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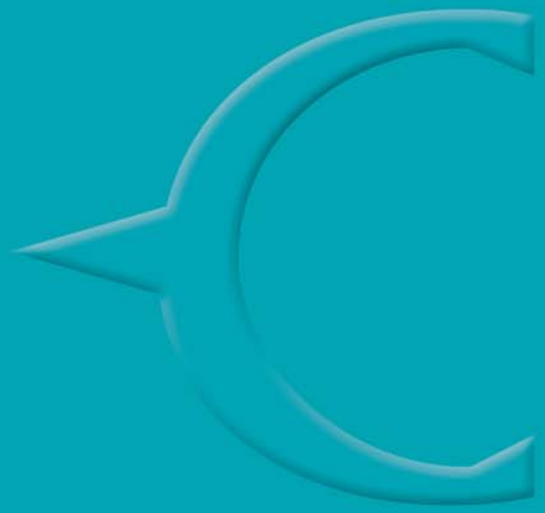

City of Kansas City, Missouri Firefighters' Pension System

Actuarial Valuation as of May 1, 2018

Produced by Cheiron
September 2018

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September 17, 2018

Board of Pension Trustees
City of Kansas City, Missouri Firefighters' Pension System
12th Floor, City Hall
414 East 12th Street
Kansas City, Missouri 64106

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the City of Kansas City, Missouri Firefighters' Pension System (KCFPS) as of May 1, 2018. The valuation is organized as follows:

- In Section I of the **Board Summary,** we describe the purpose of an actuarial valuation and summarize the key results found in this valuation.

- The **Main Body** of the report presents details on the System's:
  - Section II Assets
  - Section III Liabilities
  - Section IV Contributions
  - Section V Financial Statement Information

- In the **Appendices,** we conclude our report with detailed information describing System membership (Appendix A), actuarial assumptions and methods employed (Appendix B), a summary of pertinent plan provisions (Appendix C), and a glossary of terms (Appendix D).

The purpose of this report is to present the annual actuarial valuation of the City of Kansas City, Missouri Firefighters' Pension System. This report is for the use of the Firefighters' Pension Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

In preparing our report, we relied on information (some oral and some written) supplied by KCFPS staff. This information includes, but is not limited to, the plan provisions, employee data, and unaudited financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

Future valuation reports may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification

Standards of the American Academy of Actuaries to render the opinions contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This report was prepared for the Firefighters' Pension System for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this valuation report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,
Cheiron

Stephen T. McElhaney, FSA, FCA, EA, MAAA
Principal Consulting Actuary

Jacqueline King, ASA, EA, MAAA
Associate Actuary

SECTION I – BOARD SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe, and identify as of the valuation date:

- The financial condition of the System,
- Past and expected trends in the financial progress of the System,
- The City's contributions for Fiscal Year 2020, and
- Information required for the System's financial statement.

In the balance of this Board Summary, we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key financial results, (C) an examination of the historical trends, and (D) the projected financial outlook for the System.

A. Valuation Basis

This May 1, 2018 valuation represents Cheiron's twelfth valuation performed for KCFPS. There have been no changes in assumptions, methodologies, and plan provisions since the May 1, 2017 valuation. The contribution rate changes as a result of the May 1, 2017 revised assumptions are being phased-in over five years, and the current valuation is at the second year of this phase-in. The data, methods, assumptions, and plan provisions that serve as the basis for this valuation are all summarized in the appendices.

B. Key Findings of this Valuation

The key results of the May 1, 2018 actuarial valuation are as follows:

- We have calculated the City's contribution rate on two bases:
  - The actuarially determined City contribution rate under the Board's funding policy would have increased from 36.72% as of May 1, 2017 to 37.12% as of May 1, 2018 if the full effect of the revised actuarial assumptions had been recognized at both valuation dates. Due to the five-year phase-in of the new assumptions, the actuarially determined employer contribution rate has been calculated as 32.54% as of May 1, 2018 compared to 30.62% as of May 1, 2017. The actual rate that the City is scheduled to contribute for the current year is 30.62% of payroll, which is the actuarially determined Board contribution rate reflecting the five-year phase-in for the prior year.
  - Under the City ordinance, the City's budgeted contribution rate for the year beginning May 1, 2019 is to be based upon a 30-year closed amortization from May 1, 2014, for the entire amount of unfunded actuarial liability. This rate is 31.18%, which also reflects the five-year phase-in of the revised actuarial assumptions.

SECTION I – BOARD SUMMARY

- The FPS's unfunded actuarial liability increased from $214 million on May 1, 2017 to $221 million on May 1, 2018.

- The FPS's funding ratio, the ratio of assets over liabilities, increased from 70.5% as of May 1, 2017 to 70.8% as of May 1, 2018.

- The primary factor in the small increase in the System's funded status was an overall actuarial loss of $5.4 million.
  - During the year ended April 30, 2018, the System's assets returned 9.40% on a market value basis. The return on the actuarial asset value (i.e. incorporating asset smoothing) was 7.36% (as compared to 7.25% assumed). This resulted in an actuarial gain on investments of $0.6 million. In addition, the system experienced a loss of $5.9 million due to the difference between actual and recommended contributions as a result of payroll and timing differences as well as the five-year phase-in of the assumption changes.
  - On the liability side, the System experienced an actuarial loss of $0.1 million.

- As of May 1, 2018 the market value of assets exceeded the actuarial value by $4.5 million. The System will recognize this difference as deferred asset losses and gains over the next four years.

This report does not include disclosures required by GASB Statements No. 67 and 68. Statement No. 67 is effective for the plan year ending April 30, 2015 and Statement No. 68 is effective for the employer fiscal year ending April 30, 2016. Please refer to the separate report issued by Cheiron for accounting and financial disclosure information under GASB Statements No. 67 and No 68.

On the following page is Table I-1 which summarizes all the key results of the valuation with respect to System membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior plan years.

SECTION I – BOARD SUMMARY

Table I-1
City of Kansas City, Missouri Firefighters' Pension System
Summary of Principal Plan Results

Valuation as of:	May 1, 2017	May 1, 2018	% Change
Participant Counts			
Active Participants	978	981	0.3%
Non-duty Disabled Participants *	11	5	(54.5%)
Duty Disabled Participants *	94	103	9.6%
Retirees and Beneficiaries *	817	816	(0.1%)
Terminated Vested Participants	4	7	75.0%
Inactive Participants	6	6	0.0%
Total	**1,910**	**1,918**	0.4%
Annual Salaries of Active Members	$ 64,492,241	$ 66,264,508	2.7%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 36,699,007	$ 38,129,136	3.9%
Assets and Liabilities			
Actuarial Liability (AL)	$ 726,537,707	$ 756,950,736	4.2%
Actuarial Value of Assets	512,040,758	535,935,199	4.7%
Unfunded Actuarial Liability (UAL)	$ 214,496,949	$ 221,015,537	3.0%
Funded Ratio (AVA)	70.5%	70.8%	
Funded Ratio (MVA)	69.7%	71.4%	
Present Value of Accrued Benefits (PVAB)	$ 664,482,490	$ 689,724,925	3.8%
Market Value of Assets	506,697,663	540,393,237	6.7%
Unfunded PVAB	$ 157,784,827	$ 149,331,688	(5.4%)
Accrued Benefit Funding Ratio	76.3%	78.3%	
Contributions as a Percentage of Payroll under Board's Funding Policy **	**Fiscal Year 2019**	**Fiscal Year 2020**	
Normal Cost Contribution	13.69%	13.87%	
Administrative Expense Rate	0.37%	0.39%	
Unfunded Actuarial Liability Contribution	16.56%	18.28%	
Total Contribution	30.62%	32.54%	
Actuarially Determined Contribution (GASB)	$19,747,524	$21,562,471	9.2%

** Disabled participants that were eligible for voluntary retirement at the time of their disability are valued as Retirees. The number of such participants was 271 at May 1, 2017 and 280 at May 1, 2018.*

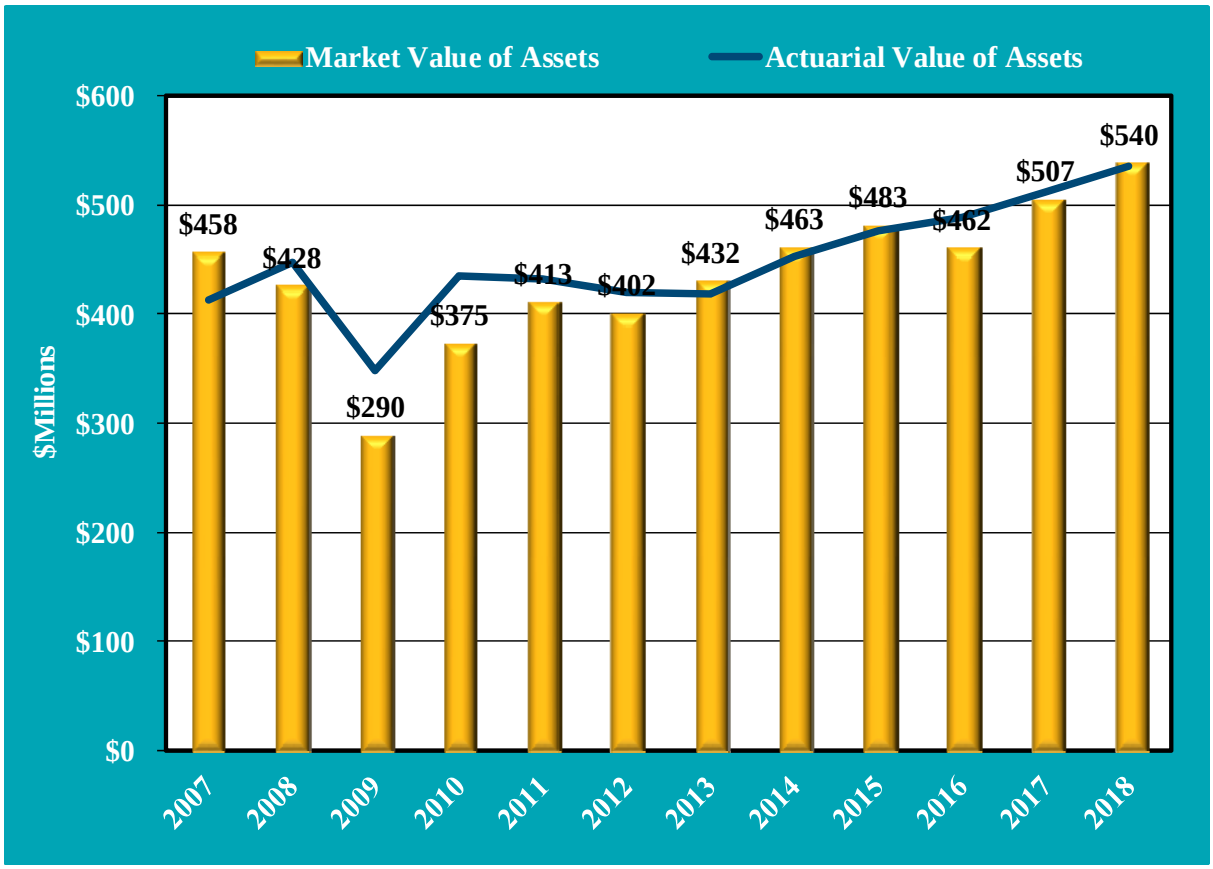
*** Fiscal Year 2019 and 2020 contribution rate and ADC reflect the 5-year phase-in of the 2017 assumption changes*

C. Historical Trends

Despite the fact that for most retirement systems, the greatest attention is given to the current valuation results and in particular the size of the current unfunded actuarial liability and the City's contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

System Assets

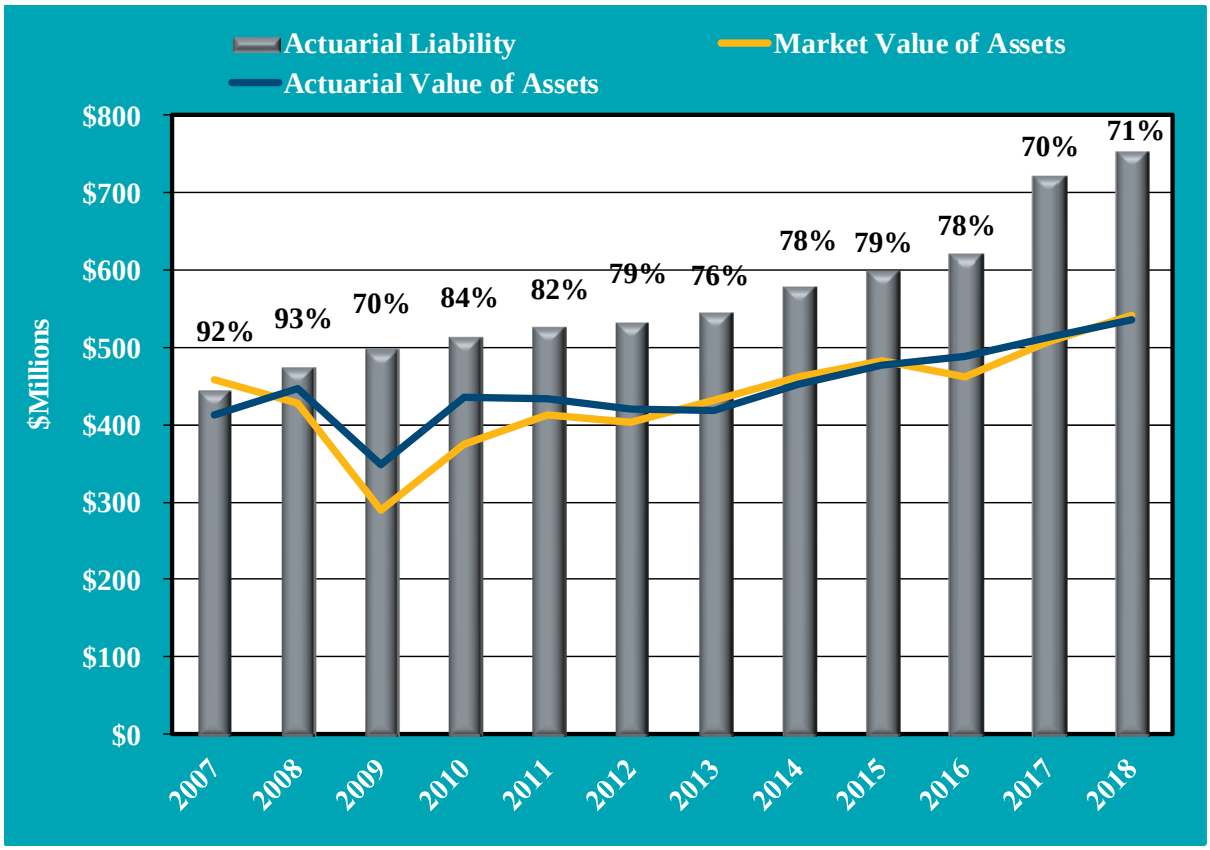
The market value of assets (MVA) returned 9.40% in 2018 compared to an assumed rate of 7.25%. With the asset smoothing method in place, the actuarial value of assets has tracked a slightly smoother path through the volatility of the market value of assets. The numbers above the bars represent the value (in millions) of the market value of assets.



SECTION I – BOARD SUMMARY

Assets and Liabilities

The chart below compares the market value of assets, the actuarial value of assets, and the actuarial liabilities, as well as the funded ratio (actuarial value of assets / actuarial liability), sometimes referred to as the benefit security ratio. This chart shows that in 2009, the System had its lowest funded ratio in the past 10 years, but has since fluctuated, with 2017 being the largest decrease as a result of the changes to actuarial assumptions.



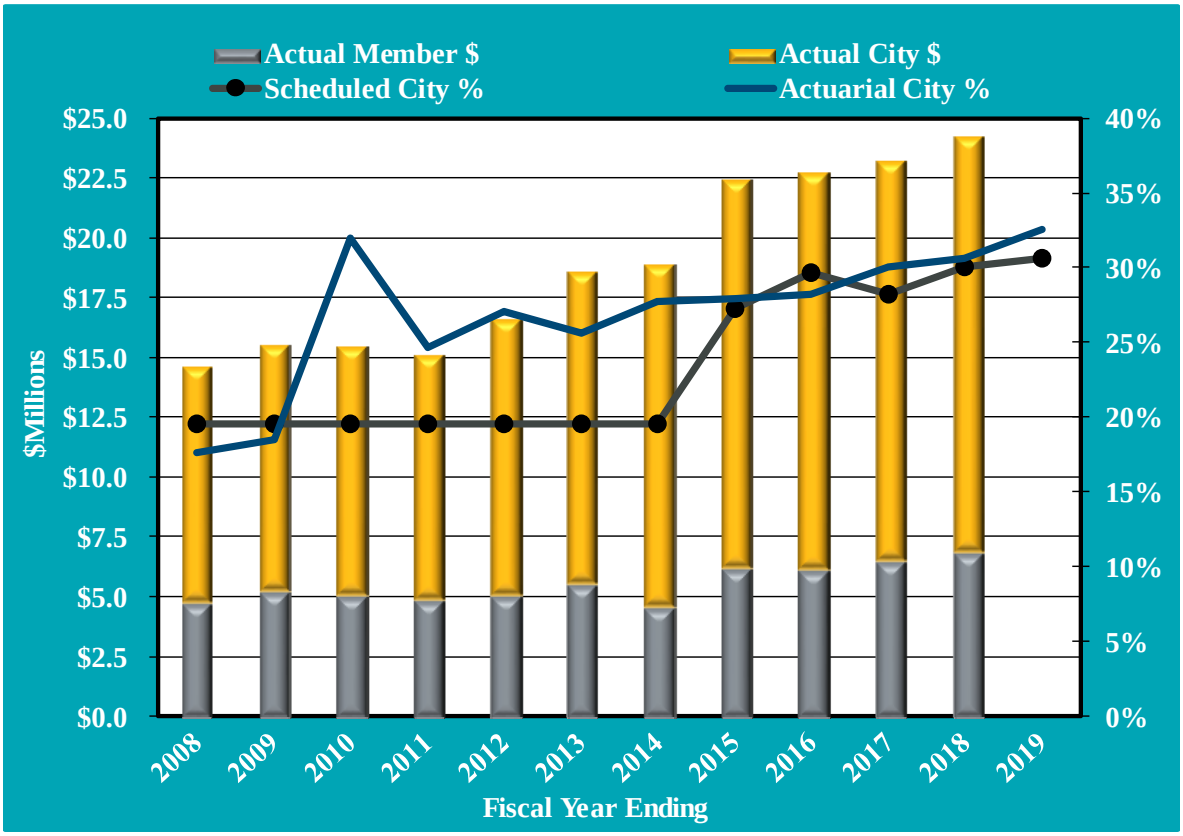
SECTION I – BOARD SUMMARY

Contribution Rates

The stacked bars in this graph show the dollar amount of contributions made by the City and the members (depicted on the left hand scale) since Fiscal Year Ending 2008. The blue line shows the City's actuarial contribution rate under the Board's funding policy as a percent of payroll (depicted on the right hand scale). The black line shows the City's scheduled contribution rate as a percent of payroll (depicted on the right hand scale).

The member contribution rate is set by City law at 9.55% of payroll prior to April 20, 2014 and 10.55% of payroll effective April 20, 2014.

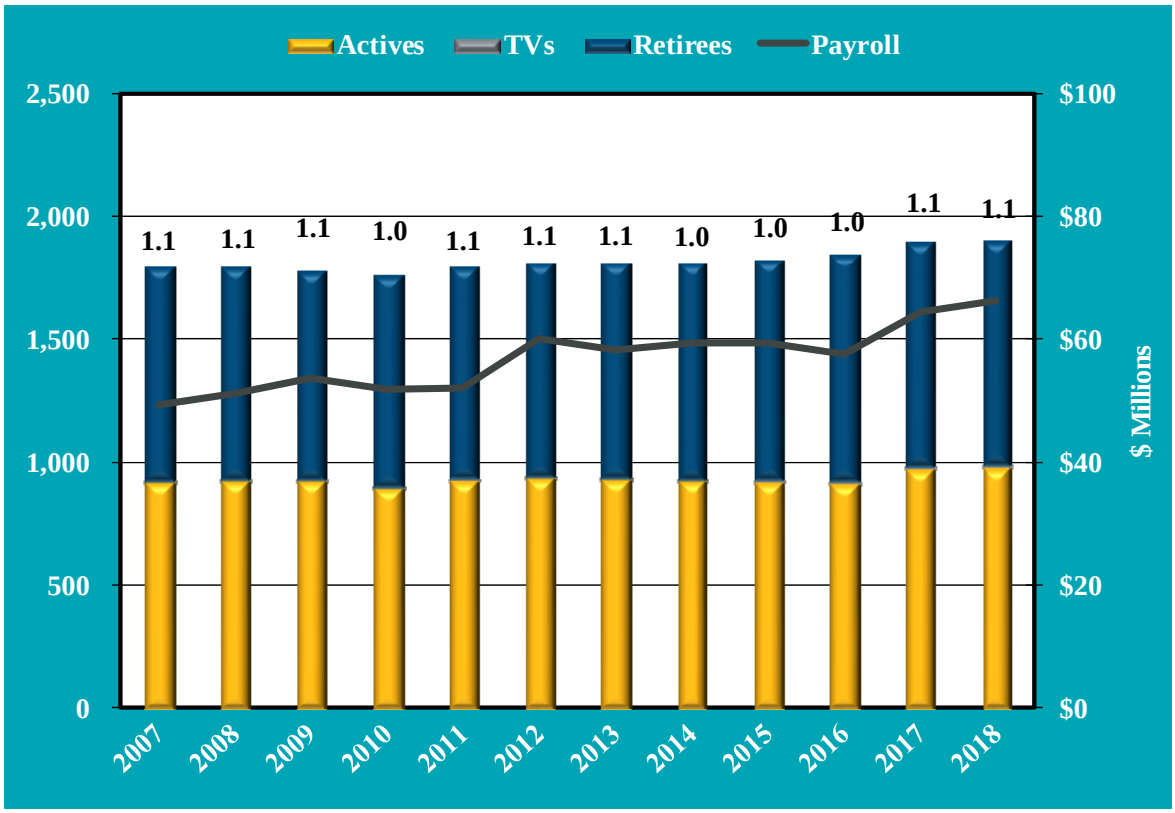
For fiscal years ending 2014 and earlier, the City contribution rate was scheduled to be 19.60% of payroll. As determined under the City's funding policy, for fiscal years ending 2015 and later, the scheduled City contribution rate is set as the actuarial contribution rate, in the prior year's actuarial valuation. The actuarial contribution rate under the Board's funding policy increased from 30.62% of payroll in 2017 to 32.54% of payroll in 2018 reflecting the phase-in of changes in actuarial assumptions. For the fiscal year ending 2019, the City is contributing 30.62% of payroll.



SECTION I – BOARD SUMMARY

Participant Trends

This chart provides a measure for the maturity in the System, by comparing the ratio of active members to inactive members (retirees and terminated-vesteds). The System's active-to-inactive ratio remained fairly consistent over the last 12 years. The black line shows the total active participating payroll for each valuation year, which increased significantly over the last year (depicted on the right hand scale).



D. Future Expected Financial Trends

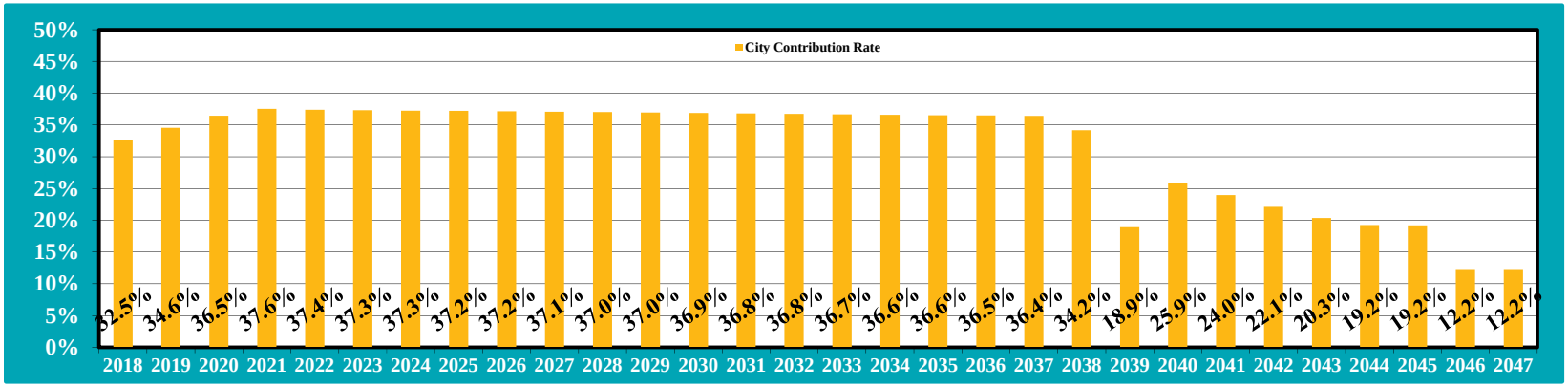
The analysis of projected financial trends is perhaps the most important component of this valuation. In this Section, we present the implications of the May 1, 2018 valuation results in terms of (1) the projected City's contributions and (2) projected System's funded status (ratio of assets over liabilities). For each projection set, we assume three different future investment return scenarios: baseline returns of 7.25%, optimistic returns of 8.75%, and pessimistic returns of 5.75%. The projections assume all other assumption in the valuation are met and that the City makes contributions equal to the prior year's actuarially determined contribution rate under the Board's funding policy.

1. Contribution Rate Projections (Board Funding Policy)

The first set of charts shows the expected City contribution rate. The years shown in the charts are plan years beginning May 1.

Baseline Returns of 7.25%

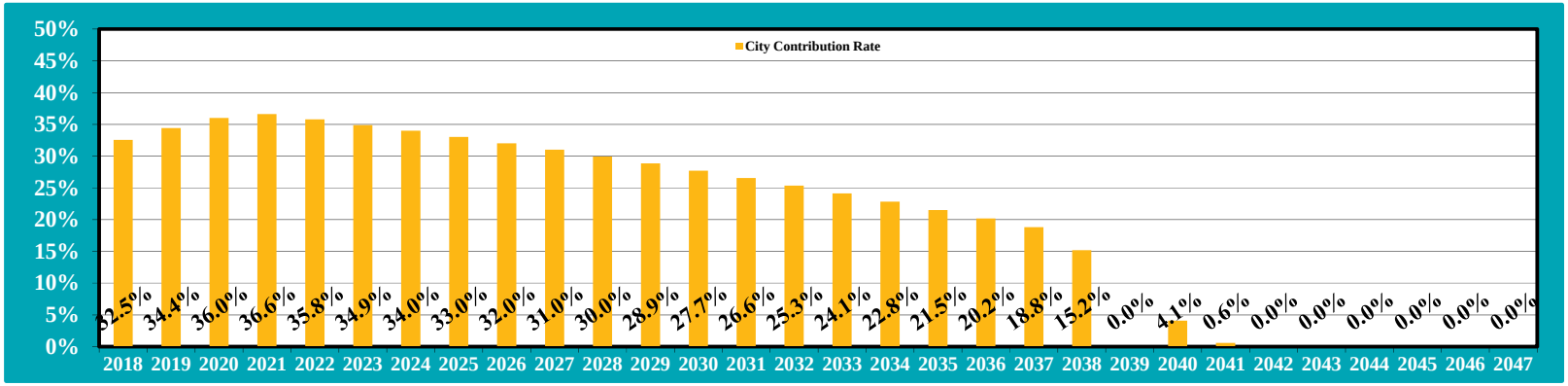
Assuming that the fund earns the assumed investment rate of 7.25% on a market value basis and that the City continues to contribute the current scheduled contribution rate equal to the prior year's actuarially determined contribution rate, the contribution rate will increase over the next three years as the 2016 investment loss is recognized and the revised actuarial assumptions become fully phased-in, and then remain fairly constant until 2038. The large decrease in the rate in 2039 reflects the full amortization of the 30-year loss base established in 2009.



SECTION I – BOARD SUMMARY

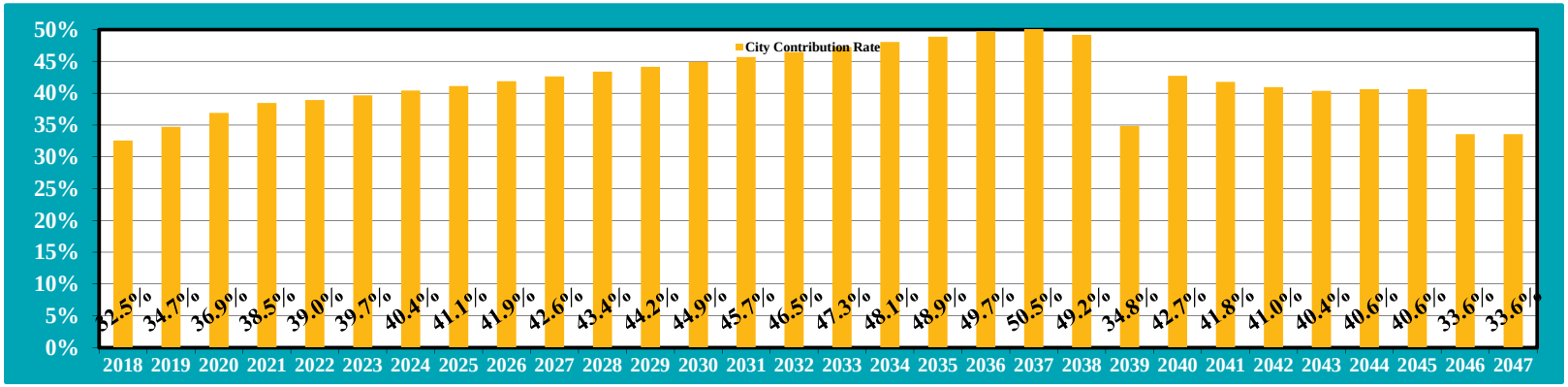
Optimistic Returns of 8.75%

If the fund earns 1.50% greater than the assumed rate, all of the future contribution rates will be lower than if the fund earns the assumed rate of 7.25%. The contribution rate becomes zero for 2039 due to the full amortization of the 2009 loss, then increases for two years and would become zero for 2042 and later.



Pessimistic Returns of 5.75%

If the fund earns 1.50% less than the assumed rate, all of the future contribution rates will be greater than if the fund earns the assumed rate of 7.25%.



SECTION I – BOARD SUMMARY

The following table shows the corresponding contribution dollar amounts of the percentages in the prior three charts.

City of Kansas City, Missouri Firefighters' Pension System
Projection Based on April 30, 2018 Actuarial Valuation
Current Amortization Schedule
Interest at 7.25%
Amounts in thousands

Valuation as of April 30,	Dollar Amount of ADC at Various Investment Returns 7.25%	8.75%	5.75%
2018	$ 21,563	$ 21,563	$ 21,563
2019	$ 23,590	$ 23,498	$ 23,682
2020	$ 25,627	$ 25,309	$ 25,943
2021	$ 27,193	$ 26,508	$ 27,865
2022	$ 27,890	$ 26,690	$ 29,056
2023	$ 28,680	$ 26,811	$ 30,477
2024	$ 29,493	$ 26,886	$ 31,969
2025	$ 30,329	$ 26,914	$ 33,529
2026	$ 31,187	$ 26,890	$ 35,158
2027	$ 32,072	$ 26,814	$ 36,865
2028	$ 32,979	$ 26,676	$ 38,646
2029	$ 33,907	$ 26,469	$ 40,504
2030	$ 34,861	$ 26,192	$ 42,445
2031	$ 35,839	$ 25,838	$ 44,473
2032	$ 36,845	$ 25,405	$ 46,592
2033	$ 37,881	$ 24,887	$ 48,809
2034	$ 38,941	$ 24,273	$ 51,121
2035	$ 40,033	$ 23,563	$ 53,539
2036	$ 41,164	$ 22,759	$ 56,074
2037	$ 42,333	$ 21,850	$ 58,730
2038	$ 40,903	$ 18,192	$ 58,872
2039	$ 23,323	$ -	$ 42,956
2040	$ 32,868	$ 5,216	$ 54,260
2041	$ 31,340	$ 745	$ 54,640
2042	$ 29,774	$ -	$ 55,193
2043	$ 28,230	$ -	$ 56,047
2044	$ 27,489	$ -	$ 58,066
2045	$ 28,290	$ -	$ 59,785
2046	$ 18,439	$ -	$ 50,879
2047	$ 18,979	$ -	$ 52,392
2048	$ 18,779	$ -	$ 53,194

Projections assume a constant population and no actuarial gains and losses

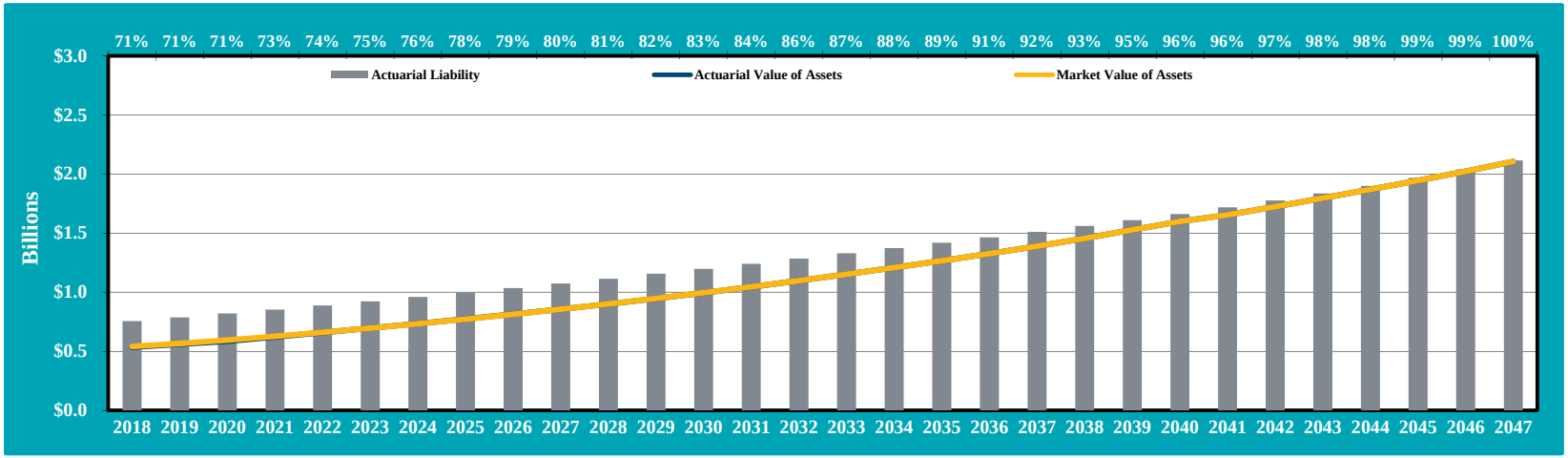
SECTION I – BOARD SUMMARY

2. Asset and Liability Projections (Board Funding Policy)

This next set of projection charts compares the market value of assets (gold line) and the actuarial or smoothed value of assets (blue line) to the System's actuarial liabilities (gray bars). The top of each chart also portrays the System's funded ratio (ratio of actuarial value of assets to actuarial liabilities). The years shown in the charts are plan years beginning May 1.

Baseline Returns of 7.25%

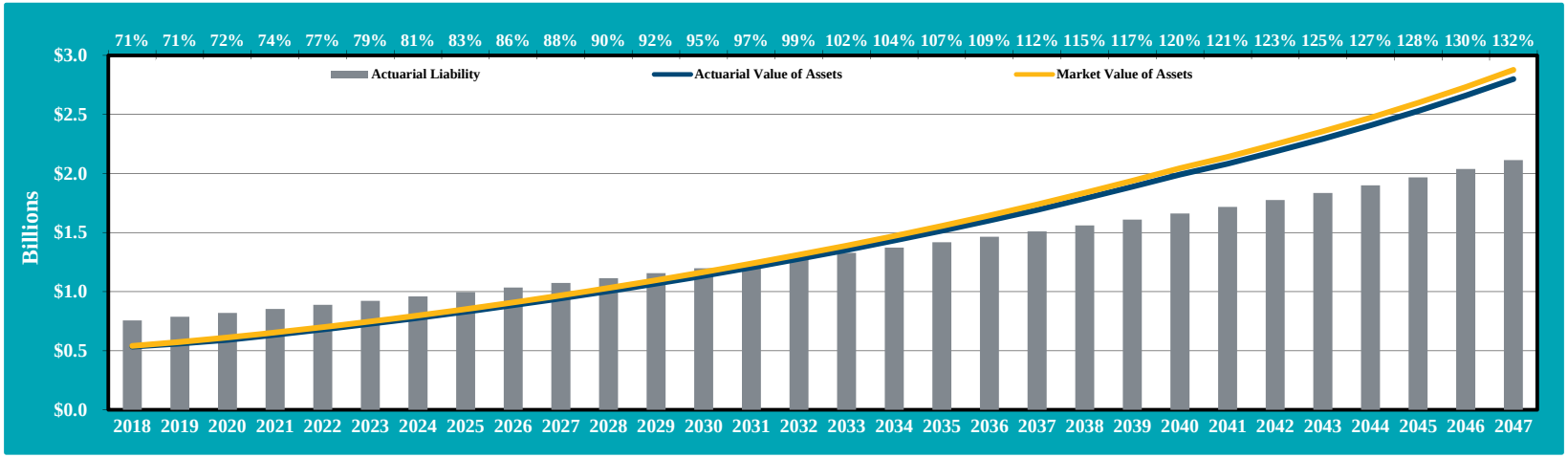
If the fund earns the assumed investment rate of 7.25% and the City continues to contribute the current scheduled contribution rate equal to the prior year's actuarially determined contribution rate, the funded ratio will increase gradually to 100% over the next 30 years.



SECTION I – BOARD SUMMARY

Optimistic Returns of 8.75%

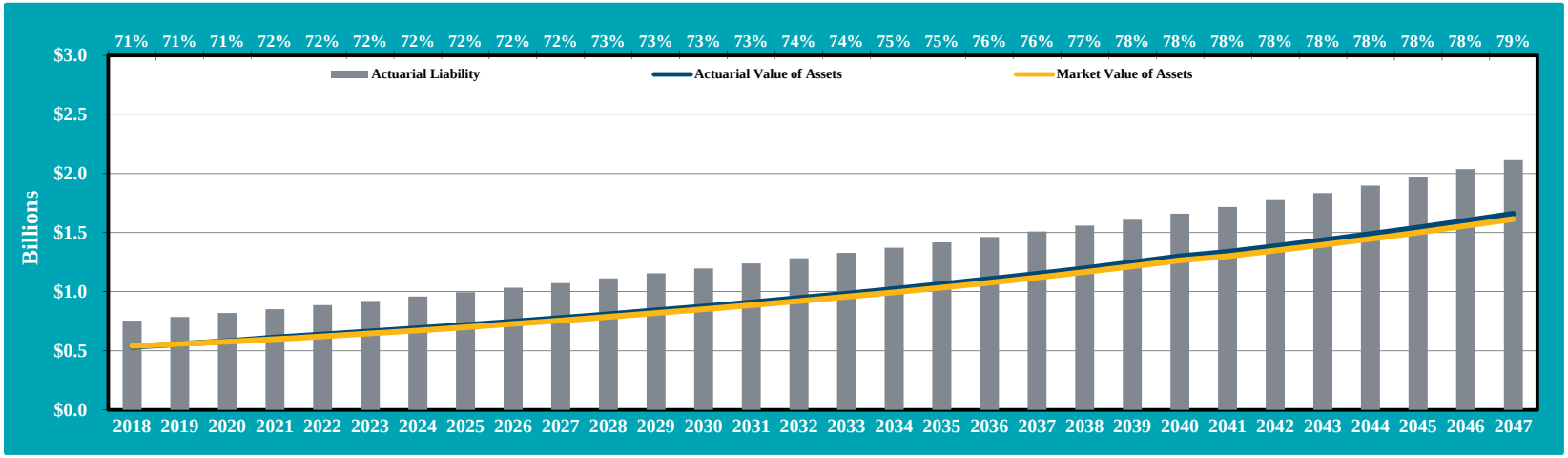
If the fund earns 1.50% greater than the assumed rate of return, the funded ratio will increase to 132% over the next 30 years.



SECTION I – BOARD SUMMARY

Pessimistic Returns of 5.75%

If the fund earns 1.50% less than the assumed rate of return, the funded ratio will only increase to 79% over the next 30 years.



SECTION I – BOARD SUMMARY

3. 30-Year Projections Based on City Contribution Policy:

The following chart shows a 30-year cost projection under a 30-year closed amortization policy beginning May 1, 2014 which is the current City contribution policy. For the purpose of these projections, it has been assumed that the active population remains constant and the fund earns the assumed return of 7.25% per year on market value.

City of Kansas City, Missouri Firefighters' Pension System
Projection Based on April 30, 2018 Actuarial Valuation
30-Year Closed Amortization from May 1, 2014
Interest at 7.25%
Amounts in thousands

Valuation as of April 30, (1)	Employer Contribution Rate (2)	Member Contribution Rate (3)	Compensation at Valuation (4)	Employer Contribution (5)	Actuarial Accrued Liability (AAL) (6)	Actuarial Value of Assets (AVA) (7)	Unfunded AAL (8)	UAL Amortization Payment Rate (9)	Normal Cost Rate (10)	Administrative Expense Rate (11)	Employer ADC (12)	Dollar Amount of ADC (13)	Funded Ratio Using AVA (14)
2018	30.62%	10.55%	$ 66,265	$ 20,290	$ 756,951	$ 535,935	$ 221,016	16.92%	13.87%	0.39%	31.17%	$ 20,657	70.8%
2019	31.17%	10.55%	$ 68,252	$ 21,274	$ 787,825	$ 559,554	$ 228,271	18.73%	14.12%	0.41%	33.25%	$ 22,697	71.0%
2020	33.25%	10.55%	$ 70,300	$ 23,375	$ 820,158	$ 585,152	$ 235,006	20.52%	14.37%	0.43%	35.31%	$ 24,824	71.3%
2021	35.31%	10.55%	$ 72,409	$ 25,568	$ 853,432	$ 621,809	$ 231,623	21.40%	14.61%	0.45%	36.46%	$ 26,399	72.9%
2022	36.46%	10.55%	$ 74,581	$ 27,192	$ 887,740	$ 656,732	$ 231,008	21.29%	14.56%	0.45%	36.30%	$ 27,074	74.0%
2023	36.30%	10.55%	$ 76,819	$ 27,885	$ 923,071	$ 691,883	$ 231,188	21.30%	14.51%	0.45%	36.26%	$ 27,853	75.0%
2024	36.26%	10.55%	$ 79,123	$ 28,690	$ 959,411	$ 728,443	$ 230,969	21.32%	14.45%	0.45%	36.22%	$ 28,658	75.9%
2025	36.22%	10.55%	$ 81,497	$ 29,518	$ 996,725	$ 766,514	$ 230,212	21.34%	14.39%	0.45%	36.18%	$ 29,487	76.9%
2026	36.18%	10.55%	$ 83,942	$ 30,370	$ 1,034,967	$ 806,107	$ 228,860	21.36%	14.33%	0.45%	36.14%	$ 30,338	77.9%
2027	36.14%	10.55%	$ 86,460	$ 31,247	$ 1,074,276	$ 847,423	$ 226,853	21.38%	14.28%	0.45%	36.11%	$ 31,218	78.9%
2028	36.11%	10.55%	$ 89,054	$ 32,157	$ 1,114,610	$ 890,481	$ 224,128	21.40%	14.22%	0.45%	36.07%	$ 32,121	79.9%
2029	36.07%	10.55%	$ 91,726	$ 33,085	$ 1,155,831	$ 935,226	$ 220,605	21.42%	14.16%	0.45%	36.03%	$ 33,047	80.9%
2030	36.03%	10.55%	$ 94,477	$ 34,040	$ 1,197,864	$ 981,652	$ 216,211	21.44%	14.09%	0.45%	35.99%	$ 34,000	82.0%
2031	35.99%	10.55%	$ 97,312	$ 35,022	$ 1,240,632	$ 1,029,767	$ 210,865	21.47%	14.03%	0.45%	35.95%	$ 34,980	83.0%
2032	35.95%	10.55%	$ 100,231	$ 36,033	$ 1,284,119	$ 1,079,645	$ 204,474	21.49%	13.96%	0.45%	35.91%	$ 35,990	84.1%
2033	35.91%	10.55%	$ 103,238	$ 37,073	$ 1,328,377	$ 1,131,434	$ 196,943	21.52%	13.90%	0.45%	35.87%	$ 37,032	85.2%
2034	35.87%	10.55%	$ 106,335	$ 38,142	$ 1,373,109	$ 1,184,937	$ 188,172	21.55%	13.83%	0.45%	35.83%	$ 38,103	86.3%
2035	35.83%	10.55%	$ 109,525	$ 39,243	$ 1,418,350	$ 1,240,309	$ 178,041	21.58%	13.77%	0.45%	35.80%	$ 39,210	87.4%
2036	35.80%	10.55%	$ 112,811	$ 40,386	$ 1,464,390	$ 1,297,957	$ 166,434	21.62%	13.71%	0.45%	35.78%	$ 40,364	88.6%
2037	35.78%	10.55%	$ 116,195	$ 41,575	$ 1,511,485	$ 1,358,268	$ 153,217	21.67%	13.66%	0.45%	35.77%	$ 41,564	89.9%
2038	35.77%	10.55%	$ 119,681	$ 42,810	$ 1,559,874	$ 1,421,630	$ 138,244	21.72%	13.61%	0.45%	35.77%	$ 42,814	91.1%
2039	35.77%	10.55%	$ 123,272	$ 44,094	$ 1,610,000	$ 1,488,647	$ 121,353	21.78%	13.56%	0.45%	35.80%	$ 44,126	92.5%
2040	35.80%	10.55%	$ 126,970	$ 45,455	$ 1,662,172	$ 1,559,796	$ 102,376	21.87%	13.52%	0.45%	35.84%	$ 45,508	93.8%
2041	35.84%	10.55%	$ 130,779	$ 46,871	$ 1,716,827	$ 1,635,729	$ 81,098	21.99%	13.49%	0.45%	35.93%	$ 46,983	95.3%
2042	35.93%	10.55%	$ 134,702	$ 48,398	$ 1,774,567	$ 1,717,252	$ 57,315	22.18%	13.46%	0.45%	36.10%	$ 48,623	96.8%
2043	36.10%	10.55%	$ 138,743	$ 50,086	$ 1,835,465	$ 1,804,709	$ 30,756	22.66%	13.44%	0.45%	36.54%	$ 50,700	98.3%
2044	36.54%	10.55%	$ 142,905	$ 52,218	$ 1,899,888	$ 1,898,820	$ 1,067	0.76%	13.41%	0.45%	14.63%	$ 20,904	99.9%
2045	14.63%	10.55%	$ 147,193	$ 21,534	$ 1,967,686	$ 2,000,100	$ (32,414)	-22.51%	13.40%	0.45%	0.00%	$ -	101.6%
2046	0.00%	10.55%	$ 151,608	$ -	$ 2,039,038	$ 2,074,992	$ (35,955)	-24.24%	13.39%	0.45%	0.00%	$ -	101.8%
2047	0.00%	10.55%	$ 156,157	$ -	$ 2,114,126	$ 2,130,963	$ (16,836)	-11.02%	13.38%	0.45%	2.81%	$ 4,386	100.8%
2048	2.81%	10.55%	$ 160,841	$ 4,520	$ 2,193,413	$ 2,189,107	$ 4,306	2.74%	13.37%	0.45%	16.56%	$ 26,635	99.8%

Projections assume a constant population and no actuarial gains and losses

SECTION II – ASSETS

Pension System assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, City contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System's assets including:

- **Disclosure** of the System's assets as of April 30, 2017 and April 30, 2018,
- Statement of the **changes** in market values during the year,
- Development of the **Actuarial Value of Assets**,
- An assessment of **investment performance**, and
- A projection of the System's expected **cash flow** for the next 10 years.

Disclosure

There are two types of asset values disclosed in the valuation, the market value of assets and the actuarial value of assets. The market value represents "snap-shot" or "cash-out" values that provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for year-to-year budgeting as are the actuarial value of assets which reflect smoothing of annual investment returns.

Table II-1 below discloses and compares each asset value as of April 30, 2017 and April 30, 2018.

Table II-1
Statement of Assets at Market Value as of April 30,

Assets	2017	2018	% Change
Cash	$ 13,771,821	$ 6,902,566	(49.9%)
Stock and Collective Trusts	496,346,987	536,533,305	8.1%
Accounts Receivable	1,202,065	1,049,035	(12.7%)
Interest and Dividends Receivable	39,165	165,939	323.7%
Contributions Receivable	1,001,481	1,214,111	21.2%
Expenses Payable	(920,389)	(966,412)	5.0%
Purchase of Investments	(1,206,479)	(842,447)	(30.2%)
Health Assets	(3,536,988)	(3,662,860)	3.6%
Market Value of Assets	**$ 506,697,663**	**$ 540,393,237**	6.7%

SECTION II – ASSETS

Changes in Market Value

Table II-2 below shows the components of change between the market value of assets as of April 30, 2017 and April 30, 2018.

Table II-2
Changes in Market Values

Value of Assets – April 30, 2017		**$ 506,697,663**
Additions		
Member Contributions	$ 6,882,375	
Employer Contributions	17,435,993	
Interest and Dividends	4,083,084	
Investment Return	45,407,328	
Total Additions	**$ 73,808,780**	
Deductions		
Benefit Payments	$ (37,245,710)	
Investment Expenses	(2,480,888)	
Administrative Expenses	(386,608)	
Total Deductions	**$ (40,113,206)**	
Value of Assets – April 30, 2018		**$ 540,393,237**

SECTION II – ASSETS

Actuarial Value of Assets

The next table, Table II-3, shows how the actuarial value of assets is developed.

A preliminary actuarial value of assets is calculated as the sum of the beginning of the year actuarial value of assets, the net new money and the expected return on an actuarial basis. The gains and losses over the last four years are recognized over the next five-year period. The gain or loss of each year is the excess of market value of assets over the preliminary value of assets, minus the sum of the unrecognized gains and losses from each of the four years. Finally, an adjustment is made so that the final actuarial value of assets is at least 80% but no more than 120% of the market value.

Table II-3
Development of Actuarial Value of Assets

1.	**Actuarial Value of Assets at May 1, 2017**	**$**	**512,040,758**
2.	Employer and Employee Contributions		24,318,368
3.	Benefit Payments and Administrative Expenses		(37,632,318)
4.	Net Cash Flow (2+3)	$	(13,313,950)
5.	Expected Value of investment return at 7.25%		36,648,769
6.	Actual investment return on Market Value		47,009,524
7.	Investment gain/(loss) for the year (6-5)	$	10,360,755
8.	Investment gain/(loss) from current and prior years to be recognized in the plan year ending April 30, 2018		

Plan Year End	Total Gain/ (Loss)	Deferral Percentage	Deferred to Future Years
April 30, 2018	$ 10,360,755	80%	$ 8,288,604
April 30, 2017	22,500,733	60%	13,500,440
April 30, 2016	(42,926,929)	40%	(17,170,772)
April 30, 2015	(801,169)	20%	(160,234)
April 30, 2014	13,664,721	0%	0
Total	$ 2,798,111		$ 4,458,038

9.	Market Value of Assets for Year ending April 30, 2018	$	540,393,237
10.	Preliminary Actuarial Value of Assets on May 1, 2018 (9 - 8 deferred)		535,935,199
11.	120% of MV, Upper Limit for Actuarial Value	$	648,471,884
12.	80% of MV, Lower Limit for Actuarial Value		432,314,590
13.	**Actuarial Value of Assets on May 1, 2018**	**$**	**535,935,199**

SECTION II – ASSETS

Investment Performance

The market value of assets (MVA) returned 9.40% during the plan year ending 2018, which is higher than the assumed 7.25% return. The actuarial value of assets (AVA) returned 7.36% during the plan year ending 2018.

The following table shows a history of the annual asset returns.

Table II-4
Historical Asset Returns

Fiscal Year Ending April 30,	Return on Market Value	Return on Actuarial Value	Assumed Return
2009	-30.19%	-20.15%	7.75%
2010	33.37%	28.48%	7.75%
2011	13.88%	2.42%	7.75%
2012	0.86%	0.33%	7.75%
2013	11.27%	3.27%	7.75%
2014	10.73%	11.79%	7.75%
2015	7.16%	8.12%	7.50%
2016	-1.61%	5.50%	7.50%
2017	12.89%	7.71%	7.50%
2018	9.40%	7.36%	7.25%

SECTION II – ASSETS

Projection of Plan's Future Cash Flows

Table II-5
Projection of Plan's Expected Cash Flows ($ thousands)

Year Beginning May 1,	Benefits and Expenses	Expected Contributions*	Net Cash Flow
2018	$ (40,207)	$ 27,281	$ (12,926)
2019	(41,450)	29,417	(12,033)
2020	(43,311)	31,712	(11,599)
2021	(45,162)	34,032	(11,130)
2022	(47,094)	35,874	(11,220)
2023	(49,124)	36,835	(12,289)
2024	(51,272)	37,884	(13,388)
2025	(53,545)	38,972	(14,573)
2026	(55,764)	40,091	(15,673)
2027	(58,116)	41,241	(16,875)

* *Expected contributions include City contributions and Member contributions. City contributions are projected under the Board's funding policy assuming future market value returns of 7.25% as shown in the graph on page 8.*

SECTION III – LIABILITIES

In this section, we present detailed information on the System's liabilities including:

- **Disclosure** of the System's liabilities at May 1, 2017 and May 1, 2018,
- Statement of **changes** in these liabilities during the year.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fund all benefits of the System both earned as of the valuation date and those to be earned in the future by current plan participants, under the current plan provisions.

- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the present value of benefits and subtracting the present value of future member contributions and future employer normal costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal** funding method.

- **Present Value of Accrued Benefits:** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fund the current accrued obligations of the System, assuming no future accruals of benefits.

None of these liabilities are appropriate for measuring the cost of settlement of plan liabilities either by purchase of annuities or payment of lump sums.

Table III-1 which follows, discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of plan assets yields, for each respective type, a **net surplus,** or an **unfunded liability**.

SECTION III – LIABILITIES

Table III-1
Liabilities Net (Surplus)/Unfunded

	May 1, 2017	May 1, 2018
Present Value of Future Benefits		
Active Participant Benefits	$ 457,390,464	$ 472,762,592
Retiree and Inactive Benefits	437,176,387	453,879,670
Present Value of Future Benefits (PVB)	$ 894,566,851	$ 926,642,262
Actuarial Liability		
Present Value of Future Benefits (PVB)	$ 894,566,851	$ 926,642,262
Present Value of Future Normal Costs (PVFNC)	168,029,144	169,691,526
Actuarial Liability (AL = PVB – PVFNC)	726,537,707	756,950,736
Actuarial Value of Assets (AVA)	512,040,758	535,935,199
Net (Surplus)/Unfunded (AL – AVA)	$ 214,496,949	$ 221,015,537
Present Value of Accrued Benefits		
Present Value of Future Benefits (PVB)	$ 894,566,851	$ 926,642,262
Present Value of Future Benefit Accruals (PVFBA)	230,084,361	236,917,337
Present Value of Accrued Benefits (PVAB = PVB – PVFBA)	664,482,490	689,724,925
Market Value of Assets (MVA)	506,697,663	540,393,237
Net Unfunded/(Surplus)	$ 157,784,827	$ 149,331,688

SECTION III – LIABILITIES

Changes in Liabilities

Each of the Liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in system assets resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure system assets

In each valuation, we report on those elements of change, which are of particular significance, potentially affecting the long-term financial outlook of the System. Below we present key changes in liabilities since the last valuation.

In the table that follows, we show the components of change in the actuarial liability between May 1, 2017 and May 1, 2018.

Table III-2

	Actuarial Liability
Liabilities May 1, 2017	$ 726,537,707
Liabilities May 1, 2018	756,950,736
Liability Increase/(Decrease)	**30,413,029**
Change Due to:	
Plan Changes	0
Assumption Changes	0
Actuarial (Gain)/Loss	78,742
Benefits Accumulated and Other Sources	30,334,287

SECTION III – LIABILITIES

In addition, we breakdown the change in actuarial liability further by showing the total actuarial (gain)/loss by source, as shown in Table III-3 below. A history of the (gain)/loss by source is shown in Table III-4 below.

Table III-3
(Gain)/Loss by Source as of May 1, 2018

Turnover	$ (775,000)
Retirement	671,000
Disability	1,042,000
Pre-retirement mortality	31,000
Post-retirement mortality	(4,171,000)
Salary increase more/(less) than expected for continuing actives	1,956,000
New entrants	299,000
Data Composition & Miscellaneous changes	1,026,000
Total (Gain)/Loss	**$ 79,000**

Table III-4
Historical Liability (Gains)/Losses ($ Millions)

Change due to:	2014	2015	2016	2017	2018
Turnover	$ 0.1	$ (0.1)	$ (1.4)	$ 0.0	$ (0.8)
Retirement	0.1	2.1	2.8	1.8	$ 0.7
Disability	(1.0)	(0.6)	0.6	1.8	$ 1.1
Pre-retirement mortality	0.0	(0.4)	0.0	(0.9)	$ 0.0
Post-retirement mortality	2.6	1.7	3.7	0.0	$ (4.2)
Salary change	(5.4)	(5.4)	(7.7)	6.0	$ 2.0
New entrants	0.2	0.2	0.2	0.9	$ 0.3
Miscellaneous	2.0	0.9	0.4	(1.3)	$ 1.0
Total (Gain)/Loss	**$ (1.4)**	**$ (1.6)**	**$ (1.4)**	**$ 8.3**	**$ 0.1**

SECTION IV – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed is the **Entry Age Actuarial Cost Method**. Under this method, there are three primary components to the total contribution: the **normal cost rate (employee and employer)**, the **administrative expense rate,** and the **unfunded actuarial liability rate** (UAL rate). The normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary. The normal cost rate is multiplied by current salary to determine each member's normal cost rate. Finally, the total normal cost rate is reduced by the member contribution rate to produce the employer normal cost rate. The difference between the Entry Age actuarial liability and the actuarial value of assets is the unfunded actuarial liability.

Contributions are calculated on two bases:

- Under the Board's funding policy for calculating the Actuarially Determined Contribution, the unfunded actuarial liability is amortized using a 30-year layered amortization method – level percent of pay. Under the layered approach, the May 1, 2008 unfunded actuarial liability is written down over a 30-year period and all future changes to the unfunded actuarial liability establish new 30-year amortization periods. Payroll is expected to increase 3.0% per year.

- Under the City ordinance, the City's contributions are to be based upon a 30-year closed amortization of the entire unfunded liability from May 1, 2014 as a level percent of pay. Payroll is expected to increase 3.0% per year.

For both calculations, the increase in contribution rates due to the May 1, 2017 actuarial assumption changes is phased-in over five years.

SECTION IV – CONTRIBUTIONS

Table IV-1 below presents and compares the employer contribution rates for the System for this valuation and the prior one using both the current Board funding policy amortization method and using a 30-year closed amortization method.

Table IV-1
Employer Contribution Rate

	May 1, 2017	May 1, 2018
Current Board Funding Policy *		
Entry Age Normal Cost Rate	13.69%	13.87%
Administrative Expense Rate	0.37%	0.39%
Amortization Payment	16.56%	18.28%
Actuarially Determined Contribution	30.62%	32.54%
30-Year Closed Amortization Method *		
Entry Age Normal Cost Rate	13.69%	13.87%
Administrative Expense Rate	0.37%	0.39%
Amortization Payment	15.15%	16.92%
Actuarially Determined Contribution	29.21%	31.18%

** Rates reflect the 5-year phase-in of the 2017 assumption changes*

SECTION IV – CONTRIBUTIONS

Table IV-2 below presents the May 1, 2018 employer contribution rates for the System. The employer contribution rate is based on the amortization schedule shown in Table IV-3. The employer contribution rates are then compared to what the City is expected to contribute for the current plan year. The current expected City contribution rate for all employees for the year ending April 30, 2019 is 30.62% of payroll.

Table IV -2
Development of Plan Contribution Rate
as of May 1, 2018

		As % of Payroll*
1.	Normal Cost (Monthly):	
	a. Total Normal Cost	25.30%
	b. Administrative Expense	0.45%
	c. Expected Members Contribution	10.55%
	d. Employer Paid Normal Cost (a) + (b) - (c)	15.20%
2.	Amortization of Unfunded Liability	
	a. Actuarial Liability	$ 756,950,736
	b. Actuarial Value of Assets	535,935,199
	c. Unfunded Liability (a) - (b)	221,015,537
	d. Amortization of Unfunded Liability	21.92%
3.	Actuarially Determined Employer Contribution Rate before phase-in (1) + (2d)	37.12%
4.	Increase due to change in 2017 assumptions	7.63%
5.	Actuarially Determined Employer Contribution Rate after phase-in (3) - (60% x (4))	32.54%
6.	Scheduled City Contributions (Prior Year's ADC)**	30.62%

* *Total payroll is $66,264,508, and the Actuarially Determined Contribution for plan year ending April 30, 2020 is $21,562,471 based on the total employer contribution rate.*

** *Determined in the May 1, 2017 valuation.*

SECTION IV – CONTRIBUTIONS

Under Board funding policy, for purposes of calculating the Actuarially Determined Contribution under GASB, the Unfunded Actuarial Liability is amortized in accordance with the schedule below:

Initial unfunded actuarial liability (as of May 1, 2008)	30 years
Changes to the UAL on and after May 1, 2009	30 years

TABLE IV-3
Unfunded Actuarial Liability Amortization Schedule

Item	Date Created	Initial Years	Initial Balance	Remaining Years	Outstanding Balance	Amortization Payment	Amortization Factor
Initial UAL	5/1/2008	30	$ 31,525,386	20	$ 33,422,092	$ 2,440,993	13.692
(Gain)/Loss*	5/1/2009	30	119,805,172	21	127,340,747	9,013,464	14.128
(Gain)/Loss*	5/1/2010	30	(72,293,282)	22	(76,860,425)	(5,283,812)	14.546
(Gain)/Loss*	5/1/2011	30	14,027,641	23	14,886,568	995,866	14.948
(Gain)/Loss*	5/1/2012	30	50,231,264	24	53,108,781	3,463,373	15.334
Assumption Change	5/1/2012	30	(32,090,739)	24	(33,929,068)	(2,212,610)	15.334
(Gain)/Loss*	5/1/2013	30	13,322,268	25	14,008,904	891,994	15.705
(Gain)/Loss*	5/1/2014	30	(15,478,970)	26	(16,162,876)	(1,006,330)	16.061
Assumption Change	5/1/2014	30	16,120,179	26	16,832,413	1,048,016	16.061
Plan Amendment	5/1/2014	30	212,181	26	221,557	13,795	16.061
(Gain)/Loss*	5/1/2015	30	(4,602,806)	27	(4,762,009)	(290,311)	16.403
(Gain)/Loss*	5/1/2016	30	7,691,151	28	7,874,369	470,630	16.732
(Gain)/Loss*	5/1/2017	30	7,063,910	29	7,148,810	419,361	17.047
Assumption Change**	5/1/2017	30	71,577,266	29	72,437,541	4,249,301	17.047
(Gain)/Loss*	5/1/2018	30	5,448,133	30	5,448,133	314,017	17.350
Total			**$ 212,558,754**		**$ 221,015,537**	**$ 14,527,746**	

**Also included differences between the Actuarially Determined Contribution and the actual contributions made.*

Under the City ordinance, amortization payments are calculated using a 30-year closed amortization method. The amortization payment as of May 1, 2018 is shown in the table below.

TABLE IV-4
Unfunded Actuarial Liability Amortization Schedule

UAL	Remaining Years *	Amortization Payment **	Amortization Factor
$221,015,537	26	$13,760,827	16.061

**30-year closed amortization period began 5/1/2014*

*** Results do not reflect the 5 year phase-in of the 2017 assumption changes*

SECTION V – FINANCIAL STATEMENT INFORMATION

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in a public retirement system's Comprehensive Annual Financial Report (CAFR) in order to receive recognition for excellence in financial reporting. Although the Kansas City Firefighters' Pension System does not issue a CAFR under GFOA guidelines, we have included certain schedules in this section for possible inclusion within the System's audited financial statements.

Tables V-1 through V-5 are exhibits which could be used with the CAFR report. Table V-1 is the Note to Required Supplementary Information, Table V-2 is a history of gains and losses in actuarial liability, Table V-3 is the Solvency Test which shows the portion of actuarial liability covered by assets, Table V-4 shows historical Actuarially Determined Contribution information, compared to what the City actually contributed, and Table V-5 is the Schedule of Funding Progress.

SECTION V – FINANCIAL STATEMENT INFORMATION

Table V-1
Note To Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	May 1, 2018
Actuarial cost method	Entry age
Amortization method	30-year layered amortization, level percent of pay for changes to the UAL on or after 5/1/2008
Remaining amortization period for the UAL	Weighted average of 23.7 years
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.25%
Projected salary increases	Ranges from 8.0% to 3.0%
Cost-of-living adjustments	3.0% simple
Inflation	2.5%

The actuarial assumptions used have been based upon recommendations by the actuary and adopted by the System's Board of Trustees. The most recent actuarial experience study was performed for the period May 1, 2011 through April 30, 2016.

The rate of employer actuarially determined contributions to the System is composed of the normal cost, expected administrative expenses, and an amortization of the unfunded actuarial liability. The normal cost is a level percent of payroll cost which, along with member contributions, will pay for projected benefits at retirement for the average plan participant. The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the actuarial value of assets as of the same date is the unfunded actuarial liability. The contribution rate change as a result of the revised assumptions adopted as of May 1, 2017 is phased-in over five years.

SECTION V – FINANCIAL STATEMENT INFORMATION

Table V-2
Analysis Of Financial Experience
Gain and Loss in Actuarial Liability During Years Ended April 30
Resulting from Differences Between Assumed Experience and Actual Experience
Gain (or Loss) for Year ending April 30,
(expressed in thousands)

Type of Activity	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Investment Income *	$ (121,621)	$ 64,430	$ (25,060)	$ (33,605)	$ (20,446)	$ 14,074	$ 3,033	$ (9,103)	$ 1,263	$ (5,369)
Combined Liability Experience	1,816	7,863	11,032	(16,627)	7,124	1,405	1,570	1,412	(8,327)	(79)
Gain/(or Loss) during Year from Financial Experience	$ (119,805)	$ 72,293	$ (14,028)	$ (50,232)	$ (13,322)	$ 15,479	$ 4,603	$ (7,691)	$ (7,064)	$ (5,448)
Non-Recurring Gain/(or Loss) Items	0	0	0	32,091	0	(16,332)	0	0	(71,577)	0
Composite Gain/(or Loss) during Year	$ (119,805)	$ 72,293	$ (14,028)	$ (18,141)	$ (13,322)	$ (853)	$ 4,603	$ (7,691)	$ (78,641)	$ (5,448)

** Investment experience includes the differences in actual and recommended contributions.*

SECTION V – FINANCIAL STATEMENT INFORMATION

Table V-3
Solvency Test
Aggregate Actuarial Liabilities for
(expressed in thousands)

Valuation Date May 1,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)	(3)
2009	$59,927	$284,711	$155,555	$348,489	100%	100%	2%
2010	$57,842	$297,377	$161,381	$435,428	100%	100%	50%
2011	$66,618	$309,207	$152,656	$432,541	100%	100%	37%
2012	$70,049	$311,907	$153,259	$420,337	100%	100%	25%
2013	$69,614	$333,764	$144,410	$418,712	100%	100%	11%
2014	$75,288	$346,493	$161,387	$452,378	100%	100%	19%
2015	$78,243	$363,896	$161,279	$476,356	100%	100%	21%
2016	$79,606	$388,599	$156,039	$488,879	100%	100%	13%
2017	$84,135	$437,176	$205,226	$512,041	100%	98%	0%
2018	$87,775	$453,880	$215,296	$535,935	100%	99%	0%

SECTION V – FINANCIAL STATEMENT INFORMATION

Table V-4
Schedule of City Contributions

Plan Year Ended April 30	Actuarially Determined Contribution	Actual Contribution	Percentage Contributed
2010	$17,123,835 *	$10,465,322	61.1%
2011	$12,827,773 *	$10,297,638	80.3%
2012	$14,045,886 *	$11,603,818	82.6%
2013	$15,400,040 *	$13,120,169	85.2%
2014	$16,182,139 *	$14,344,958	88.6%
2015	$16,182,139 **	$16,258,533	100.5%
2016	$16,581,464 **	$16,631,844	100.3%
2017	$16,726,994 **	$16,754,798	100.2%
2018	$17,316,499 **	$17,435,993	100.7%
2019	$19,747,524 **	--	--

**The actuarially determined contribution for the plan years ended April 30, 2010 through April 30, 2014 is based on the actuarially computed contribution for the valuation year.*

***For plan years ended April 30, 2015 and later, the actuarially determined contribution is based on the calculation for the prior valuation year using estimated valuation payroll. The actuarially computed contribution for the current valuation year is described in Section IV, Table IV-2.*

SECTION V – FINANCIAL STATEMENT INFORMATION

Table V-5
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (b)	Unfunded Actuarial Liability (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)
5/1/2009	$348,489,209	$500,193,509	$151,704,300	69.67%	$53,612,509	282.96%
5/1/2010	$435,427,953	$516,599,916	$81,171,963	84.29%	$51,934,305	156.30%
5/1/2011	$432,540,955	$528,481,037	$95,940,082	81.85%	$51,983,293	184.56%
5/1/2012	$420,336,845	$535,215,109	$114,878,264	78.54%	$60,062,558	191.26%
5/1/2013	$418,711,963	$547,787,899	$129,075,936	76.44%	$58,356,072	221.19%
5/1/2014	$452,378,238	$583,167,922	$130,789,684	77.57%	$59,410,476	220.15%
5/1/2015	$476,356,399	$603,417,753	$127,061,354	78.94%	$59,294,555	214.29%
5/1/2016	$488,878,575	$624,244,469	$135,365,894	78.32%	$57,625,619	234.91%
5/1/2017	$512,040,758	$726,537,707	$214,496,949	70.48%	$64,492,241	332.59%
5/1/2018	$535,935,199	$756,950,736	$221,015,537	70.80%	$66,264,508	333.54%

** Not less than zero.*

APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System Table of Plan Coverage	5/1/2017	5/1/2018	% change
Active Members in Valuation			
Tier 1			
Number	830	787	-5.18%
Average Age	42.19	43.06	2.06%
Average Service	15.98	16.88	5.63%
Total Payroll	58,230,949	$ 57,442,161	-1.35%
Average Anticipated Payroll	$ 70,158	$ 72,989	4.04%
Account Balance	$ 83,439,459	$ 86,108,383	3.20%
Eligible to Retire on:			
Voluntary Pension	100	115	15.00%
Deferred Pension	547	528	-3.47%
Total Active Vested Members	647	643	-0.62%
Tier 2			
Number	148	194	31.08%
Average Age	27.19	28.06	3.20%
Average Service	1.15	1.91	66.09%
Total Payroll	6,261,291	$ 8,822,347	40.90%
Average Anticipated Payroll	$ 42,306	$ 45,476	7.49%
Account Balance	$ 695,193	$ 1,666,343	139.70%
Eligible to Retire on:			
Voluntary Pension	0	0	N/A
Deferred Pension	0	0	N/A
Total Active Vested Members	0	0	N/A
Total			
Number	978	981	0.31%
Average Age	39.92	40.09	0.43%
Average Service	13.74	13.92	1.31%
Total Payroll	$ 64,492,241	$ 66,264,508	2.75%
Average Anticipated Payroll	$ 65,943	$ 67,548	2.43%
Account Balance	$ 84,134,652	$ 87,774,726	4.33%
Eligible to Retire on:			
Voluntary Pension	100	115	15.00%
Deferred Pension	547	528	-3.47%
Total Active Vested Members	647	643	-0.62%

APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System Table of Plan Coverage (cont.)	5/1/2017	5/1/2018	% change
Vested Terminated Members	4	7	75.00%
Deaths During the Plan Year	47	48	2.13%
Pensioners:			
Number in Pay Status*			
Retirees	582	570	-2.06%
Duty Disabled Retirees	94	103	9.57%
Non-duty Disabled Retirees	11	5	-54.55%
Total	**687**	**678**	-1.31%
Average Age	67.85	67.55	-0.44%
Average Monthly Benefit***	$ 3,893	$ 4,071	4.55%
Beneficiaries in Pay Status**	235	246	4.68%
Members Due Refunds	6	6	0.00%
New Disabilities	8	7	-12.50%

** Disabled participants that were eligible for voluntary retirement at the time of their disability are valued as Retirees*

***Widows, QDROs, and Children*

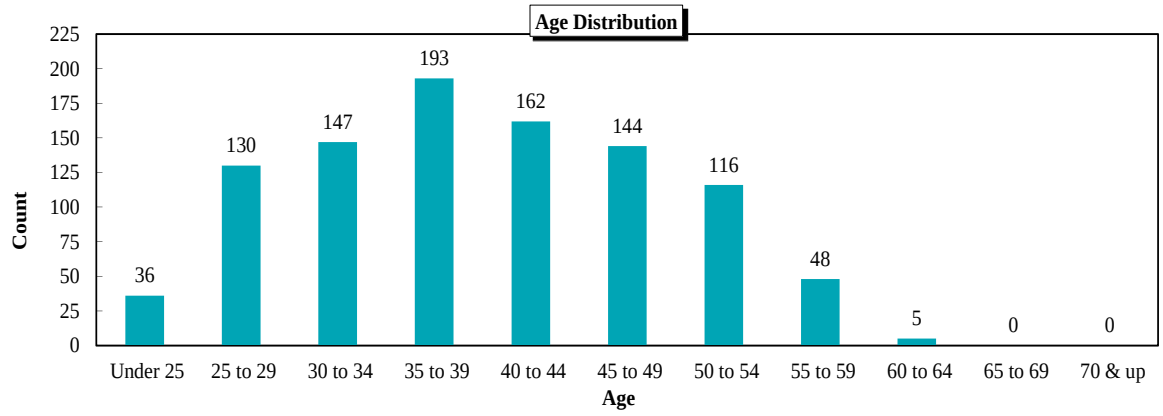
****The monthly benefit does not include the health insurance subsidy benefits*

APPENDIX A – MEMBERSHIP INFORMATION

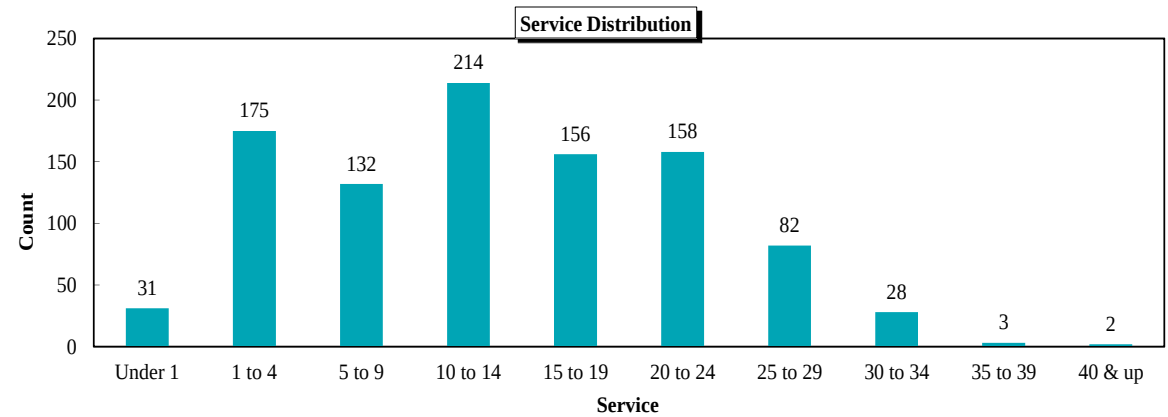
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TOTAL
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	14	22	0	0	0	0	0	0	0	0	36
25 to 29	15	93	22	0	0	0	0	0	0	0	130
30 to 34	2	54	61	30	0	0	0	0	0	0	147
35 to 39	0	6	44	106	37	0	0	0	0	0	193
40 to 44	0	0	5	71	52	33	1	0	0	0	162
45 to 49	0	0	0	5	48	66	25	0	0	0	144
50 to 54	0	0	0	0	17	50	35	14	0	0	116
55 to 59	0	0	0	2	1	9	21	14	1	0	48
60 to 64	0	0	0	0	1	0	0	0	2	2	5
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	31	175	132	214	156	158	82	28	3	2	981

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TOTAL



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TOTAL

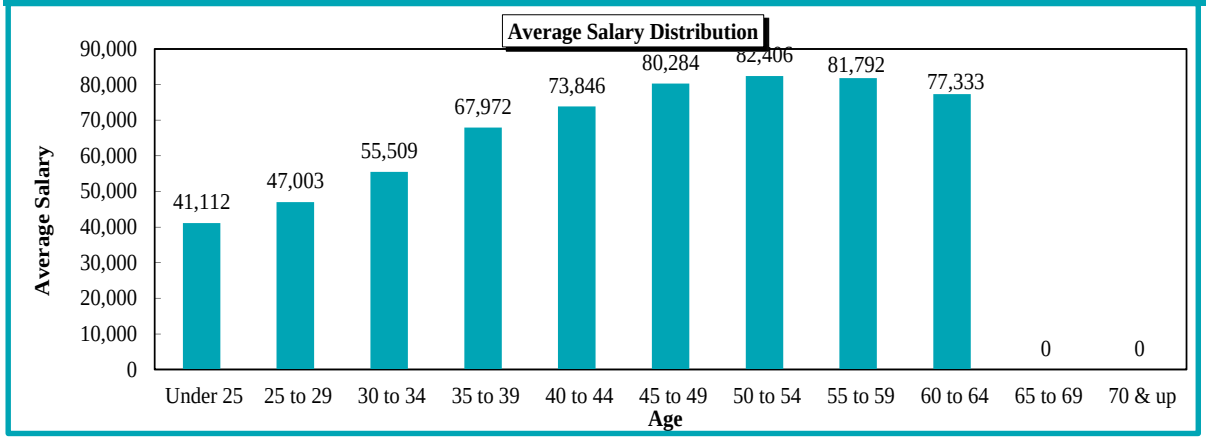


APPENDIX A – MEMBERSHIP INFORMATION

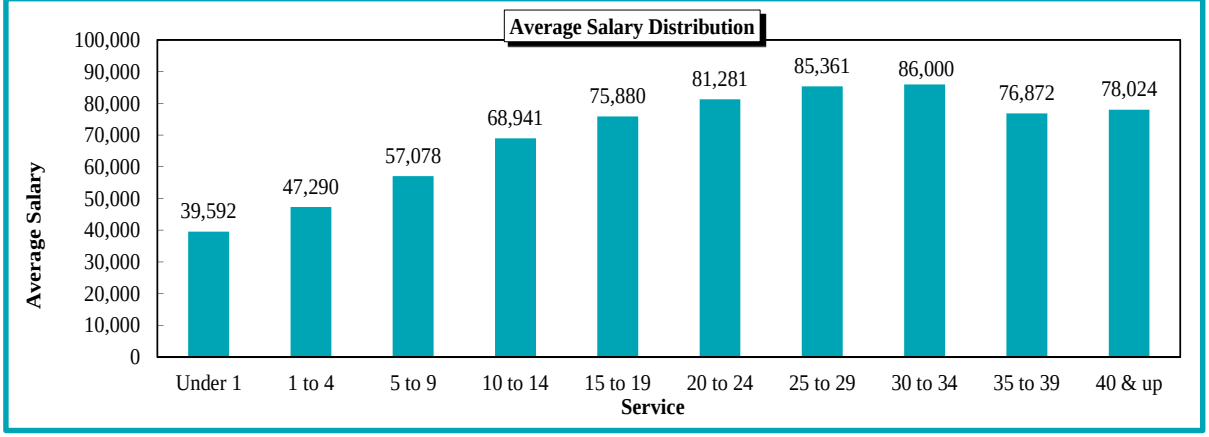
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TOTAL
AVERAGE SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	36,586	43,992	0	0	0	0	0	0	0	0	41,112
25 to 29	41,249	46,078	54,836	0	0	0	0	0	0	0	47,003
30 to 34	48,210	49,021	56,409	65,842	0	0	0	0	0	0	55,509
35 to 39	0	62,596	58,152	69,429	76,347	0	0	0	0	0	67,972
40 to 44	0	0	65,645	69,246	76,093	81,213	81,480	0	0	0	73,846
45 to 49	0	0	0	70,632	75,786	82,670	84,552	0	0	0	80,284
50 to 54	0	0	0	0	74,630	80,285	87,176	87,502	0	0	82,406
55 to 59	0	0	0	74,466	74,568	76,872	83,482	84,497	74,568	0	81,792
60 to 64	0	0	0	0	74,568	0	0	0	78,024	78,024	77,333
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	39,592	47,290	57,078	68,941	75,880	81,281	85,361	86,000	76,872	78,024	67,548

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TOTAL



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TOTAL

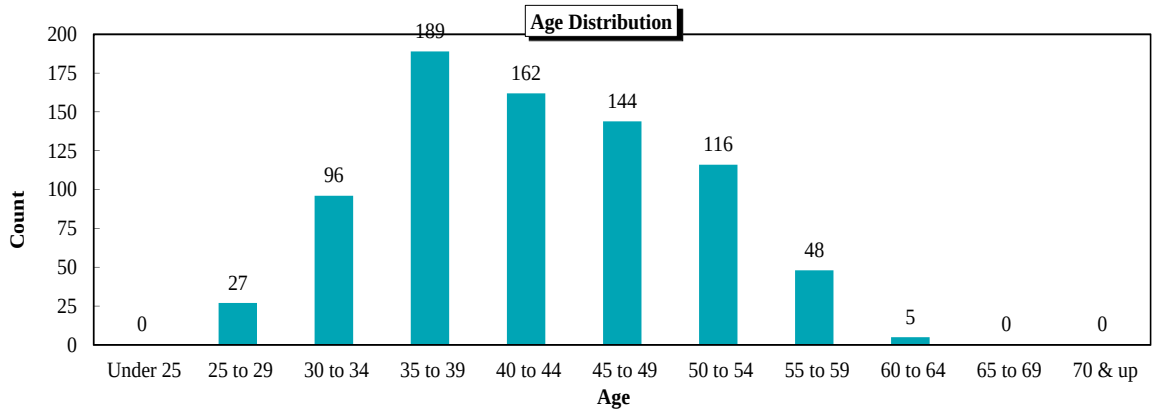


APPENDIX A – MEMBERSHIP INFORMATION

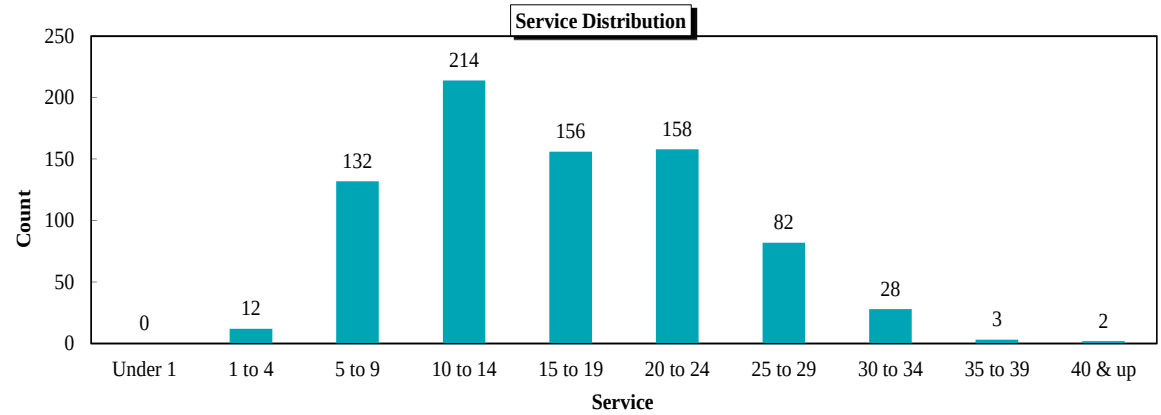
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TIER 1
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	5	22	0	0	0	0	0	0	0	27
30 to 34	0	5	61	30	0	0	0	0	0	0	96
35 to 39	0	2	44	106	37	0	0	0	0	0	189
40 to 44	0	0	5	71	52	33	1	0	0	0	162
45 to 49	0	0	0	5	48	66	25	0	0	0	144
50 to 54	0	0	0	0	17	50	35	14	0	0	116
55 to 59	0	0	0	2	1	9	21	14	1	0	48
60 to 64	0	0	0	0	1	0	0	0	2	2	5
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	0	12	132	214	156	158	82	28	3	2	787

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TIER 1



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TIER 1

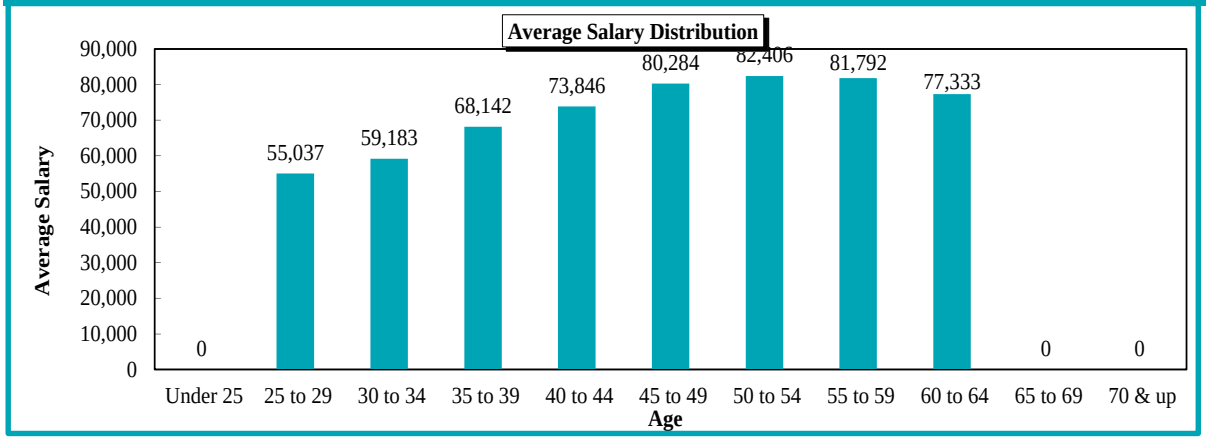


APPENDIX A – MEMBERSHIP INFORMATION

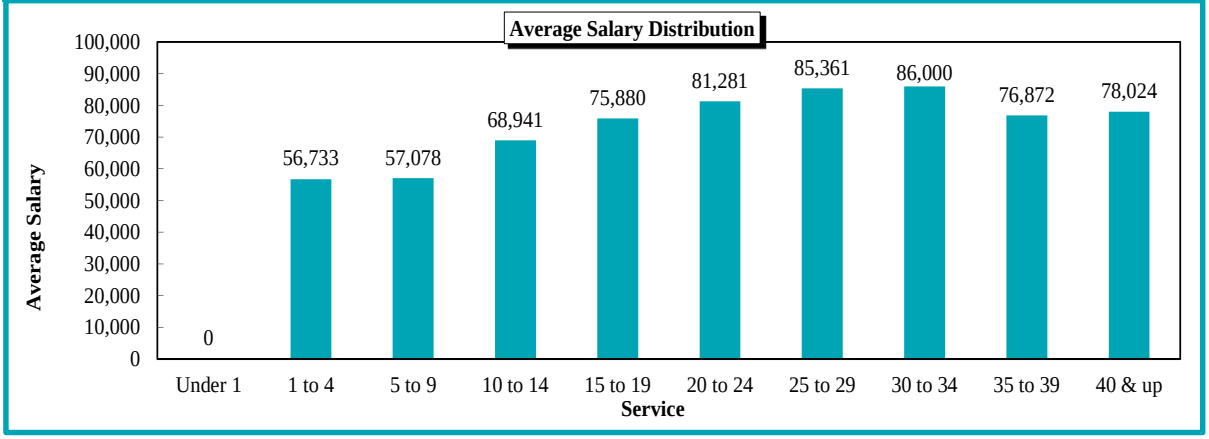
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TIER 1
AVERAGE SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	55,922	54,836	0	0	0	0	0	0	0	55,037
30 to 34	0	53,074	56,409	65,842	0	0	0	0	0	0	59,183
35 to 39	0	67,908	58,152	69,429	76,347	0	0	0	0	0	68,142
40 to 44	0	0	65,645	69,246	76,093	81,213	81,480	0	0	0	73,846
45 to 49	0	0	0	70,632	75,786	82,670	84,552	0	0	0	80,284
50 to 54	0	0	0	0	74,630	80,285	87,176	87,502	0	0	82,406
55 to 59	0	0	0	74,466	74,568	76,872	83,482	84,497	74,568	0	81,792
60 to 64	0	0	0	0	74,568	0	0	0	78,024	78,024	77,333
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	0	56,733	57,078	68,941	75,880	81,281	85,361	86,000	76,872	78,024	72,989

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TIER 1



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TIER 1

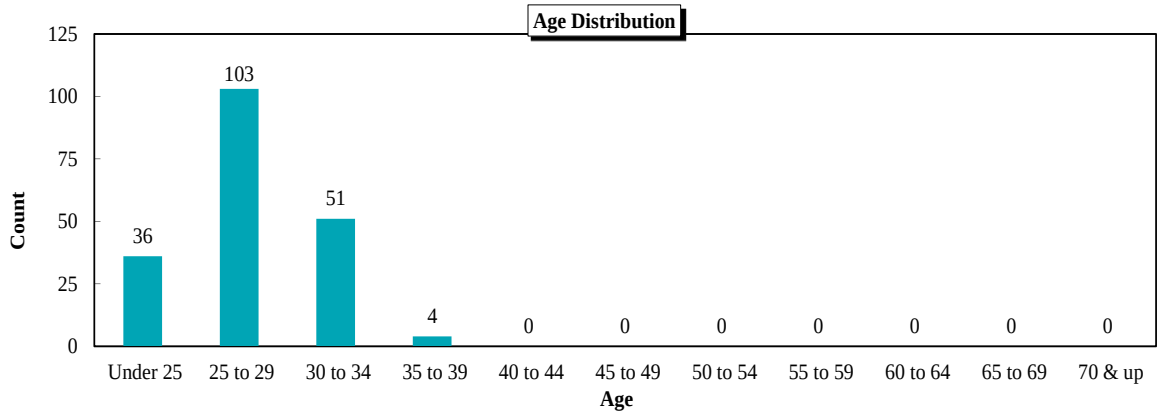


APPENDIX A – MEMBERSHIP INFORMATION

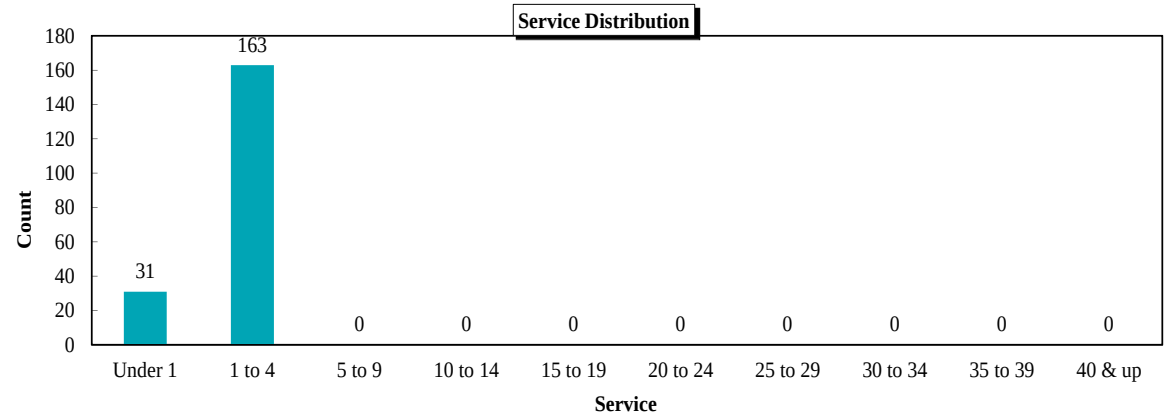
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TIER 2
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	14	22	0	0	0	0	0	0	0	0	36
25 to 29	15	88	0	0	0	0	0	0	0	0	103
30 to 34	2	49	0	0	0	0	0	0	0	0	51
35 to 39	0	4	0	0	0	0	0	0	0	0	4
40 to 44	0	0	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	31	163	0	0	0	0	0	0	0	0	194

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TIER 2



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TIER 2

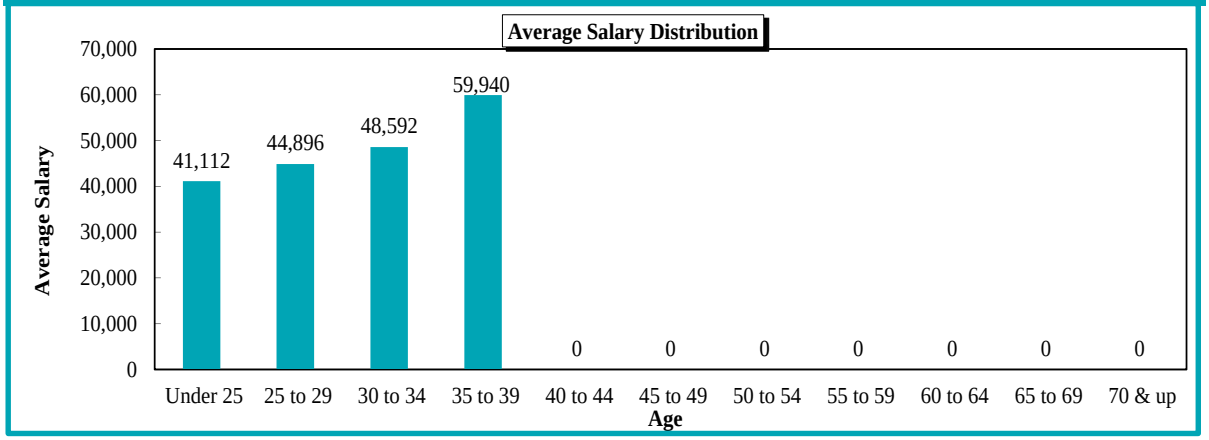


APPENDIX A – MEMBERSHIP INFORMATION

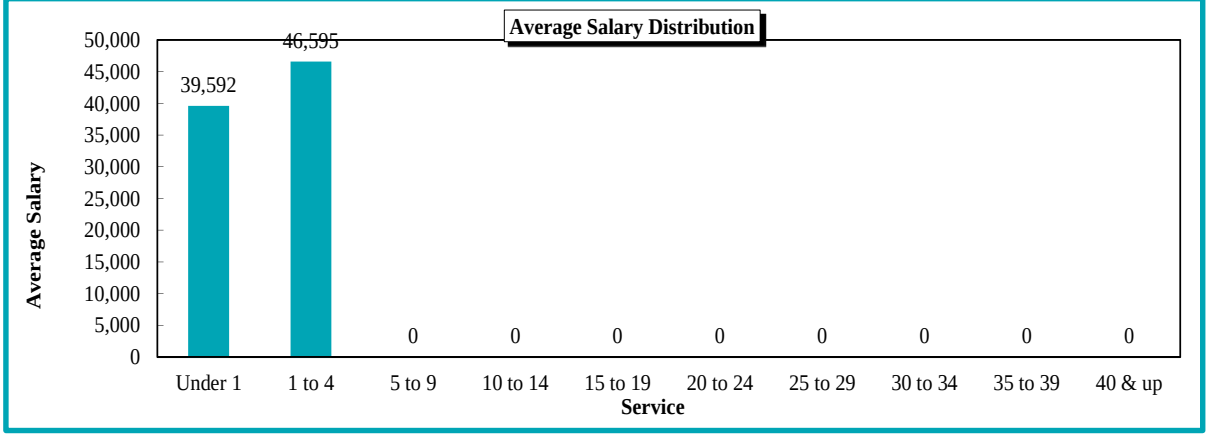
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2018
TIER 2
AVERAGE SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	36,586	43,992	0	0	0	0	0	0	0	0	41,112
25 to 29	41,249	45,518	0	0	0	0	0	0	0	0	44,896
30 to 34	48,210	48,608	0	0	0	0	0	0	0	0	48,592
35 to 39	0	59,940	0	0	0	0	0	0	0	0	59,940
40 to 44	0	0	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	39,592	46,595	0	0	0	0	0	0	0	0	45,476

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2018
TIER 2



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2018
TIER 2



APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System
Pensions in Payment Status by Type and Monthly Amount
as of May 1, 2018

Monthly Amount	Total	Voluntary	Vested	Disability	Widows & Children	QDROs
Total	**924**	**550**	**20**	**108**	**229**	**17**
Under $500	26	0	3	0	19	4
$500-1,000	63	1	4	2	52	4
1,000-1,500	59	3	2	5	45	4
1,500-2,000	71	17	1	12	39	2
2,000-2,500	63	23	2	5	32	1
2,500-3,000	55	34	5	2	14	0
3,000-3,500	78	62	1	7	8	0
3,500-4,000	131	100	2	23	4	2
4,000-4,500	165	113	0	46	6	0
4,500-5,000	63	55	0	5	3	0
5,000-5,550	65	61	0	0	4	0
5,500-6,000	48	45	0	0	3	0
6,000-6,500	7	6	0	1	0	0
6,500-7,000	7	7	0	0	0	0
7,000 & over	23	23	0	0	0	0

During the year ended April 30, 2018 there were 50 new pensions awarded (17 Voluntary, 1 Vested, 7 Disabled, and 25 Widows, QDROs, and Children)

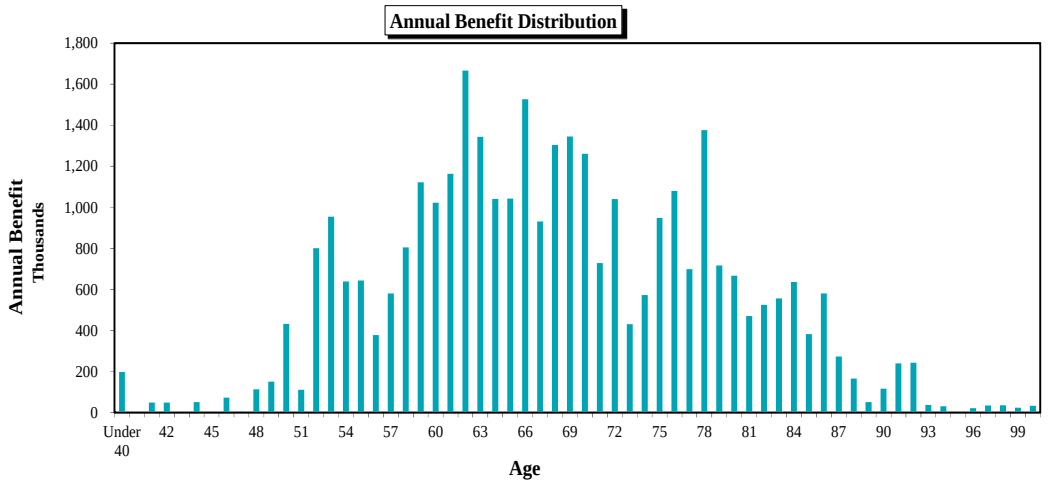
APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension Plan Distribution of Retired Members and Survivors as of May 1, 2018

Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	14	$50,089	57	13	$579,797	89	5	$50,632
25	0	0	58	16	804,113	90	9	115,990
26	0	0	59	21	1,121,616	91	12	239,325
27	0	0	60	21	1,021,721	92	7	242,668
28	0	0	61	20	1,163,144	93	3	36,590
29	0	0	62	31	1,666,053	94	2	30,187
30	0	0	63	24	1,342,731	95	0	0
31	0	0	64	21	1,041,018	96	1	21,288
32	0	0	65	20	1,041,450	97	1	34,299
33	1	22,436	66	26	1,526,708	98	3	35,330
34	1	7,211	67	18	931,030	99	2	23,545
35	2	25,694	68	26	1,302,861	100	2	32,198
36	0	0	69	26	1,345,112	101	1	17,294
37	0	0	70	24	1,260,030	102	1	25,526
38	1	48,118	71	19	727,831	103	1	36,006
39	2	43,488	72	25	1,040,150	104	0	0
40	0	0	73	11	430,019	105	2	15,762
41	1	48,118	74	16	571,782	106	0	0
42	1	48,749	75	25	948,419	107	1	15,598
43	0	0	76	27	1,079,806	108	1	20,254
44	1	50,342	77	19	697,788	109	0	0
45	0	0	78	33	1,375,156	110	0	0
46	1	71,593	79	19	716,365	111	0	0
47	1	3,988	80	21	666,110	112	0	0
48	2	112,995	81	17	469,785	113	0	0
49	3	151,046	82	16	524,702	114	0	0
50	8	432,201	83	17	554,940	115	0	0
51	4	110,518	84	23	636,257	116	0	0
52	15	800,001	85	17	382,417	117	0	0
53	18	954,592	86	22	580,087	118	0	0
54	13	638,456	87	11	272,437	119	0	0
55	13	642,644	88	8	164,513	120	0	0
56	7	377,214						
						Totals	816	$33,617,933

The above counts include 280 persons who elected disability retirement after becoming eligible for voluntary retirement.

Kansas City Firefighters' Pension Plan Distribution of Retired Members and Survivors as of May 1, 2018



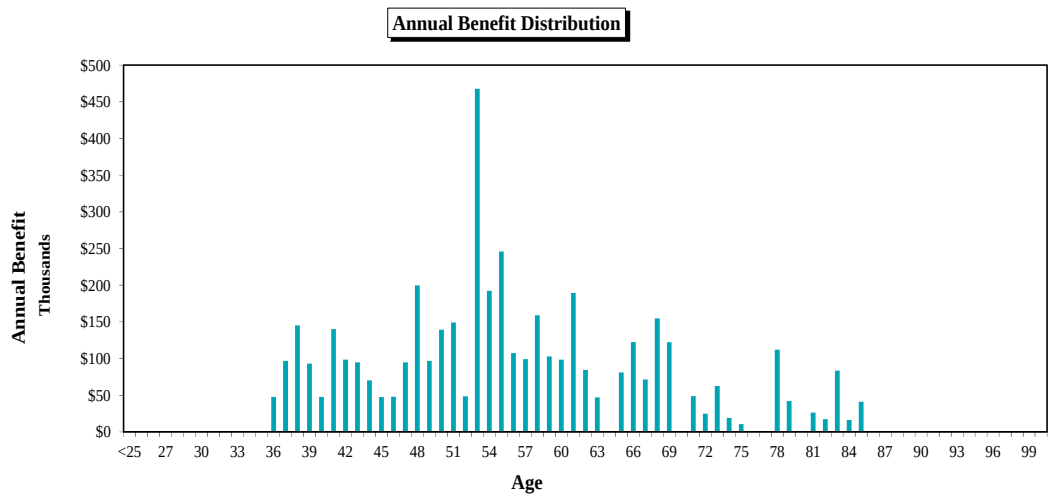
APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension Plan Distribution of Disabled Members as of May 1, 2018

Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	$0	57	2	$99,131	89	0	$0
25	0	0	58	3	158,896	90	0	0
26	0	0	59	2	103,023	91	0	0
27	0	0	60	2	98,509	92	0	0
28	0	0	61	5	189,547	93	0	0
29	0	0	62	2	84,381	94	0	0
30	0	0	63	1	47,194	95	0	0
31	0	0	64	0	0	96	0	0
32	0	0	65	2	81,263	97	0	0
33	0	0	66	3	122,515	98	0	0
34	0	0	67	2	71,472	99	0	0
35	0	0	68	5	154,898	100	0	0
36	1	47,732	69	3	122,485	101	0	0
37	2	96,819	70	0	0	102	0	0
38	3	145,178	71	1	48,815	103	0	0
39	2	93,087	72	1	24,885	104	0	0
40	1	47,732	73	2	62,767	105	0	0
41	3	140,268	74	1	19,191	106	0	0
42	2	98,499	75	1	10,492	107	0	0
43	2	94,904	76	0	0	108	0	0
44	2	70,455	77	0	0	109	0	0
45	1	47,554	78	4	111,965	110	0	0
46	1	48,003	79	2	42,048	111	0	0
47	2	95,044	80	0	0	112	0	0
48	4	199,824	81	1	26,406	113	0	0
49	2	96,934	82	1	17,522	114	0	0
50	3	139,476	83	4	83,625	115	0	0
51	3	149,085	84	1	16,225	116	0	0
52	1	48,587	85	2	41,181	117	0	0
53	9	467,669	86	0	0	118	0	0
54	4	192,467	87	0	0	119	0	0
55	5	245,949	88	0	0	120	0	0
56	2	107,503						
						Totals	108	$4,511,205

The above counts exclude 280 persons who elected disability retirement after becoming eligible for voluntary retirement.

Kansas City Firefighters' Pension Plan Distribution of Disabled Members as of May 1, 2018



APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System
Change in Plan Membership

Tier 1

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2017	**830**	**4**	**5**	**105**	**582**	**235**	**1,761**
New Entrants	0	0	0	0	0	0	0
Rehires	0	0	0	0	0	0	0
Vested Terminations	(1)	3	(2)	0	0	0	0
Terminated with Refund Due	(3)	0	3	0	0	0	0
Return of Contributions	(3)	0	(1)	0	0	0	(4)
Disabilities	(7)	0	0	7	0	0	0
Retirements	(18)	0	0	0	18	0	0
Deaths	0	0	0	(4)	(30)	(13)	(47)
New Survivor	0	0	0	0	0	25	25
Benefit Ceased	0	0	0	0	0	(1)	(1)
Miscellaneous Adjustments	(11)	0	0	0	0	0	(11)
May 1, 2018	**787**	**7**	**5**	**108**	**570**	**246**	**1,723**

Tier 2

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2017	**148**	**0**	**1**	**0**	**0**	**0**	**149**
New Entrants	38	0	0	0	0	0	38
Rehires	1	0	(1)	0	0	0	0
Vested Terminations	0	0	0	0	0	0	0
Terminated with Refund Due	(1)	0	1	0	0	0	0
Return of Contributions	(1)	0	0	0	0	0	(1)
Disabilities	0	0	0	0	0	0	0
Retirements	0	0	0	0	0	0	0
Deaths	(1)	0	0	0	0	0	(1)
New Survivor	0	0	0	0	0	0	0
Benefit Ceased	0	0	0	0	0	0	0
Miscellaneous Adjustments	10	0	0	0	0	0	10
May 1, 2018	**194**	**0**	**1**	**0**	**0**	**0**	**195**

Total

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2017	**978**	**4**	**6**	**105**	**582**	**235**	**1,910**
New Entrants	38	0	0	0	0	0	38
Rehires	1	0	(1)	0	0	0	0
Vested Terminations	(1)	3	(2)	0	0	0	0
Terminated with Refund Due	(4)	0	4	0	0	0	0
Return of Contributions	(4)	0	(1)	0	0	0	(5)
Disabilities	(7)	0	0	7	0	0	0
Retirements	(18)	0	0	0	18	0	0
Deaths	(1)	0	0	(4)	(30)	(13)	(48)
New Survivor	0	0	0	0	0	25	25
Benefit Ceased	0	0	0	0	0	(1)	(1)
Miscellaneous Adjustments	(1)	0	0	0	0	0	(1)
May 1, 2018	**981**	**7**	**6**	**108**	**570**	**246**	**1,918**

**Widows, QDROs, and Children*

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Net Investment Return

7.25% net of investment fees, including inflation at 2.50%

2. Mortality Rates

Non-annuitant mortality: RP-2000 Combined Healthy Non-Annuitant Mortality Table, projected using a modified Scale MP-2015 on a generational basis.

Healthy annuitant mortality: RP-2000 Combined Healthy Annuitant Mortality Table set forward one year for males and females, projected using a modified Scale MP-2015 on a generational basis.

Disabled annuitant mortality: RP-2000 Combined Disabled Mortality Table, projected using a modified Scale MP-2015 on a generational basis.

Modified Projection Scale: Modified Scale MP-2015 using the Society of Actuaries' model implementation tool with rates converging to the ultimate rate in 2019 (instead of 2029) and an ultimate rate improvement of 0.85% (instead of 1.0%) up to age 85 decreasing to 0.7% (instead of 0.85%) at age 95.

3. Percentage of Deaths that are Duty Related

5.00%

4. Disability Rates

Disability Rates before Retirement	
Age	Disability*
20 - 29	0.01%
30 – 34	0.15%
35 – 39	0.30%
40 – 44	0.50%
45 – 49	1.00%
50 – 64	0.50%
65 and up	---

** Disability rates are set to zero once 25 years of service is earned for Tier 1 members and 27 years of service is earned for Tier 2.*

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Percentage of Disability Retirements that are Duty Related

Disability Retirement Rates (Duty Related)	
Age	Annual Rate
20 - 29	95.0%
30 – 34	90.0%
35 – 44	85.0%
45 and up	80.0%

6. Termination Rates

Termination Rates before Retirement		
	Termination*	
Service	Tier 1	Tier 2
0	3.00%	3.00%
1	2.75%	2.75%
2	2.45%	2.45%
3	2.15%	2.15%
4	1.85%	1.85%
5	1.55%	1.55%
6	1.40%	1.40%
7	1.32%	1.32%
8	1.24%	1.24%
9	1.16%	1.16%
10	1.08%	1.08%
11	1.00%	1.00%
12	0.92%	0.92%
13	0.84%	0.84%
14 – 24	0.75%	0.75%
25 – 26	---	0.75%
27 and up	---	---

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

7. Retirement Rates for Active Employees

Rates of Active Employees		
Years of Service	Rate (%)	
	Tier 1	Tier 2
25	10.00%	---
26	10.00	---
27	10.00	10.00%
28	10.00	10.00
29	20.00	20.00
30	27.50	27.50
31	35.00	35.00
32	35.00	35.00
33	35.00	35.00
34	35.00	35.00
35 years, or age 65 if earlier	100.00	100.00

8. Retirement Age for Inactive Vested Members

50

9. Unknown Data for Members

Same as those exhibited by members with similar known characteristics

10. Percent Married

80% of active male participants and 50% for active female participants

11. Age of Spouse

Males three-years older than females

12. Eligible Children

None

13. Administrative Expenses

0.45% of payroll is added to the normal cost of the system for expected administrative expenses.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

14. Salary Increase

Total Wage Growth: 3.00%, including inflation at 2.50%. Total assumed salary increase including step and promotional increases are based upon years of service and shown in the table below.

Service	Rate
0	8.00%
1	7.70%
2	7.40%
3	7.10%
4	6.80%
5	6.50%
6	6.20%
7	5.90%
8	5.60%
9	5.30%
10	5.00%
11	4.85%
12	4.70%
13	4.55%
14	4.40%
15	4.25%
16	4.10%
17	3.95%
18	3.80%
19	3.65%
20 to 24	3.50%
25 and up	3.00%

15. Cost-of-Living Adjustments for Tier 2 Members

For purposes of valuing future Cost-of-Living Adjustments for Tier 2 members, it is assumed that the percentage increase in the Consumer Price Index will equal or exceed 2.5% and that the funded ratio will equal or exceed 80% at the time that such adjustments would be applied.

16. Interest on Employee Contributions

3.00% per year, compounded annually

17. Change in Assumptions

None

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Rationale for Assumptions

1. Economic Assumptions

The investment return assumption of 7.25% was selected based upon an analysis that included (a) capital market assumptions provided by the investment consultant, (b) the asset allocation of the fund, and (c) investment return assumptions of other public retirement systems.

The inflation assumption of 2.5% was selected based upon an analysis that included (a) input from the investment consultant, (b) historical inflation as measured by the Consumer Price Index, and (c) implied inflation in long-term government bonds.

The long-term wage growth assumption of 3.0% was based upon the inflation assumption of 2.5% plus a real wage growth assumption of 0.5% that was derived from an analysis of historical increases in Social Security Average earnings.

2. Demographic Assumptions

The demographic assumptions are based upon the most recent experience study covering the period 2011-2016.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

C. Actuarial Methods

1. Funding Method

Entry Age Normal Actuarial Cost Method: Entry age is the age at the time the participant commenced employment. Normal cost and actuarial liability are calculated on an individual basis and are allocated by salary, with normal cost determined as if the current benefit accrual rate had always been in effect.

2. Actuarial Value of Assets

A preliminary actuarial value of assets is calculated as the sum of the beginning of the year actuarial value of assets, the net new money, and the expected return on an actuarial basis. The gains and losses over the last four years are recognized over the next five-year period. The gain or loss of each year is the excess of market value of assets over the preliminary value of assets, minus the sum of the unrecognized gains and losses from each of the four years. Finally, an adjustment is made so that the final actuarial value of assets is at least 80% but no more than 120% of the market value.

3. Amortization of Unfunded Actuarial Liability/(Surplus)

i. Board Funding Policy: 30-year layered amortization method – level percent of pay. Under the layered approach, the May 1, 2008 unfunded actuarial liability is written down over a 30-year period and all future changes to the unfunded actuarial liability establish new 30-year amortization periods. Payroll is expected to increase 3.0% per year.

ii. City Contribution Policy: Under the Ordinance, the City's contribution will be based on a closed 30-year amortization period from May 1, 2014, level percent of pay. Payroll is expected to increase 3.0% per year.

iii. Contribution rate changes as a result of revised assumptions adopted as of May 1, 2017 are phased-in over five years.

4. Changes in Methods

None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Plan Year

May 1 through April 30.

2. Membership

Tier 1: All Firefighters hired prior to April 20, 2014 become members as a condition of employment.

Tier 2: All Firefighters hired on or after April 20, 2014 become members as a condition of employment.

Membership begins on the first day of employment.

3. Creditable Service

Total creditable service is defined as the sum of the service as a Firefighter after becoming a member after July 1, 1953, plus any service earned prior to July 1, 1953, if continuous.

4. Contributions

Pension System:	Members contributed 9.55% of base salary prior to April 20, 2014. Effective April 20, 2014, the member contribution rate increased to 10.55%. For the year beginning May 1, 2018, the City is contributing 30.62% of payroll, which is the actuarially determined Board contribution rate for the prior year. Future City contributions will be determined through the City's budgeting process.
Interest on Employee Contributions:	Determined by the Board of Trustees, not to exceed 3.00%, compounded annually.
Health Insurance Subsidy:	Effective January 1, 2001, the City contribution is 2% of base salary and the employee contribution is 1% of base salary. Contributions and benefits for the Health Insurance Subsidy are separately accounted for under the Plan. The assets, liabilities, contributions, and benefits of the Health Insurance Subsidy are excluded from this valuation.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

5. Voluntary Retirement

Eligibility requirements:	Tier 1: 25 years of service. Tier 2: 27 years of service
Amount:	The base pension is 2.5% of average final compensation per year of creditable service to a maximum of 80%. Average final compensation is defined as the average of the two highest years of base compensation in the last 10 years. The minimum retirement benefit is $600 per month.

6. Duty Disability Benefit

Age Requirement:	None
Service Requirement:	None
Amount:	The pension is 62.5% of average final compensation at disability with a minimum 62.5% of the current maximum salary payable to the rank of a firefighter. The current maximum monthly salary as of May 1, 2018 is $6,336.

7. Non-duty Disability

Age Requirement:	Less than 65
Service Requirement:	10 years of service
Amount:	The pension is 25% of the average final compensation plus 2.5% of average final compensation per year of creditable service in excess of 10 years, not to exceed 80% of average final compensation, with a minimum of $600 per month.

8. Vesting

Age Requirement:	None
Service Requirement:	10 years of service

Amount:	2.5% of average final compensation per year of creditable service, not to exceed 62.5% of average final compensation, payable at age 50. If the employee dies in a deferred status, before age 50, the beneficiary receives a lump-sum equal to member contributions with interest. If such death occurs after age 50, the widow and children receive the same benefits as for pre-retirement non-duty death, but reduced by the ratio of the member's service to 25 years if in Tier 1, and 27 years if in Tier 2.

9. Withdrawal (Refund) Benefits

Age Requirement:	None
Service Requirement:	Less than 10 years of creditable service
Amount:	If an employee terminates before becoming eligible for a deferred pension, he or she receives a return of member contributions with interest. This benefit is reduced by a service charge of 10%, 8%, 6%, 4% or 2% if employee withdraws with less than one year, two years, three years, four years, or five years of employment respectively.

10. Pre-Retirement Duty Death Benefits

Age Requirement:	None
Service Requirement:	None
Funeral Benefit	A lump-sum payment of $2,000
Surviving Spouse Benefit:	100% of the accrued pension is paid with a minimum of 62.5% of the member's average final compensation. The minimum benefit payable is 62.5% of the maximum salary payable to the rank of a firefighter. The current maximum monthly salary as of May 1, 2018 is $6,336. The surviving spouse's benefit for spouses of active firefighters eligible for a service pension is 100% of the regular pension reduced for the election of optional 100% joint and survivor coverage. The minimum benefit is $275 per month.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Child's Benefit:	If there is no surviving spouse or the spouse dies or remarries, the spouse's benefit is divided equally to the children and paid until age 18 (or 21 if a student). If a surviving spouse exists, $100 per month is paid until age 18 (or age 21 if a student).
Return of Contribution:	A return of accumulated contributions and interest is guaranteed. If there is no surviving spouse or dependent children the accumulated contributions and interest or the unpaid balance thereof shall be paid to the Estate or to a named beneficiary.

11. Pre-Retirement Non-duty Death Benefits

Age Requirement:	None
Service Requirement:	None
Funeral Benefit:	A lump-sum payment of $2,000
Surviving Spouse Benefit:	50% of the accrued pension is paid with a minimum of 25% of average final compensation payable for the life of the surviving spouse. The surviving spouse's benefit for active firefighters eligible for a voluntary pension is 100% of the regular pension, reduced for the election of optional 100% joint and survivor coverage. The minimum benefit is $275 per month.
Child's Benefit:	If no surviving spouse or the spouse dies, the spouse's benefit is divided equally to the children and paid until age 18 (or 21 if a student). If a surviving spouse exists, $100 per month is paid until age 18 (or 21 if a student).
Return of Contributions:	A return of accumulated contributions and interest is guaranteed. If there is no surviving spouse or dependent children the accumulated contributions and interest or the unpaid balance thereof shall be paid to the Estate or to a named beneficiary.

12. Post-Retirement Death Benefit

Age Requirement:	None
Service Requirement:	None
Amount:	If married to the same person at retirement and death, pension benefits are paid in the form of a Joint and 50% Survivor annuity

or in any other available optional form elected by the member and spouse in an actuarially equivalent amount, not less than 25% of the retiree's final average compensation per month. The minimum benefit is $275. Payments equal to the amount of the member's accumulated contributions and interest are guaranteed. In addition, a lump-sum funeral benefit of $2,000 is paid.

13. Cost-of-Living Adjustment (COLA)

Tier 1: An increase of 3.00% of the original pension will be made annually. This does not apply to funeral benefits.

Tier 2: COLA will only be payable if the prior year's funding ratio is greater than or equal to 80% and will be equal to the percentage increase in the consumer price index, up to a maximum of 2.50%, payable at the 27th anniversary of date of hire.

Members must retire on or before January 1, in order to receive a COLA in the next year.

14. Changes since Last Valuation

None

APPENDIX D – GLOSSARY OF TERMS

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

2. Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

3. Actuarial Gain/(Loss)

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

4. Actuarial Liability

The portion of the Actuarial Present Value of Projected Benefits which will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe $100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you will not be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is:

Amount		Probability of Payment		1/(1+Investment Return)		
$100	x	(1 - .01)	x	1/(1+.1)	=	$90

6. Actuarial Valuation

The determination, as of a specified date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

APPENDIX D – GLOSSARY OF TERMS

7. Actuarial Value of Assets

The value of cash, investments, and other property belonging to a pension plan as used by the actuary for the purpose of an Actuarial Valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

8. Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

11. Funded Percentage

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

12. Investment Return Assumption

The assumed interest rate used for projecting dollar related values in the future.

13. Mortality Table

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

14. Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

APPENDIX D – GLOSSARY OF TERMS

15. Projected Benefits

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and increases in future compensation and service credits.

16. Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets.