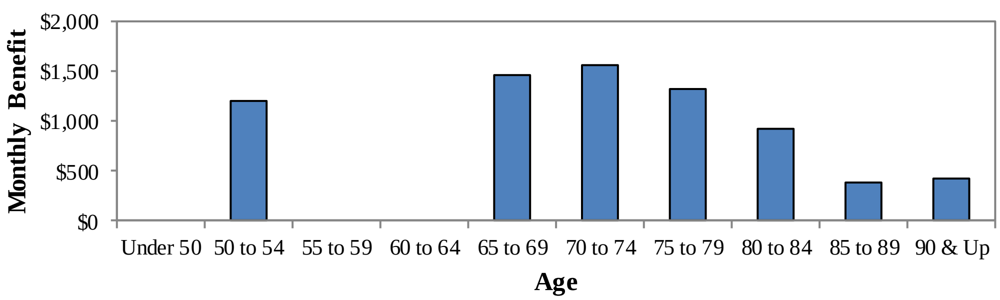
* Does not include supplemental benefits
** May not add due to rounding

Age Distribution



Age

Average Benefit



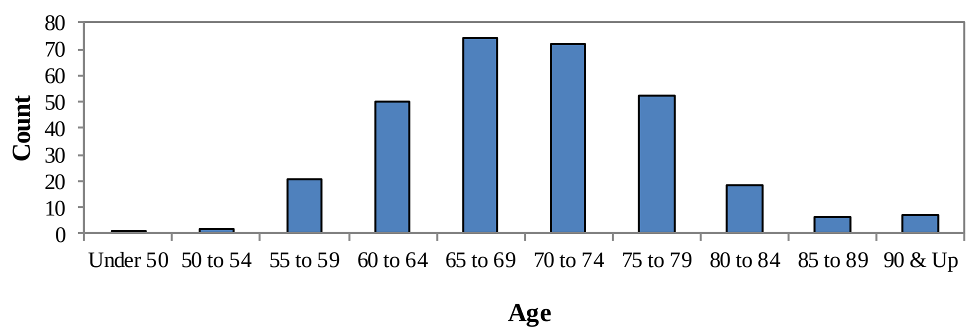
CIVILIAN EMPLOYEES' RETIREMENT SYSTEM
OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI
SUMMARY OF RETIRED MEMBERS
as of April 30, 2021

Combined Retirees & Beneficiaries

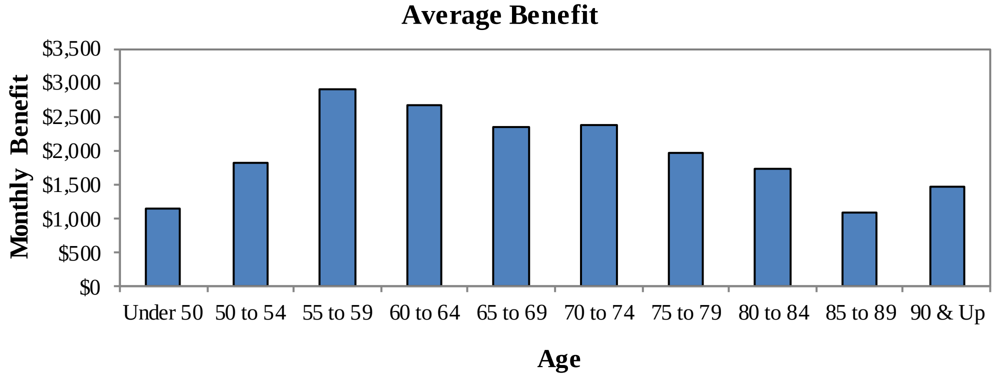
	Number			Monthly Benefit*		
Age	Male	Female	Total	Male	Female	Total**
Under 50	1	0	1	$ 1,137	$ 0	$ 1,137
50 to 54	1	1	2	2,436	1,206	3,642
55 to 59	7	14	21	25,109	35,929	61,038
60 to 64	17	33	50	50,794	82,574	133,368
65 to 69	21	53	74	51,743	122,498	174,241
70 to 74	28	44	72	75,281	95,791	171,072
75 to 79	24	28	52	59,453	43,430	102,883
80 to 84	4	14	18	9,384	21,844	31,228
85 to 89	2	4	6	3,316	3,200	6,516
90 & Up	5	2	7	9,314	954	10,267
Total**	110	193	303	$ 287,966	$ 407,425	$ 695,391

* Does not include supplemental benefits
** May not add due to rounding

Age Distribution



Average Benefit



CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

SUMMARY OF BENEFIT PROVISIONS

Membership

All regularly appointed full-time civilian employees of the Kansas City, Missouri Police Department who are not eligible to receive a pension from any other City-funded retirement system, shall become members as a condition of their employment.

Tier I member – A person who became a member prior to August 28, 2013 and remains a member on August 28, 2013.

Tier II member – A person who became a member on or after August 28, 2013.

Service Retirement

Eligibility –

Tier I member – Later of age 65 or member's 10th anniversary of employment.

Tier II member – Later of age 67 or member's 20th anniversary of employment.

Amount of Pension – Benefit equal to 2% of Final Compensation multiplied by years of creditable service.

Final Compensation –

Tier I member – Average annual compensation during the two years of service with the highest salary, whether consecutive or otherwise, or during the entire period of service if less than two years.

Tier II member – Average annual compensation during the three years of service with the highest salary, whether consecutive or otherwise, or during the entire period of service if less than three years.

Early Retirement

Tier I members – Eligible for early retirement as follows:

a) Beginning at age 55, if member has at least 10 years of creditable service. Pension computed as service retirement and then reduced by 0.50% for each month the benefit commences prior to the month following that in which the member turns age 60.
b) Beginning at age 60, if member has at least 5 years of creditable service. Pension computed as service retirement and then reduced by 0.50% for each month the benefit commences prior to the month following that in which the member turns age 65.
c) Beginning at age 60, if member has at least 10 years of creditable service. Pension computed as service retirement without reduction.
d) At any time after the member's age plus years of creditable service equals or exceeds 80 (Rule of 80). Pension computed as service retirement without reduction.

Tier II members – Eligible for early retirement as follows:

a) Beginning at age 62, if member has at least 5 years of creditable service. Pension computed as service retirement and then reduced by 0.50% for each month the benefit commences prior to the month following that in which the member turns age 67.
b) Beginning at age 62, if a member has at least 20 years of creditable service. Pension computed as service retirement without reduction.
c) At any time after the member's age plus years of creditable service equals or exceeds 85 (Rule of 85). Pension computed as service retirement without reduction.

Deferred Retirement (Vested Termination)

***Eligibility* –** 5 or more years of creditable service.

Amount of Pension – Computed as service retirement but based upon service, Final Compensation and benefit formula in effect at termination of employment. Benefit may begin at early retirement age, adjusted by applicable reductions.

Duty Disability

Eligibility – A member in active service who has a total and permanent disability that prevents the member from engaging in any occupation or performing any work for remuneration or profit for the remainder of their life. The disability must be the direct result of performance of duties with the Police Department. No age or service requirement.

***Amount of Pension* –** 50% of Final Compensation payable for the remainder of the member's life or as long as the permanent disability continues.

Duty disability benefits may be subject to offset or reduction by amounts paid or payable under any Workers' Compensation law. A disability retiree who is not age 60 may be required by the Retirement Board to undergo continuing eligibility reviews once every three years which may include a medical re-examination.

Non-duty Disability

Eligibility – A member in active service, with a minimum of 10 years of service, who has a total and permanent disability that prevents the member from engaging in any occupation or performing any work for remuneration or profit for the remainder of their life. Disability is not the direct result of performance of duties with the Police Department.

Amount of pension – 30% of Final Compensation but in no event less than the amount the member would have been entitled to as a pension if the member had retired on the same date with equivalent age and creditable service.

A disability retiree who is not age 60 may be required by the Retirement Board to undergo continuing eligibility reviews once every three years which may include a medical re-examination.

Death in Service (less than 20 years of service)

Eligibility – Death of an active member with at least 5 but less than 20 years of service.

Amount of Pension – 50% of the member's accrued pension payable to the surviving spouse for spouse's lifetime. The effective date shall be the later of the first day of the month after the member's death or what would have been the member's earliest retirement date.

Funeral Benefit **-** $1,000 payable upon the death of an active member.

Death in Service (20 or more years of service)

Eligibility – Death of an active member with 20 or more years of service.

Amount of Pension – Surviving spouse may elect the greater of 50% of the member's accrued pension commencing as described above, or a monthly benefit determined on a joint and survivor's basis from the actuarial value of the member's accrued pension at date of death.

Funeral Benefit **-** $1,000 payable upon the death of an active member.

Death After Retirement

Eligibility – Death of a retired member who was receiving a benefit.

Amount of Pension – Eligible surviving spouse receives a pension equal to 50% of the member's benefit at the time of actual retirement plus cost of living adjustments. Benefit is payable for the life of the surviving spouse. In order to be eligible, the spouse and the member must have been married at the time of retirement.

In lieu of the 50% surviving spouse death benefit, a member may elect, at the time of retirement, a reduced actuarially equivalent 100% surviving spouse annuity. In such case, the surviving spouse shall receive the same amount as the benefit being paid to the member and such benefit is payable for the life of the surviving spouse.

If the total amount paid to a member and surviving spouse is less than the member's accumulated contributions, with interest, an amount equal to the difference shall be paid to the member's named beneficiary.

Funeral Benefit **-** $1,000 payable upon the death of a retired member.

Non-Vested Termination

Eligibility – Termination of employment and no pension is or will become payable.

Amount of Benefit – Refund of member's contributions with interest.

Post-Retirement Benefit Increases

Eligibility – Members and surviving spouses eligible if member's pension commenced by December 31 of prior calendar year.

Amount of Benefit – May receive an annual cost-of-living adjustment in an amount not to exceed 3% of their respective base pension. Base pension is the pension computed under the provisions of the law at the date of retirement, without regard to cost-of-living adjustments. The COLA adjustment is normally effective with the June 1st benefit payment.

Statutes require that the Retirement Board must act upon the advice of a qualified actuary when granting cost of living adjustments. The liabilities in this report assume a 2.5% ad hoc COLA will be granted in each future year.

Member Contributions

5% of base pay.

Supplemental Retirement Benefit

Retirement on or before August 28, 2007 – current retired and disabled members and their surviving spouses are eligible to receive the supplemental benefit of $160 per month in addition to pension benefits.

Retirements after August 28, 2007 – current and future retired and disabled members and their surviving spouses are eligible to receive the supplemental benefit of $160 per month if the member had 15 years of creditable service.

Optional Form of Benefit Payment

Members retiring with at least one or more years of service beyond their eligible retirement date may elect to take a portion of their benefit as a lump-sum distribution (PLOP). Members electing PLOP will receive an actuarially reduced monthly benefit for their lifetime.

CIVILIAN EMPLOYEES' RETIREMENT SYSTEM OF THE POLICE DEPARTMENT OF KANSAS CITY, MISSOURI

ACTUARIAL COST METHOD AND ASSUMPTIONS

Actuarial Cost Method

The actuarial cost method is a procedure for allocating the actuarial present value of pension benefits and expenses to time periods. The method used for the valuation is known as the Entry Age Normal actuarial cost method and has the following characteristics.

(i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.

(ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered compensation.

The Entry Age Normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's assumed pensionable compensation rates between the entry age of the member and the assumed exit ages.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called actuarial accrued liability. Deducting actuarial assets from the actuarial accrued liability determines the unfunded actuarial accrued liability or (surplus).

Asset Valuation Method

The Board adopted a new asset smoothing method effective with the April 30, 2011 valuation. Under the current methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five-year period. No corridor is used with the new method. The change to a new asset smoothing method was implemented by setting the actuarial value of assets at April 30, 2011 equal to the market value of assets.

Actuarial Assumptions

Valuations beginning with the April 30, 2019 actuarial valuation include assumptions and methods resulting from the experience study covering the 5-year period from May 1, 2012 to April 30, 2017.

The Board adopted a new Funding Policy at their November 8, 2016 meeting. The amortization policy for the unfunded actuarial accrued liability (UAAL) was changed from an open 30-year period (reset to 30 years each valuation) to a closed 30-year period (declining by one year each valuation), beginning with the April 30, 2017 valuation. Any new UAAL generated as a result of actuarial experience in subsequent years will be layered and amortized over a closed 20-year period.

Economic Assumptions

Investment return: 7.10% per year, net of investment expenses, compounded annually.

Pay increase assumption: Rates for sample years of service are shown below.

	Annual Rate of Pay Increase		
Years of Service	General Wage Growth	Merit and Longevity	Total
0-15	3.00%	3.50%	6.50%
16-30	3.00%	1.50%	4.50%
31+	3.00%	0.60%	3.60%

Price inflation: 2.50% per year, compounded annually.

Payroll Growth Assumption: 3.00% per year, compounded annually.

Mortality Tables:

Healthy Retirees: RP-2000 Healthy Annuitant Table with a 1-year age set forward, projected to 2017 using Scale AA (also set forward 1 year). Future mortality improvement is projected generationally using the ultimate projection scale of MP-2017 and reflects the 1-year age set-forward.

Disabled Retirees: RP-2000 Healthy Annuitant Table with a 5-year age set forward, projected to 2017 using Scale AA (also set forward 5 year). Future mortality improvement is projected generationally using the ultimate projection scale of MP-2017 and reflects the 5-year age set-forward.

Actives: RP-2000 Employee Table with a 1-year age set forward, projected to 2017 using Scale AA (also set forward 1 year). Future mortality improvement is projected generationally using the ultimate projection scale of MP-2017 and reflects the 1-year age set-forward.

Rates of separation from active membership:

Years of Service	% of Active Members Separating Within Next Year
0	18.00%
1	16.50%
2	15.00%
3	13.50%
4	12.00%
5	10.50%
6	9.00%
7	7.50%
8	6.00%
9	5.00%
10	4.00%
11	3.00%
12	2.00%
13	2.00%
14	2.00%
15	2.00%
16	2.00%
17	1.50%
18	1.00%
19	0.50%
20+	0.00%

The rates do not apply to members eligible to retire and do not include separation on account of death or disability.

Rates of Disability:

Sample Ages	% of Active Members Becoming Disabled Within Next Year
25	0.023%
30	0.030%
35	0.038%
40	0.053%
45	0.075%
50	0.135%
55	0.270%
60	0.675%
65	3.200%

It is assumed that 1/3 of disabilities will be duty related.

Rates of Electing Refund upon Termination: Vested members are assumed to elect a deferred benefit unless the refund of employee contributions exceeds the present value of the deferred benefit.

Rates of Retirement:

	Tier 1 Members	
Age	**Reduced**	**Unreduced**
50		15%
51-54		12%
55-59	3%	12%
60-61	10%	12%
62-64	10%	25%
65		25%
66-69		30%
70		100%

	Tier 2 Members	
Age	**Reduced**	**Unreduced**
51-54		12%
55-59		12%
60-61	10%	12%
62-64	10%	25%
65	10%	25%
66	10%	30%
67-69		30%
70		100%

Inactive vested members are assumed to retire at the first unreduced retirement age.

Miscellaneous and Technical Assumptions

Marriage Assumption:	85% of males and 55% of females are assumed to be married for purposes of death-in-service benefits and death-after-retirement benefits. Males are assumed to be 3 years older than their spouses. Actual reported data is utilized for retirees and beneficiaries.
Pay Increase Timing:	Assumed to occur at the start of the fiscal year.
Pay Annualization:	Reported pays for members with less than 1 year of service were annualized for valuation purposes.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year at the start of the year in which the decrement is assumed to occur.
Benefit Service:	Service calculated to the nearest month, as of the decrement date, is used to determine the amount of benefit payable.
Other:	Turnover decrement does not operate during retirement eligibility.
Interest on Member Contributions:	None assumed.
Form of Payment:	The assumed normal form of payment is a 50% joint and survivor annuity, if married. Otherwise, a single life annuity.
Administrative Expense:	0.50% of payroll each year. Administrative expenses beyond this allocation and all investment expenses are assumed to be funded by investment return in excess of the actuarial assumed rate of return.
Cost of Living Adjustment:	It was assumed the Retirement Board will grant, on average, a 2.5% cost of living adjustment each year.

Actuarial Accrued Liability	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	The difference between actuarial accrued liability and the valuation assets. Most retirement systems have an unfunded actuarial accrued liability. They arise each time new benefits are added and each time an actuarial loss is realized. The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liability and the trend in its amount.

KCPERS Policy

Policy #027 - Funding Policy
Adopted: November 8, 2016
Revised: September 12, 2019

The purpose of the funding policy is to state the overall funding goals for the Police Retirement System of Kansas City, Missouri and Civilian Employees' Retirement System of the Police Department of Kansas City, Missouri (KCPERS or System), the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks.

I. Funding Goals

The objective is to accumulate sufficient assets during a member's employment with the Kansas City, Missouri Police Department from member and employer contributions to KCPERS (and investment earnings on those contributions) to fully finance the benefits the member receives throughout retirement. In meeting this objective, KCPERS will strive to meet the following funding goals:

- To maintain an increasing ratio of assets to actuarial liabilities and reach a funded ratio of at least 100 percent;
- To maintain adequate asset levels to finance the benefits promised to members;
- To develop a pattern of stable contribution amounts and rates as a percentage of member payroll. This goal is achieved by contribution amounts from the City of Kansas City, Missouri and rates as a percentage of payroll from members of the Systems as set out in sections 86.1000 and 86.1010RSMo. for the Police plan and sections 86.1390 and 86.1400RSMo. for the Civilian Employees' plan. In order to evaluate whether the contribution amounts and rates are sufficient, an annual Actuarial Required Contribution Rate (ARC) will be calculated in the annual valuations of the Systems. The ARC may be referred to in the valuations as the Actuarial Determined Contribution Rate (ADC). Such valuations will be prepared in accordance with the principles of practice promulgated by the Actuarial Standards Board. The ARC will be calculated as the normal cost rate plus the amortization payment on the unfunded actuarial liability, based on the amortization methodology set out in this funding policy. The ARC will never be less than the normal cost rate determined under the Entry Age Normal funding method.
- To provide intergenerational equity for members and taxpayers with respect to KCPERS' contribution requirements.

II. Benchmarks

To track progress in achieving the previously outlined funding goals, the following benchmarks will be measured annually as of the actuarial valuation date (with due recognition that a single year's results may not be indicative of long-term trends):

- **Funded ratio –** The funded ratio, defined as the actuarial value of KCPERS' assets divided by KCPERS' actuarial liability, should be increasing over time, before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions.
- **Evaluation of Contribution Amounts and Rates –** The Retirement Board Trustees have a fiduciary responsibility to ensure the funding of the Systems by maintaining the contribution amounts and rates set out in state statutes. The Trustees recognize that the ARC will fluctuate from year to year, due to the volatility associated with investing in the financial markets. Therefore, valuation results which produce an ARC that is higher or lower than the current contribution amounts and rates will be submitted to the City for inclusion in the next budget cycle.

III. Actuarial Methods and Assumptions

Actuarial Assumptions: The actuarial assumptions used will be those last adopted by the Trustees based upon the advice and recommendation of the actuary. A formal study of KCPERS' experience shall be conducted by the actuary at least every five years and the results of the study used to form the basis of the actuary's recommendations. In addition, the actual experience compared to the actuarial assumptions will be monitored each year in the annual actuarial valuation by including an analysis of the actuarial gain or loss by source.

Actuarial Cost Method: The actuarial cost method is the means by which the total present value of future benefits for current active and inactive members is allocated to each year of service, including past years. The Entry Age cost method will be used.

Asset Valuation Method: The method of valuing assets is intended to recognize a "smoothed" value of assets that is market related. Asset smoothing methods reduce the effect of short term volatility on contributions while still tracking the overall movement of the market value of assets by recognizing the effects of investment gains and losses over a period of years. The asset valuation method uses the difference between the actual and assumed investment return on the market value of assets, recognized evenly over a five year period. No corridor is used with this asset valuation method.

Amortization of the Unfunded Actuarial Liability (UAL): The UAL as of April 30, 2017 is amortized over a closed, 30-year period. Any new UAL generated as a result of actuarial experience in subsequent years will be separately identified as a new amortization base and amortized over a closed 20 year period. Any new UAL generated as a result of changes to benefits will be amortized over a closed 20 year period. Changes in the UAL resulting from changes in the actuarial assumptions or methods used in the valuation will be amortized over a period not to exceed 25 years, as determined by the Board upon the recommendation of the actuary. All amortization payments will be developed using the level percent of payroll methodology.

IV. Other

Actuarial Audit: The Trustees may have an audit of KCPERS' actuarial valuation results conducted by an independent actuary periodically, as determined by the Trustees. The purpose of such a review is to provide a critique of the reasonableness of the actuarial methods and assumptions in use and to verify the resulting actuarially computed liabilities and contribution rates.

Benefit Changes: An actuarial cost study shall be completed before any change to the benefit structure is made.

Actuarial Projections: The funded status of KCPERS will be monitored on a regular basis, both on a snapshot basis in the actuarial valuation and on a projected basis. The Trustees will periodically have projections of funded status performed to assess the current and expected future progress toward the overall funding goals of KCPERS.

V. Funding Policy Review

It is expected that the funding policy may need to be amended in future years as the funding of the Retirement Systems is a dynamic process which is dependent on a number of variables. Therefore, the funding policy will be reviewed annually following the annual actuarial valuation and amended as necessary by the Trustees.