



# **City of Kansas City, Missouri Firefighters' Pension System**

**Actuarial Valuation  
as of May 1, 2017**

**Produced by Cheiron**

**September 2017**

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September 11, 2017

Board of Pension Trustees  
City of Kansas City, Missouri Firefighters' Pension System  
12<sup>th</sup> Floor, City Hall  
414 East 12<sup>th</sup> Street  
Kansas City, MO 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, 2017. 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.

Board of Pension Trustees

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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 McElhaney, FSA, FCA, EA, MAAA  
Principal Consulting Actuary



Jacqueline King, ASA, EA, MAAA  
Associate Actuary

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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 2019, 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, 2017 valuation represents Cheiron's eleventh valuation performed for KCFPS. Effective with this valuation, the actuarial assumptions have been revised based on the results of the experience study conducted for the period from May 1, 2011 to April 30, 2016. The contribution rate changes as a result of the revised assumptions will be phased-in over five years. 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, 2017 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 30.05% as of May 1, 2016 to 36.72% as of May 1, 2017 if the full effect of the revised actuarial assumptions had been recognized. Under the prior actuarial assumptions, the rate would have been 29.09%. Therefore, due to the five-year phase-in of the new assumptions, the actuarially determined employer contribution rate has been calculated at 30.62% as of May 1, 2017, which is 20% between the rate under the revised assumptions and the prior assumptions. The actual rate that the City is scheduled to contribute for the current year is 30.05% of payroll, which is the actuarially determined Board contribution rate for the prior year, for the period from May 1, 2017 to April 30, 2018.
  - Under the City ordinance, the City's budgeted contribution rate for the year beginning May 1, 2018 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 29.21%, which also reflects the five-year phase-in of the revised actuarial assumptions.

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- The FPS's unfunded actuarial liability increased from \$135 million on May 1, 2016 to \$214 million on May 1, 2017.
- The FPS's funding ratio, the ratio of assets over liabilities, decreased from 78.3% as of May 1, 2016 to 70.5% as of May 1, 2017.
- The primary factor in the decrease in the System's funded status was an overall actuarial loss of \$78.6 million.
  - During the year ended April 30, 2017, the System's assets returned 12.89% on a market value basis. The return on the actuarial asset value (i.e. incorporating asset smoothing) was 7.71% (as compared to 7.50% assumed). This resulted in an actuarial gain on investments of \$1.0 million. In addition, the system experienced a gain of \$0.3 million due to the difference between actual and recommended contributions as a result of payroll and timing differences.
  - On the liability side, the System experienced an actuarial loss of \$8.3 million.
  - The change in actuarial assumptions resulted in an increase in the actuarial liability of \$71.6 million.
- As of May 1, 2017 the actuarial value of assets exceeded the market value by \$5.3 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.

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**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, 2016	May 1, 2017	% Change
<b><u>Participant Counts</u></b>			
Active Participants	922	978	6.1%
Non-duty Disabled Participants *	15	11	(26.7%)
Duty Disabled Participants *	78	94	20.5%
Retirees and Beneficiaries *	833	817	(1.9%)
Terminated Vested Participants	3	4	33.3%
Inactive Participants	9	6	(33.3%)
<b>Total</b>	<b>1,860</b>	<b>1,910</b>	<b>2.7%</b>
Annual Salaries of Active Members	\$ 57,625,619	\$ 64,492,241	11.9%
Annual Retirement Allowances for Retired Members and Beneficiaries	\$ 35,569,326	\$ 36,699,007	3.2%
<b><u>Assets and Liabilities</u></b>			
Actuarial Liability (AL)	\$ 624,244,469	\$ 726,537,707	16.4%
Actuarial Value of Assets	488,878,575	512,040,758	4.7%
Unfunded Actuarial Liability (UAL)	\$ 135,365,894	\$ 214,496,949	58.5%
Funded Ratio (AVA)	78.3%	70.5%	
Funded Ratio (MVA)	74.0%	69.7%	
Present Value of Accrued Benefits (PVAB)	\$ 585,983,881	\$ 664,482,490	13.4%
Market Value of Assets	462,024,002	506,697,663	9.7%
Unfunded PVAB	\$ 123,959,879	\$ 157,784,827	27.3%
Accrued Benefit Funding Ratio	78.8%	76.3%	
<b><u>Contributions as a Percentage of Payroll under Board's Funding Policy</u></b>			
	<b>Fiscal Year 2018</b>	<b>Fiscal Year 2019 **</b>	
Normal Cost Contribution	13.74%	13.69%	
Administrative Expense Rate	0.35%	0.37%	
Unfunded Actuarial Liability Contribution	<u>15.96%</u>	<u>16.56%</u>	
Total Contribution	30.05%	30.62%	
Actuarially Determined Contribution (GASB)	\$17,316,499	\$19,747,524	14.0%

\* Disabled participants that were eligible for normal retirement at the time of their disability are valued as Retirees. The number of such participants was 255 at May 1, 2016 and 271 at May 1, 2017.

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

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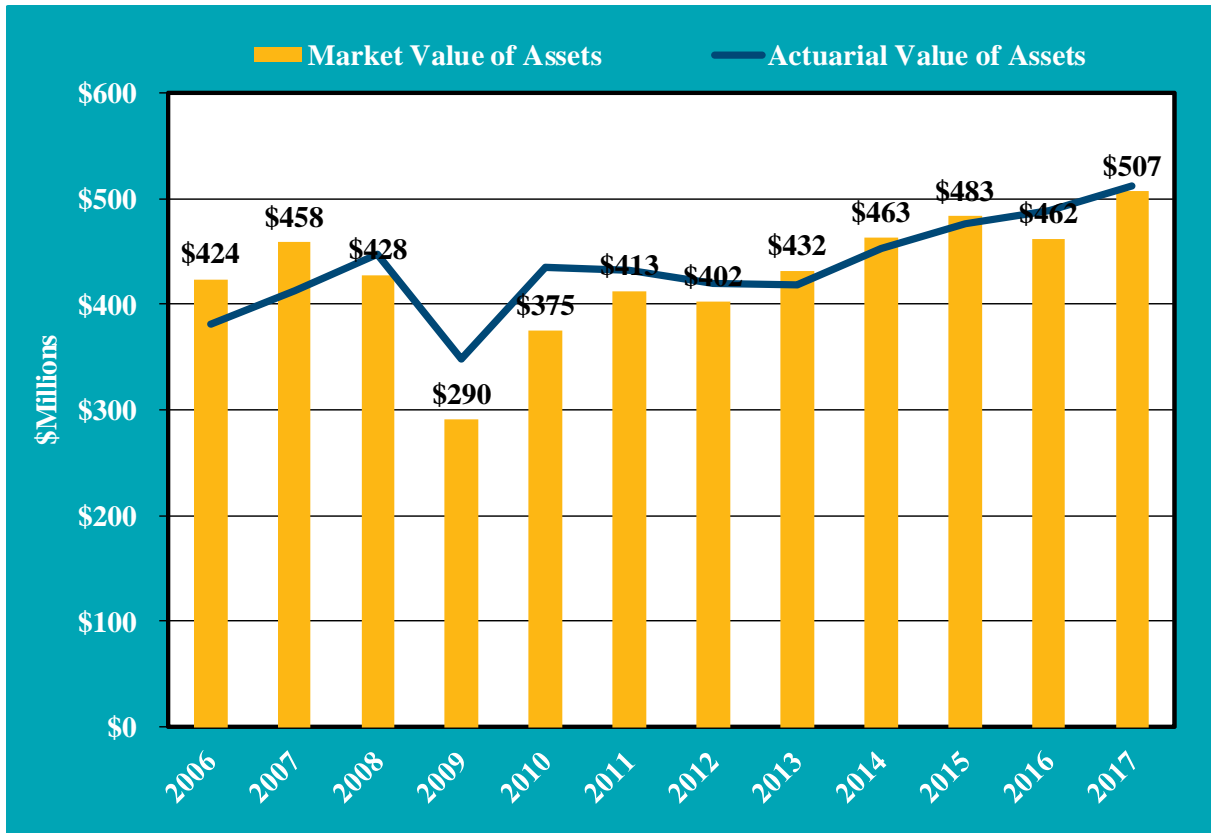
SECTION I – BOARD SUMMARY

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 12.89% in 2017 compared to an assumed rate of 7.50%. 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.



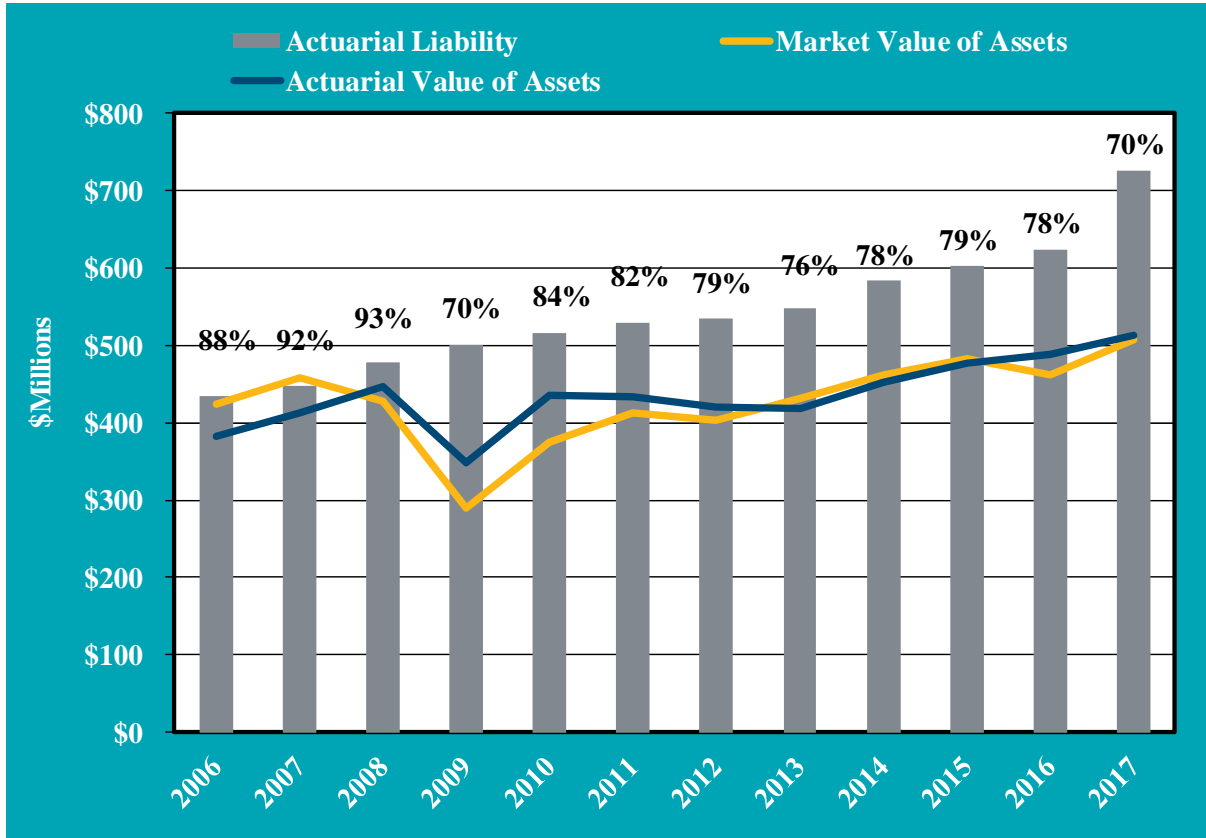


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**SECTION I – BOARD SUMMARY**

**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 the System's funding ratio decreased over the past year to 70%, mostly due to the changes to actuarial assumptions.



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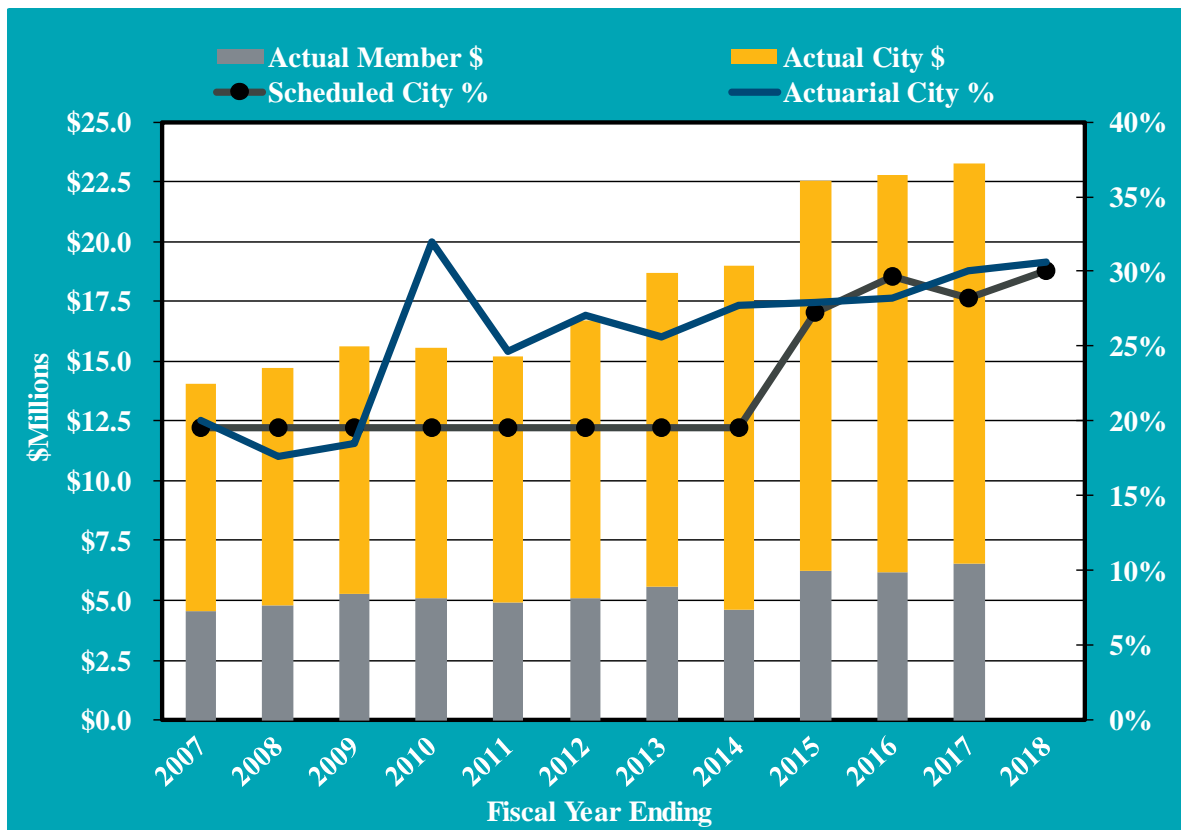
**SECTION I – BOARD SUMMARY**

**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 2007. 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. For Fiscal Years Ending 2015 and later, the scheduled City contribution rate is the actuarial contribution rate, determined under the City's funding policy, in the prior year's actuarial valuation. The actuarial contribution rate under the Board's funding policy increased from 30.05% of payroll in 2016 to 30.62% of payroll in 2017 reflecting actuarial liability losses and the phase-in of changes in actuarial assumptions. For the Fiscal Year Ending 2018, the City is contributing 30.05% of payroll which is the actuarial contribution rate determined for the Fiscal Year Ending 2017.

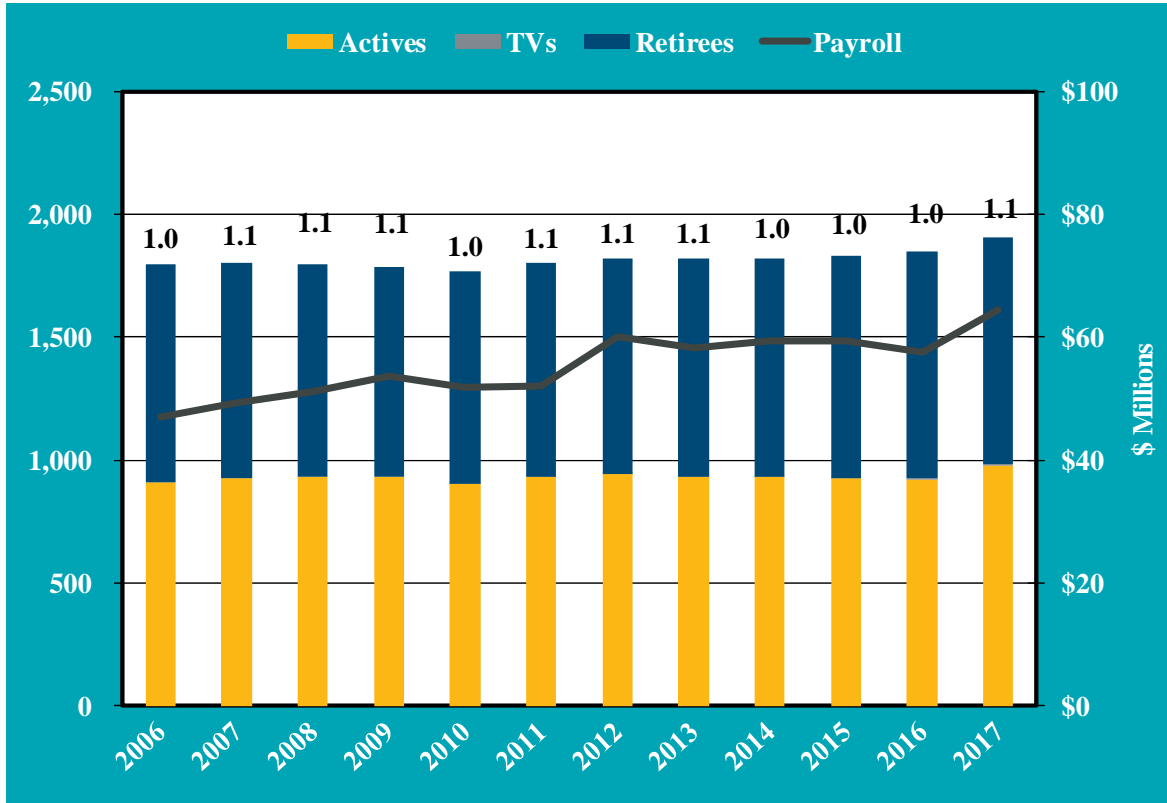


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**SECTION I – BOARD SUMMARY**

**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.



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**SECTION I – BOARD SUMMARY**

**D. Future Expected Financial Trends**

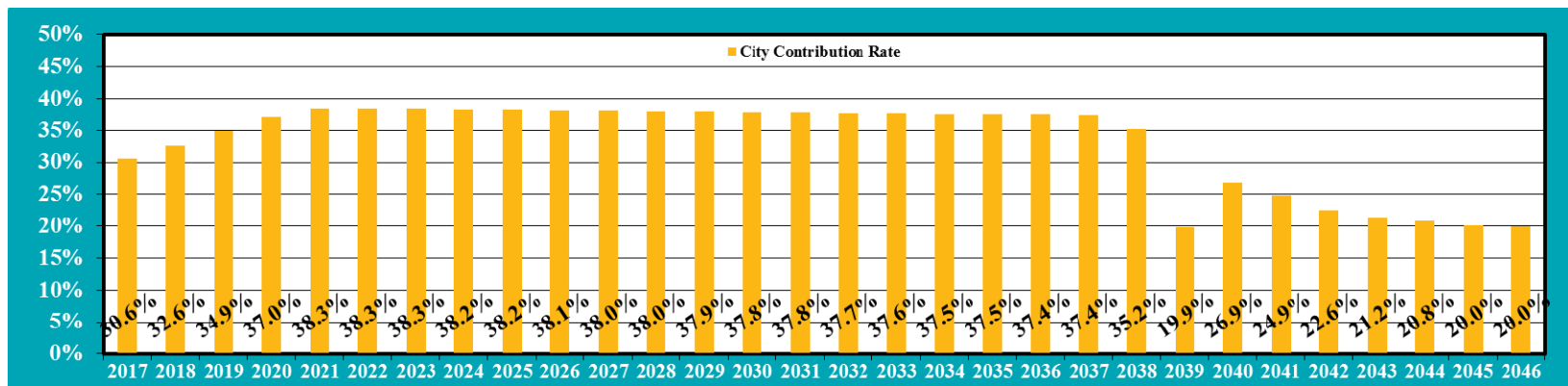
The analysis of projected financial trends is perhaps the most important component of this valuation. In this Section, we present the implications of the May 1, 2017 valuation results in terms of (1) the projected City’s contributions and (2) projected System’s funded status (ratio of assets over liabilities). 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 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 four 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.

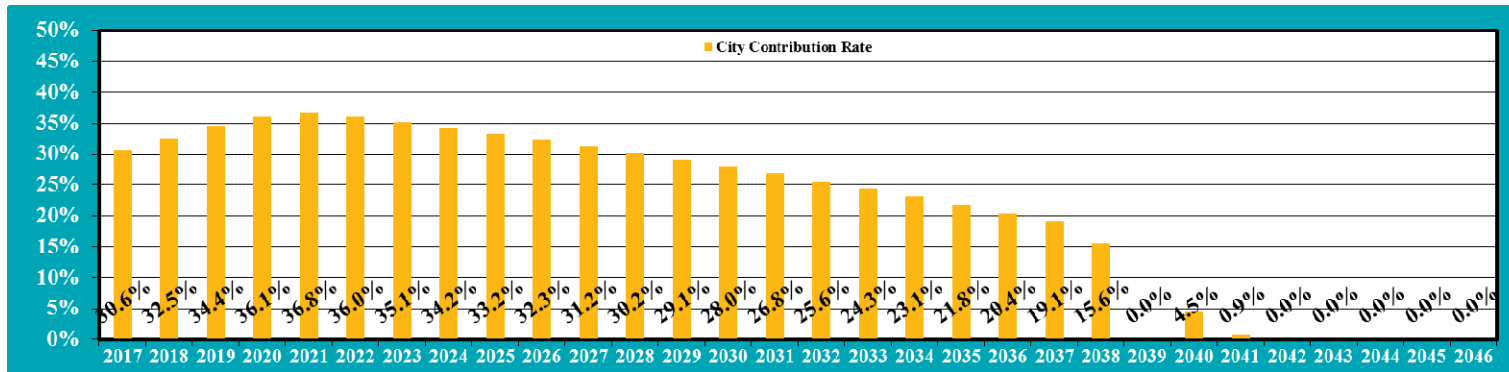


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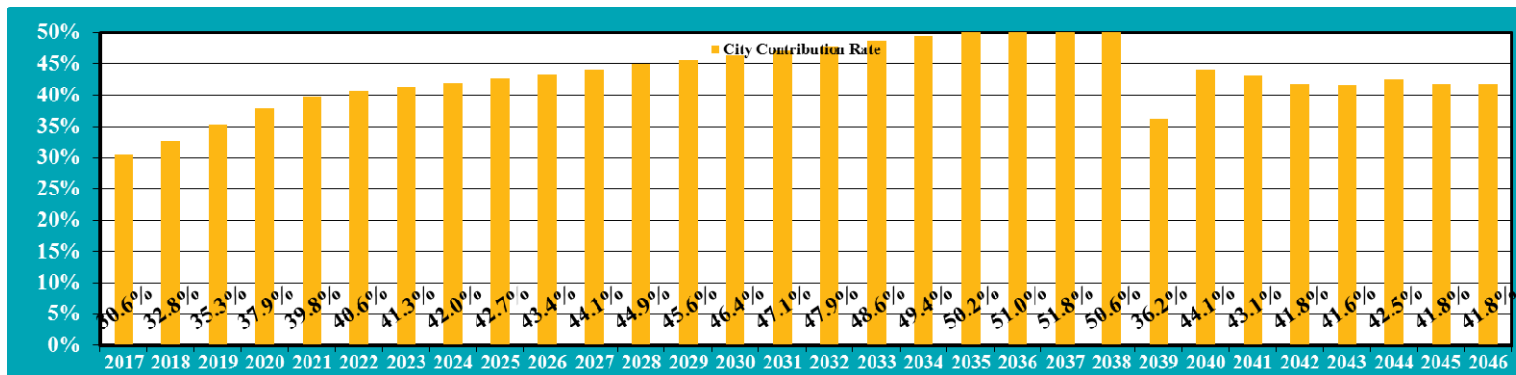
**Optimistic Returns of 8.75%**

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.



**Optimistic 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%.



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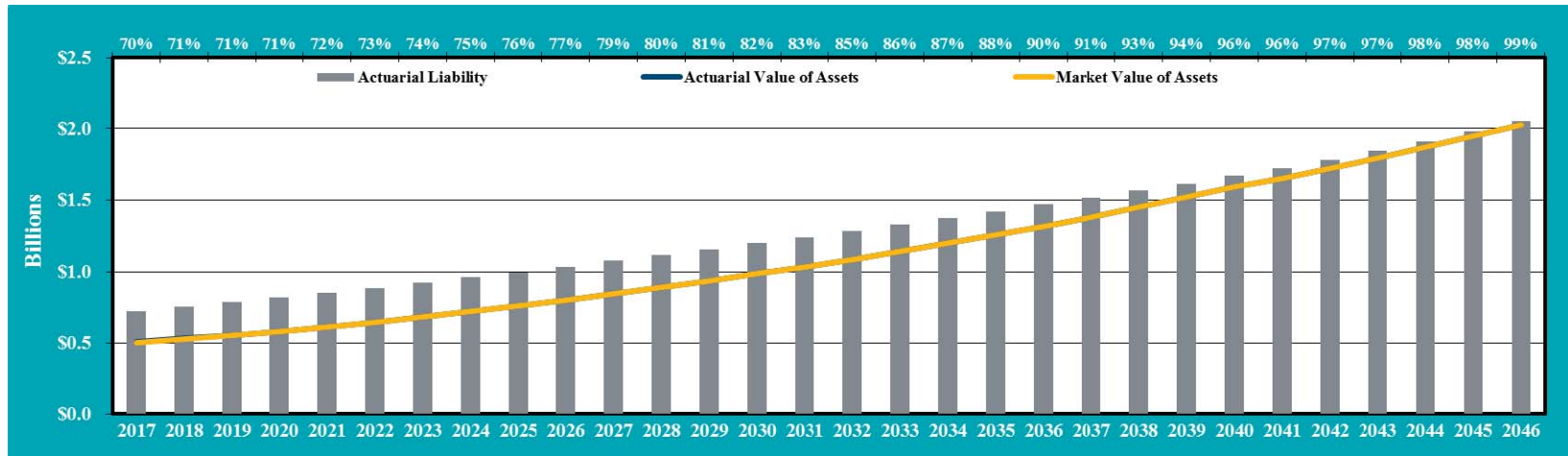
**SECTION I – BOARD SUMMARY**

**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 99% over the next 30 years.

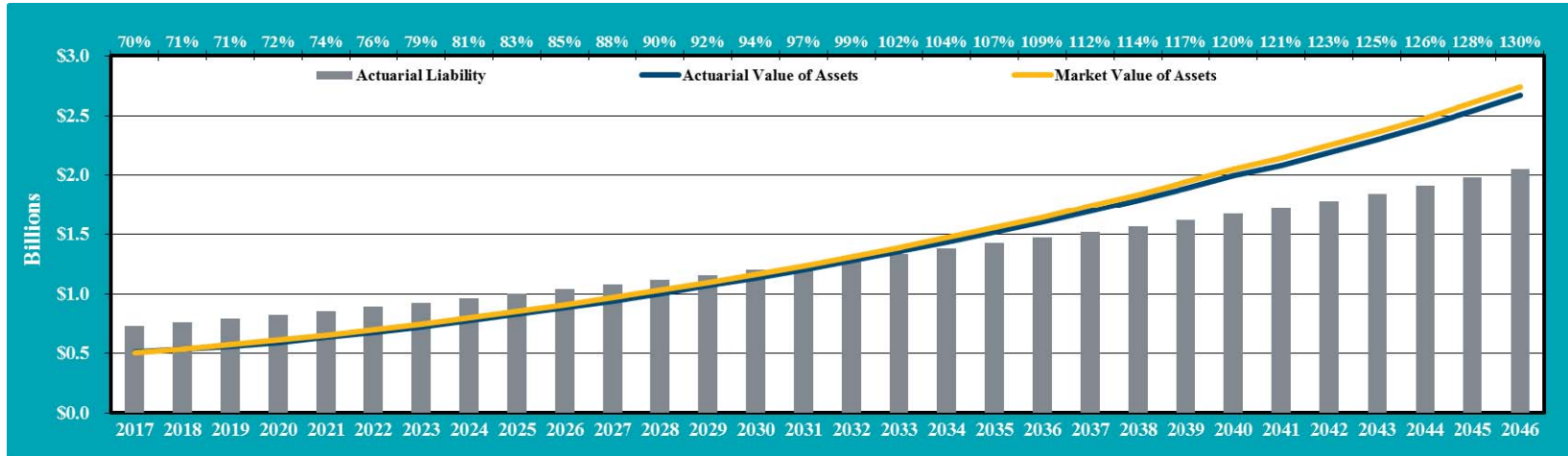


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**SECTION I – BOARD SUMMARY**

**Optimistic Returns of 8.75%**

If the fund earns 1.50% greater than the assumed rate of return, the funded ratio will increase to 130% over the next 30 years.

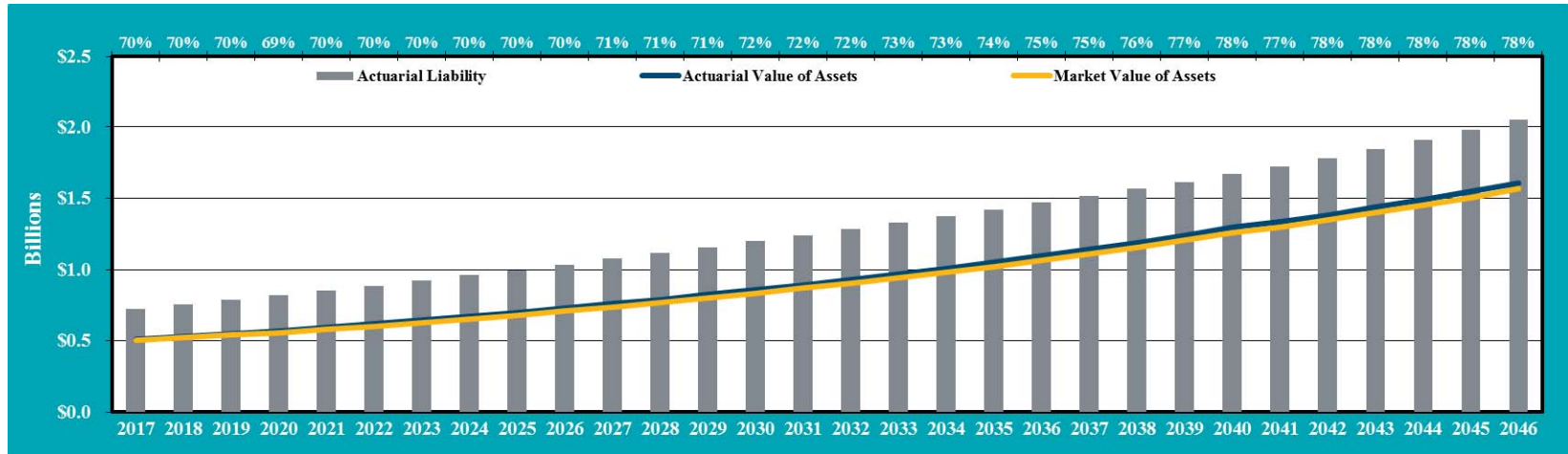


**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
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**SECTION I – BOARD SUMMARY**

**Pessimistic Returns of 5.75%**

If the fund earns 1.50% less than the assumed rate of return, the funded ratio will decrease gradually and then increase to 78% over the next 30 years as contributions are increased in response to the lower asset returns.



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

The chart on the following page 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.



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City of Kansas City, Missouri Firefighters' Pension System Projection Based on April 30, 2016 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)	
2017	30.05%	10.55%	\$ 64,492	\$ 19,380	\$ 726,538	\$ 512,041	\$ 214,497	15.15%	13.69%	0.37%	29.21%	\$ 18,837	70.5%	
2018	29.20%	10.55%	\$ 66,427	\$ 19,397	\$ 756,635	\$ 534,578	\$ 222,058	16.96%	13.94%	0.39%	31.30%	\$ 20,789	70.7%	
2019	31.30%	10.55%	\$ 68,420	\$ 21,415	\$ 787,975	\$ 554,915	\$ 233,059	19.12%	14.19%	0.41%	33.72%	\$ 23,074	70.4%	
2020	33.72%	10.55%	\$ 70,472	\$ 23,763	\$ 820,318	\$ 577,721	\$ 242,598	21.17%	14.44%	0.43%	36.03%	\$ 25,395	70.4%	
2021	36.03%	10.55%	\$ 72,587	\$ 26,153	\$ 853,699	\$ 611,883	\$ 241,817	22.29%	14.68%	0.45%	37.42%	\$ 27,162	71.7%	
2022	37.42%	10.55%	\$ 74,764	\$ 27,977	\$ 888,071	\$ 644,430	\$ 243,641	22.40%	14.63%	0.45%	37.48%	\$ 28,025	72.6%	
2023	37.48%	10.55%	\$ 77,007	\$ 28,862	\$ 923,516	\$ 679,507	\$ 244,009	22.43%	14.58%	0.45%	37.46%	\$ 28,846	73.6%	
2024	37.46%	10.55%	\$ 79,317	\$ 29,712	\$ 959,984	\$ 716,188	\$ 243,796	22.45%	14.52%	0.45%	37.42%	\$ 29,683	74.6%	
2025	37.42%	10.55%	\$ 81,697	\$ 30,571	\$ 997,416	\$ 754,415	\$ 243,001	22.47%	14.47%	0.45%	37.38%	\$ 30,541	75.6%	
2026	37.38%	10.55%	\$ 84,148	\$ 31,454	\$ 1,035,787	\$ 794,209	\$ 241,578	22.49%	14.41%	0.45%	37.34%	\$ 31,424	76.7%	
2027	37.34%	10.55%	\$ 86,672	\$ 32,363	\$ 1,075,272	\$ 835,808	\$ 239,463	22.51%	14.35%	0.45%	37.31%	\$ 32,338	77.7%	
2028	37.31%	10.55%	\$ 89,272	\$ 33,308	\$ 1,115,827	\$ 879,234	\$ 236,592	22.53%	14.29%	0.45%	37.27%	\$ 33,275	78.8%	
2029	37.27%	10.55%	\$ 91,951	\$ 34,270	\$ 1,157,250	\$ 924,371	\$ 232,879	22.56%	14.22%	0.45%	37.23%	\$ 34,235	79.9%	
2030	37.23%	10.55%	\$ 94,709	\$ 35,260	\$ 1,199,482	\$ 971,236	\$ 228,246	22.58%	14.16%	0.45%	37.19%	\$ 35,223	81.0%	
2031	37.19%	10.55%	\$ 97,550	\$ 36,279	\$ 1,242,505	\$ 1,019,898	\$ 222,607	22.61%	14.09%	0.45%	37.15%	\$ 36,240	82.1%	
2032	37.15%	10.55%	\$ 100,477	\$ 37,327	\$ 1,286,294	\$ 1,070,427	\$ 215,866	22.63%	14.03%	0.45%	37.11%	\$ 37,288	83.2%	
2033	37.11%	10.55%	\$ 103,491	\$ 38,406	\$ 1,330,925	\$ 1,123,002	\$ 207,924	22.66%	13.96%	0.45%	37.08%	\$ 38,371	84.4%	
2034	37.08%	10.55%	\$ 106,596	\$ 39,526	\$ 1,376,105	\$ 1,177,434	\$ 198,671	22.70%	13.89%	0.45%	37.04%	\$ 39,483	85.6%	
2035	37.04%	10.55%	\$ 109,794	\$ 40,668	\$ 1,421,874	\$ 1,233,900	\$ 187,974	22.73%	13.83%	0.45%	37.01%	\$ 40,632	86.8%	
2036	37.01%	10.55%	\$ 113,088	\$ 41,854	\$ 1,468,515	\$ 1,292,796	\$ 175,719	22.77%	13.77%	0.45%	36.99%	\$ 41,829	88.0%	
2037	36.99%	10.55%	\$ 116,480	\$ 43,086	\$ 1,516,270	\$ 1,354,506	\$ 161,764	22.82%	13.71%	0.45%	36.98%	\$ 43,074	89.3%	
2038	36.98%	10.55%	\$ 119,975	\$ 44,367	\$ 1,565,381	\$ 1,419,427	\$ 145,954	22.87%	13.66%	0.45%	36.98%	\$ 44,371	90.7%	
2039	36.98%	10.55%	\$ 123,574	\$ 45,698	\$ 1,616,302	\$ 1,488,180	\$ 128,122	22.94%	13.62%	0.45%	37.01%	\$ 45,732	92.1%	
2040	37.01%	10.55%	\$ 127,281	\$ 47,107	\$ 1,669,321	\$ 1,561,234	\$ 108,086	23.03%	13.58%	0.45%	37.06%	\$ 47,166	93.5%	
2041	37.06%	10.55%	\$ 131,099	\$ 48,585	\$ 1,724,841	\$ 1,639,216	\$ 85,625	23.16%	13.54%	0.45%	37.15%	\$ 48,698	95.0%	
2042	37.15%	10.55%	\$ 135,032	\$ 50,165	\$ 1,783,495	\$ 1,722,985	\$ 60,509	23.36%	13.51%	0.45%	37.32%	\$ 50,397	96.6%	
2043	37.32%	10.55%	\$ 139,083	\$ 51,906	\$ 1,845,391	\$ 1,812,925	\$ 32,466	23.86%	13.48%	0.45%	37.79%	\$ 52,557	98.2%	
2044	37.79%	10.55%	\$ 143,256	\$ 54,136	\$ 1,910,940	\$ 1,909,810	\$ 1,130	0.81%	13.46%	0.45%	14.71%	\$ 21,077	99.9%	
2045	14.71%	10.55%	\$ 147,554	\$ 21,705	\$ 1,980,040	\$ 2,014,260	\$ (34,220)	-23.70%	13.44%	0.45%	0.00%	\$ -	101.7%	
2046	0.00%	10.55%	\$ 151,980	\$ -	\$ 2,053,054	\$ 2,091,010	\$ (37,957)	-25.53%	13.42%	0.45%	0.00%	\$ -	101.8%	
2047	0.00%	10.55%	\$ 156,540	\$ -	\$ 2,130,250	\$ 2,149,122	\$ (18,872)	-12.32%	13.41%	0.45%	1.54%	\$ 2,413	100.9%	

Projections assume a constant population and no actuarial gains and losses



**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2016 and April 30, 2017,
- 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, 2016 and April 30, 2017.

<b>Table II-1</b>			
<b>Statement of Assets at Market Value as of April 30,</b>			
<b>Assets</b>	<b>2016</b>	<b>2017</b>	<b>% Change</b>
Cash	\$ 17,451,659	\$ 13,771,821	(21.1%)
Stock and Collective Trusts	447,466,038	496,346,987	10.9%
Accounts Receivable	921,993	1,202,065	30.4%
Interest and Dividends Receivable	33,271	39,165	17.7%
Contributions Receivable	943,790	1,001,481	6.1%
Expenses Payable	(772,700)	(920,389)	19.1%
Purchase of Investments	(1,017,655)	(1,206,479)	18.6%
Health Assets	(3,002,394)	(3,536,988)	17.8%
<b>Market Value of Assets</b>	<b>\$ 462,024,002</b>	<b>\$ 506,697,663</b>	<b>9.7%</b>

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2016 and April 30, 2017.

<b>Table II-2 Changes in Market Values</b>	
<b>Value of Assets – April 30, 2016</b>	<b>\$ 462,024,002</b>
<b><u>Additions</u></b>	
Member Contributions	\$ 6,534,349
Employer Contributions	16,754,798
Interest and Dividends	3,121,179
Investment Return	57,877,363
<b>Total Additions</b>	<b>\$ 84,287,689</b>
<b><u>Deductions</u></b>	
Benefit Payments	\$ (36,922,344)
Investment Expenses	(2,346,624)
Administrative Expenses	(345,060)
<b>Total Deductions</b>	<b>\$ (39,614,028)</b>
<b>Value of Assets – April 30, 2017</b>	<b>\$ 506,697,663</b>

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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.

<b>Table II-3 Development of Actuarial Value of Assets</b>			
<b>1. Actuarial Value of Assets at May 1, 2016</b>			<b>\$ 488,878,575</b>
2. Employer and Employee Contributions			23,289,147
3. Benefit Payments and Administrative Expenses			(37,267,404)
4. Net Cash Flow (2+3)			<u>\$ (13,978,257)</u>
5. Expected Value of investment return at 7.50%			36,151,185
6. Actual investment return on Market Value			<u>58,651,918</u>
7. Investment gain/(loss) for the year (6-5)			<u>\$ 22,500,733</u>
8. Investment gain/(loss) from current and prior years to be recognized in the plan year ending April 30, 2017			
	Total Gain/ (Loss)	Deferral Percentage	Deferred to Future Years
Plan Year End			
April 30, 2017	\$ 22,500,733	80%	\$ 18,000,586
April 30, 2016	(42,926,929)	60%	(25,756,157)
April 30, 2015	(801,169)	40%	(320,468)
April 30, 2014	13,664,721	20%	2,732,944
April 30, 2013	<u>12,508,914</u>	0%	<u>0</u>
Total	<u>\$ 4,946,270</u>		<u>\$ (5,343,095)</u>
9. Market Value of Assets for Year ending April 30, 2017			\$ 506,697,663
10. Preliminary Actuarial Value of Assets on May 1, 2017 (9 - 8 deferred)			512,040,758
11. 120% of MV, Upper Limit for Actuarial Value			\$ 608,037,196
12. 80% of MV, Lower Limit for Actuarial Value			405,358,130
<b>13. Actuarial Value of Assets on May 1, 2017</b>			<b>\$ 512,040,758</b>

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION II – ASSETS**

**Investment Performance**

The market value of assets (MVA) returned 12.89% during the plan year ending 2017, which is higher than the assumed 7.50% return. The actuarial value of assets (AVA) returned 7.71% during the plan year ending 2017. The assumed return for the plan year ending 2018 will be 7.25%.

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

<b>Table II-4 Historical Asset Returns</b>			
<b>Fiscal Year Ending April 30,</b>	<b>Return on Market Value</b>	<b>Return on Actuarial Value</b>	<b>Assumed Return</b>
2008	-4.50%	11.05%	7.75%
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%

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION II – ASSETS**

**Projection of Plan's Future Cash Flows**

<b>Table II-5 Projection of Plan's Expected Cash Flows (\$ thousands)</b>				
<b>Year Beginning May 1,</b>	<b>Benefits and Expenses</b>	<b>Expected Contributions*</b>	<b>Net Cash Flow</b>	
2017	\$ (38,434)	\$ 26,184	\$ (12,250)	
2018	(39,823)	27,341	(12,482)	
2019	(41,545)	29,551	(11,994)	
2020	(43,316)	32,016	(11,300)	
2021	(45,219)	34,515	(10,704)	
2022	(47,108)	36,522	(10,586)	
2023	(49,137)	37,641	(11,496)	
2024	(51,306)	38,731	(12,575)	
2025	(53,578)	39,844	(13,734)	
2026	(55,763)	40,980	(14,783)	

\* *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.*

CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017

**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, 2016 and May 1, 2017,
- 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**.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION III – LIABILITIES**

<b>Table III-1</b>		
<b>Liabilities Net (Surplus)/Unfunded</b>		
	<b>May 1, 2016</b>	<b>May 1, 2017</b>
<b><u>Present Value of Future Benefits</u></b>		
Active Participant Benefits	\$ 380,553,651	\$ 457,390,464
Retiree and Inactive Benefits	388,599,173	437,176,387
<b>Present Value of Future Benefits (PVB)</b>	<b>\$ 769,152,824</b>	<b>\$ 894,566,851</b>
<b><u>Actuarial Liability</u></b>		
Present Value of Future Benefits (PVB)	\$ 769,152,824	\$ 894,566,851
Present Value of Future Normal Costs (PVFNC)	144,908,355	168,029,144
<b>Actuarial Liability (AL = PVB – PVFNC)</b>	<b>624,244,469</b>	<b>726,537,707</b>
Actuarial Value of Assets (AVA)	488,878,575	512,040,758
<b>Net (Surplus)/Unfunded (AL – AVA)</b>	<b>\$ 135,365,894</b>	<b>\$ 214,496,949</b>
<b><u>Present Value of Accrued Benefits</u></b>		
Present Value of Future Benefits (PVB)	\$ 769,152,824	\$ 894,566,851
Present Value of Future Benefit Accruals (PVFBA)	183,168,943	230,084,361
<b>Present Value of Accrued Benefits (PVAB = PVB – PVFBA)</b>	<b>585,983,881</b>	<b>664,482,490</b>
Market Value of Assets (MVA)	462,024,002	506,697,663
<b>Net Unfunded/(Surplus)</b>	<b>\$ 123,959,879</b>	<b>\$ 157,784,827</b>



**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2016 and May 1, 2017.

<b>Table III-2</b>	
	<b>Actuarial Liability</b>
Liabilities May 1, 2016	\$ 624,244,469
Liabilities May 1, 2017	726,537,707
<b>Liability Increase/(Decrease)</b>	<b>102,293,238</b>
Change Due to:	
Plan Changes	0
Assumption Changes	71,577,266
Actuarial (Gain)/Loss	8,326,643
Benefits Accumulated and Other Sources	22,389,329

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2017	
Turnover	\$ 17,000
Retirement	1,832,000
Disability	1,806,000
Pre-retirement mortality	(935,000)
Post-retirement mortality	(42,000)
Salary increase more/(less) than expected for continuing actives	6,008,000
New entrants	945,000
Data Composition & Miscellaneous changes	<u>(1,304,000)</u>
<b>Total (Gain)/Loss</b>	<b>\$ 8,327,000</b>

Table III-4 Historical Liability (Gains)/Losses (\$ Millions)					
Change due to:	2013	2014	2015	2016	2017
Turnover	\$ 0.0	\$ 0.1	\$ (0.1)	\$ (1.4)	\$ 0.0
Retirement	0.8	0.1	2.1	2.8	\$ 1.8
Disability	(1.9)	(1.0)	(0.6)	0.6	\$ 1.8
Pre-retirement mortality	0.0	0.0	(0.4)	0.0	\$ (0.9)
Post-retirement mortality	(2.1)	2.6	1.7	3.7	\$ 0.0
Salary change	(6.3)	(5.4)	(5.4)	(7.7)	\$ 6.0
New entrants	0.2	0.2	0.2	0.2	\$ 0.9
Miscellaneous	<u>2.2</u>	<u>2.0</u>	<u>0.9</u>	<u>0.4</u>	<u>\$ (1.3)</u>
<b>Total (Gain)/Loss</b>	<b>\$ (7.1)</b>	<b>\$ (1.4)</b>	<b>\$ (1.6)</b>	<b>\$ (1.4)</b>	<b>\$ 8.3</b>

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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.

<b>Table IV-1</b>		
<b>Employer Contribution Rate</b>		
	<b>May 1, 2016</b>	<b>May 1, 2017*</b>
<b><u>Current Board Funding Policy</u></b>		
Entry Age Normal Cost Rate	13.74%	13.69%
Administrative Expense Rate	0.35%	0.37%
Amortization Payment	15.96%	16.56%
Actuarially Determined Contribution	30.05%	30.62%
<b><u>30-Year Closed Amortization Method</u></b>		
Entry Age Normal Cost Rate	13.74%	13.69%
Administrative Expense Rate	0.35%	0.37%
Amortization Payment	14.42%	15.15%
Actuarially Determined Contribution	28.51%	29.21%

*\* May 1, 2017 rates reflect the 5-year phase-in of the 2017 assumption changes*

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION IV – CONTRIBUTIONS**

Table IV-2 below presents the May 1, 2017 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, 2018 is 30.05% of payroll.

<b>Table IV -2 Development of Plan Contribution Rate as of May 1, 2017</b>		<b>As % of Payroll*</b>
1. Normal Cost (Monthly):		
a. Total Normal Cost		25.42%
b. Administrative Expense		0.45%
c. Expected Members Contribution		10.55%
d. Employer Paid Normal Cost (a) + (b) - (c)		15.32%
2. Amortization of Unfunded Liability		
a. Actuarial Liability	\$ 726,537,707	
b. Actuarial Value of Assets	512,040,758	
c. Unfunded Liability (a) - (b)	214,496,949	
d. Amortization of Unfunded Liability		21.40%
3. Actuarially Determined Employer Contribution Rate (1) + (2d)		36.72%
4. Actuarially Determined Employer Contribution Rate under prior assumptions		29.09%
5. Increase due to change in assumptions (3) - (4)		7.63%
6. Actuarially Determined Employer Contribution Rate after phase-in (3) - (80% x (5))		30.62%
7. Scheduled City Contributions (Prior Year's ADC)**		30.05%

\* Total payroll is \$64,492,241, and the Actuarially Determined Contribution for plan year ending April 30, 2019 is \$19,747,524 based on the total employer contribution rate.

\*\* Determined in the May 1, 2016 valuation.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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

<b>TABLE IV-3</b>							
<b>Unfunded Actuarial Liability Amortization Schedule</b>							
<b>Item</b>	<b>Date Created</b>	<b>Initial Years</b>	<b>Initial Balance</b>	<b>Remaining Years</b>	<b>Outstanding Balance</b>	<b>Amortization Payment</b>	<b>Amortization Factor</b>
Initial UAL	5/1/2008	30	\$ 31,525,386	21	\$ 33,481,503	\$ 2,369,896	14.128
(Gain)/Loss*	5/1/2009	30	119,805,172	22	127,294,571	8,750,936	14.546
(Gain)/Loss*	5/1/2010	30	(72,293,282)	23	(76,683,855)	(5,129,915)	14.948
(Gain)/Loss*	5/1/2011	30	14,027,641	24	14,826,229	966,860	15.334
(Gain)/Loss*	5/1/2012	30	50,231,264	25	52,808,554	3,362,498	15.705
Assumption Change	5/1/2012	30	(32,090,739)	25	(33,737,266)	(2,148,165)	15.705
(Gain)/Loss*	5/1/2013	30	13,322,268	26	13,909,225	866,014	16.061
(Gain)/Loss*	5/1/2014	30	(15,478,970)	27	(16,026,199)	(977,019)	16.403
Assumption Change	5/1/2014	30	16,120,179	27	16,690,075	1,017,492	16.403
Plan Amendment	5/1/2014	30	212,181	27	219,683	13,393	16.403
(Gain)/Loss*	5/1/2015	30	(4,602,806)	28	(4,715,870)	(281,855)	16.732
(Gain)/Loss*	5/1/2016	30	7,691,151	29	7,789,123	456,922	17.047
(Gain)/Loss*	5/1/2017	30	7,063,910	30	7,063,910	407,146	17.350
Assumption Change**	5/1/2017	30	71,577,266	30	71,577,266	4,125,535	17.350
<b>Total</b>			<b>\$ 207,110,621</b>		<b>\$ 214,496,949</b>	<b>\$ 13,799,737</b>	

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

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

Under the City ordinance, amortization payments are calculated using a 30-year closed amortization method. The amortization payment as of May 1, 2017 is shown in the table below.

<b>TABLE IV-4</b>			
<b>Unfunded Actuarial Liability Amortization Schedule</b>			
<b>UAL</b>	<b>Remaining Years *</b>	<b>Amortization Payment **</b>	<b>Amortization Factor</b>
\$214,496,949	27	\$13,076,567	16.403

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

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

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2017
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 24.6 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.



**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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									
<i>Gain (or Loss) for Year ending April 30,</i>									
<i>(expressed in thousands)</i>									
Type of Activity	2009	2010	2011	2012	2013	2014	2015	2016	2017
Investment Income *	\$ (121,621)	\$ 64,430	\$ (25,060)	\$ (33,605)	\$ (20,446)	\$ 14,074	\$ 3,033	\$ (9,103)	\$ 1,263
Combined Liability Experience	1,816	7,863	11,032	(16,627)	7,124	1,405	1,570	1,412	(8,327)
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)
Non-Recurring Gain/(or Loss) Items	0	0	0	32,091	0	(16,332)	0	0	(71,577)
Composite Gain/(or Loss) during Year	\$ (119,805)	\$ 72,293	\$ (14,028)	\$ (18,141)	\$ (13,322)	\$ (853)	\$ 4,603	\$ (7,691)	\$ (78,641)

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

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION V – FINANCIAL STATEMENT INFORMATION**

Table V-3 Solvency Test Aggregate Actuarial Liabilities for <i>(expressed in thousands)</i>							
Valuation Date May 1,	Active		Active Member Employer Financed Contributions	Actuarial Value of Reported Assets	Portion of Actuarial Liabilities Covered by Reported Assets		
	Member Contributions (1)	Retirees & Beneficiaries (2)	(3)		(1)	(2)	(3)
2008	\$55,234	\$281,002	\$142,499	\$447,209	100%	100%	78%
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%

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION V – FINANCIAL STATEMENT INFORMATION**

<b>Table V-4 Schedule of City Contributions</b>			
<b>Plan Year Ended April 30</b>	<b>Actuarially Determined Contribution</b>	<b>Actual Contribution</b>	<b>Percentage Contributed</b>
2009	\$9,476,409 *	\$10,319,886	108.9%
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 **	--	--

*\*The actuarially determined contribution for the plan years ended April 30, 2009 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.*

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**SECTION V – FINANCIAL STATEMENT INFORMATION**

**Table V-5  
Schedule of Funding Progress**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Liability (b)</b>	<b>Unfunded Actuarial Liability (b) - (a)</b>	<b>Funded Ratio (a) / (b)</b>	<b>Covered Payroll (c)</b>	<b>UAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)</b>
5/1/2008	\$447,209,064	\$478,734,450	\$31,525,386	93.41%	\$51,168,515	61.61%
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%

\* Not less than zero.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Kansas City Firefighters' Pension System</b>			
<b>Table of Plan Coverage</b>			
	<b>5/1/2016</b>	<b>5/1/2017</b>	<b>% change</b>
<b>Active Members in Valuation</b>			
<b><u>Tier 1</u></b>			
Number	865	830	-4.05%
Average Age	41.32	42.19	2.11%
Average Service	15.12	15.98	5.69%
Total Payroll	55,591,181	\$ 58,230,949	4.75%
Average Anticipated Payroll	\$ 64,267	\$ 70,158	9.17%
Account Balance	\$ 79,449,717	\$ 83,439,459	5.02%
Eligible to Retire on:			
Normal Pension	119	100	-15.97%
Deferred Pension	<u>519</u>	<u>547</u>	5.39%
Total Active Vested Members	638	647	1.41%
<b><u>Tier 2</u></b>			
Number	57	148	159.65%
Average Age	26.12	27.19	4.10%
Average Service	0.75	1.15	53.33%
Total Payroll	2,034,438	\$ 6,261,291	207.77%
Average Anticipated Payroll	\$ 35,692	\$ 42,306	18.53%
Account Balance	\$ 155,963	\$ 695,193	345.74%
Eligible to Retire on:			
Normal Pension	0	0	N/A
Deferred Pension	<u>0</u>	<u>0</u>	N/A
Total Active Vested Members	0	0	N/A
<b><u>Total</u></b>			
Number	922	978	6.07%
Average Age	40.38	39.92	-1.14%
Average Service	14.23	13.74	-3.44%
Total Payroll	\$ 57,625,619	\$ 64,492,241	11.92%
Average Anticipated Payroll	\$ 62,501	\$ 65,943	5.51%
Account Balance	\$ 79,605,680	\$ 84,134,652	5.69%
Eligible to Retire on:			
Normal Pension	119	100	-15.97%
Deferred Pension	<u>519</u>	<u>547</u>	5.39%
Total Active Vested Members	638	647	1.41%

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Kansas City Firefighters' Pension System</b>				
<b>Table of Plan Coverage (cont.)</b>				
	<b>5/1/2016</b>		<b>5/1/2017</b>	<b>% change</b>
<b>Vested Terminated Members</b>	3		4	33.33%
<b>Deaths During the Plan Year</b>	35		47	34.29%
<b>Pensioners:</b>				
Number in Pay Status*				
Retirees	594		582	-2.02%
Duty Disabled Retirees	78		94	20.51%
Non-duty Disabled Retirees	<u>15</u>		<u>11</u>	-26.67%
<b>Total</b>	<b>687</b>		<b>687</b>	0.00%
Average Age	68.04		67.85	-0.28%
Average Monthly Benefit***	\$ 3,775		\$ 3,893	3.14%
<b>Beneficiaries in Pay Status**</b>	239		235	-1.67%
<b>Members Due Refunds</b>	9		6	-33.33%
<b>New Disabilities</b>	6		8	33.33%

\* Disabled participants that were eligible for normal 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

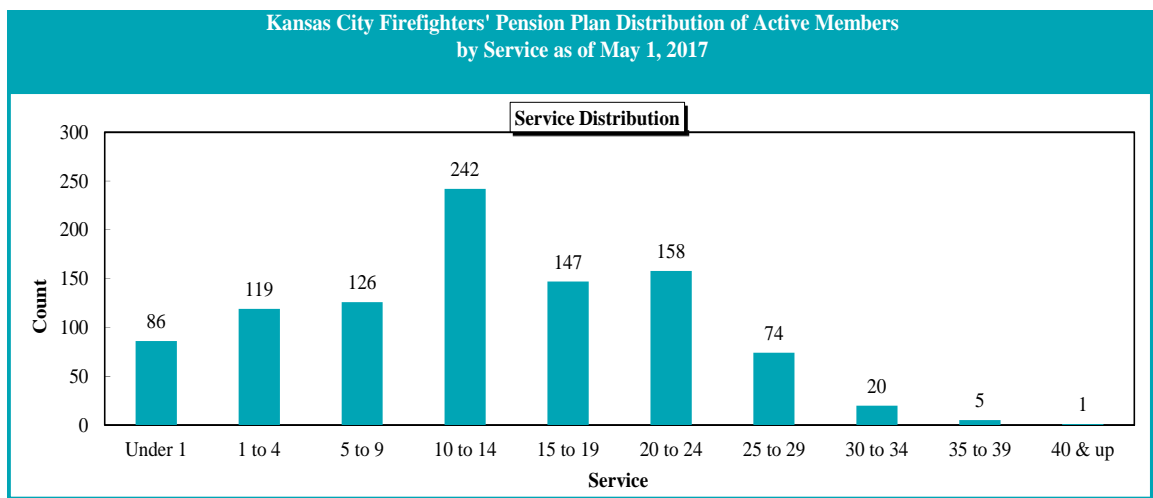
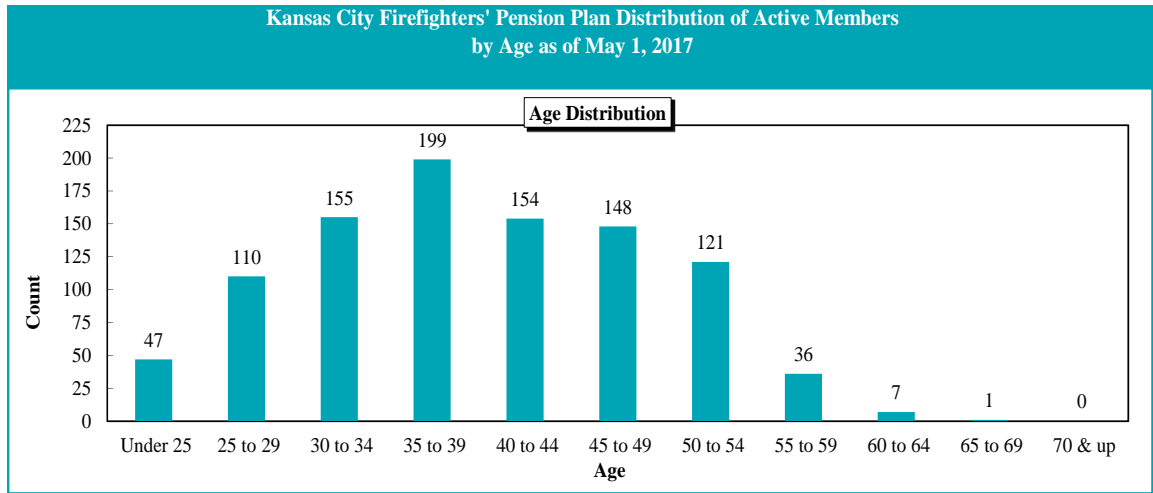
**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

**Kansas City Firefighters' Pension Plan Distribution of Active Members  
by Age and Service as of May 1, 2017**

**COUNTS BY AGE/SERVICE**

Age	Service										Total
	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	
Under 25	29	18	0	0	0	0	0	0	0	0	47
25 to 29	37	55	18	0	0	0	0	0	0	0	110
30 to 34	17	39	68	31	0	0	0	0	0	0	155
35 to 39	3	7	38	125	26	0	0	0	0	0	199
40 to 44	0	0	2	65	53	34	0	0	0	0	154
45 to 49	0	0	0	15	49	75	9	0	0	0	148
50 to 54	0	0	0	6	16	44	46	9	0	0	121
55 to 59	0	0	0	0	2	4	19	10	1	0	36
60 to 64	0	0	0	0	1	1	0	1	4	0	7
65 to 69	0	0	0	0	0	0	0	0	0	1	1
70 & up	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>86</b>	<b>119</b>	<b>126</b>	<b>242</b>	<b>147</b>	<b>158</b>	<b>74</b>	<b>20</b>	<b>5</b>	<b>1</b>	<b>978</b>



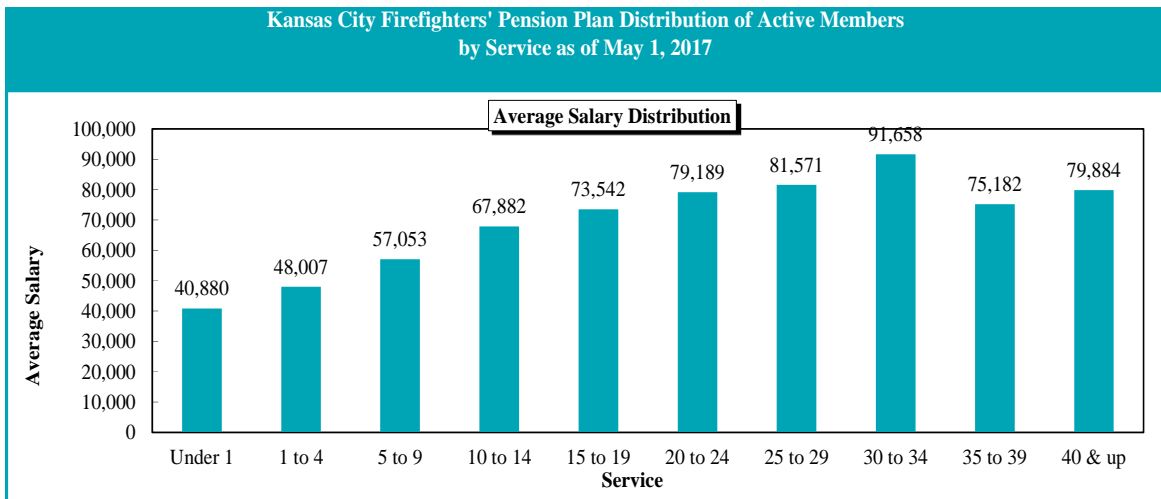
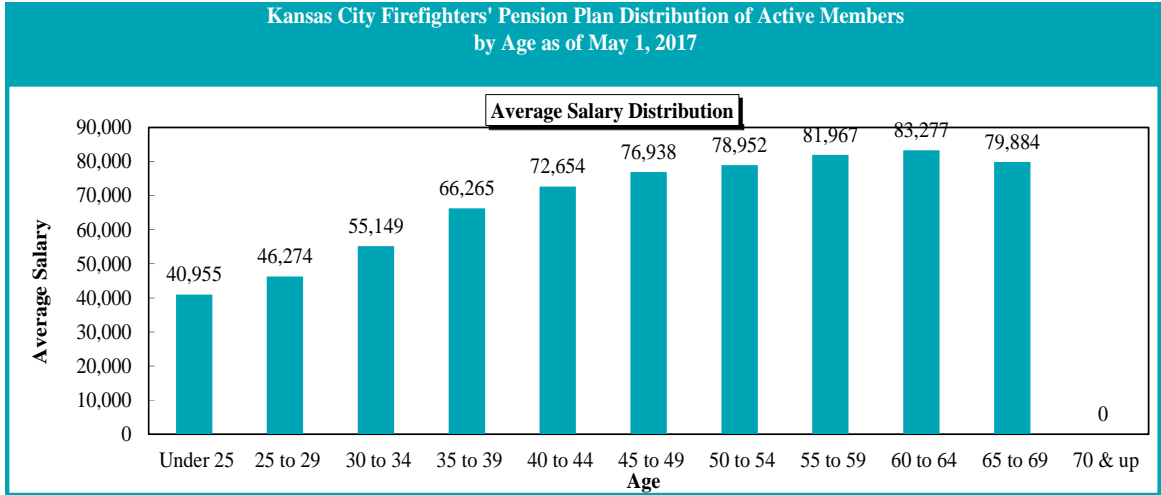
**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

**Kansas City Firefighters' Pension Plan Distribution of Active Members  
by Age and Service as of May 1, 2017**

**AVERAGE SALARY BY AGE/SERVICE**

Age	Service										Total
	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	
Under 25	38,888	44,284	0	0	0	0	0	0	0	0	40,955
25 to 29	40,054	47,165	56,336	0	0	0	0	0	0	0	46,274
30 to 34	43,073	49,198	56,546	66,196	0	0	0	0	0	0	55,149
35 to 39	57,896	57,556	57,589	67,950	74,156	0	0	0	0	0	66,265
40 to 44	0	0	70,584	67,874	73,967	79,866	0	0	0	0	72,654
45 to 49	0	0	0	70,500	73,296	80,438	78,337	0	0	0	76,938
50 to 54	0	0	0	68,698	72,167	76,992	83,173	85,852	0	0	78,952
55 to 59	0	0	0	0	72,048	74,007	79,225	93,335	72,048	0	81,967
60 to 64	0	0	0	0	72,048	79,884	0	127,140	75,966	0	83,277
65 to 69	0	0	0	0	0	0	0	0	0	79,884	79,884
70 & up	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>40,880</b>	<b>48,007</b>	<b>57,053</b>	<b>67,882</b>	<b>73,542</b>	<b>79,189</b>	<b>81,571</b>	<b>91,658</b>	<b>75,182</b>	<b>79,884</b>	<b>65,943</b>





**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Kansas City Firefighters' Pension System Pensions in Payment Status by Type and Monthly Amount as of May 1, 2017</b>					
<b>Monthly Amount</b>	<b>Total</b>	<b>Normal</b>	<b>Vested</b>	<b>Disability</b>	<b>Widows, QDROs &amp; Children</b>
<b>Total</b>	<b>922</b>	<b>563</b>	<b>19</b>	<b>105</b>	<b>235</b>
Under \$500	29	0	3	0	26
\$500-1,000	67	1	4	4	58
1,000-1,500	60	5	3	5	47
1,500-2,000	75	24	1	14	36
2,000-2,500	65	28	2	5	30
2,500-3,000	58	41	4	3	10
3,000-3,500	87	72	0	7	8
3,500-4,000	167	114	2	42	9
4,000-4,500	122	100	0	20	2
4,500-5,000	63	57	0	4	2
5,000 & over	129	121	0	1	7

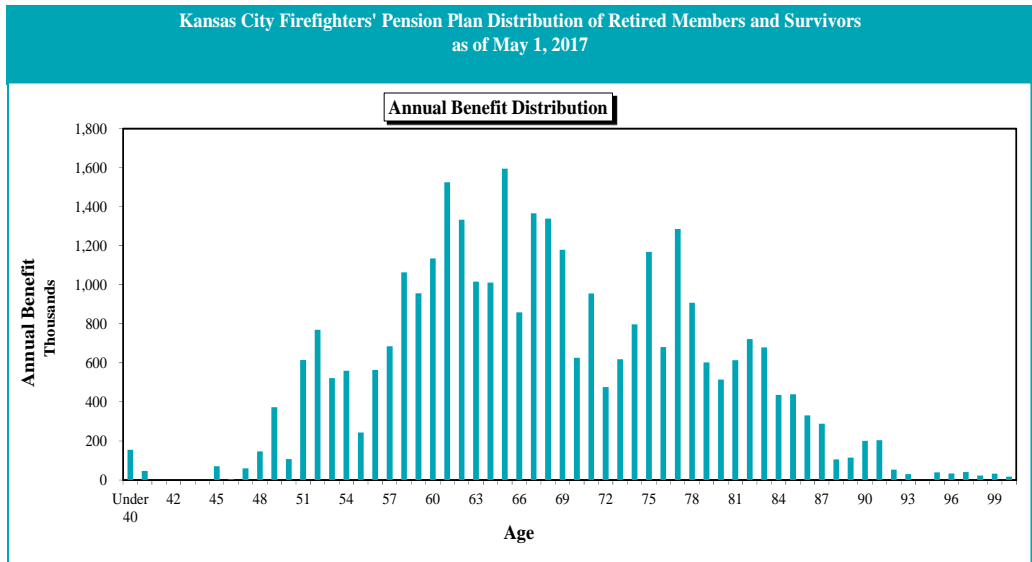
*During the year ended April 30, 2017 there were 38 new pensions awarded (17 Normal, 2 Vested, 8 Disabled, and 11 Widows, QDROs, and Children)*

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

Kansas City Firefighters' Pension Plan Distribution of Retired Members and Survivors as of May 1, 2017								
Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	14	\$48,648	57	14	\$685,108	89	9	\$114,407
25	0	0	58	20	1,063,381	90	10	200,736
26	0	0	59	21	955,984	91	7	203,088
27	0	0	60	20	1,134,931	92	4	52,225
28	0	0	61	30	1,525,326	93	2	29,818
29	0	0	62	25	1,333,296	94	0	0
30	0	0	63	21	1,016,527	95	2	39,331
31	0	0	64	19	1,010,889	96	1	33,144
32	1	22,079	65	28	1,594,329	97	4	40,050
33	1	7,211	66	17	857,803	98	2	23,244
34	3	24,591	67	29	1,366,145	99	2	31,761
35	0	0	68	27	1,338,638	100	1	17,008
36	0	0	69	23	1,179,413	101	1	23,181
37	1	46,794	70	16	625,628	102	1	35,273
38	1	5,127	71	24	955,622	103	0	0
39	0	0	72	12	476,054	104	2	15,537
40	1	46,794	73	18	618,841	105	0	0
41	0	0	74	22	797,447	106	2	49,382
42	0	0	75	28	1,168,650	107	2	84,129
43	0	0	76	18	681,276	108	0	0
44	0	0	77	31	1,285,847	109	0	0
45	1	69,508	78	25	908,459	110	0	0
46	1	3,889	79	20	602,322	111	0	0
47	1	59,854	80	19	514,522	112	0	0
48	3	146,464	81	18	613,839	113	0	0
49	7	372,385	82	22	721,638	114	0	0
50	4	107,003	83	23	678,933	115	0	0
51	12	614,367	84	17	436,005	116	0	0
52	15	769,701	85	17	439,347	117	0	0
53	11	521,780	86	14	331,161	118	0	0
54	11	559,792	87	12	288,358	119	0	0
55	6	243,763	88	8	106,179	120	0	0
56	13	564,032						
<b>Totals</b>							<b>817</b>	<b>\$32,537,994</b>

The above counts include 271 persons who elected disability retirement after becoming eligible for normal retirement.

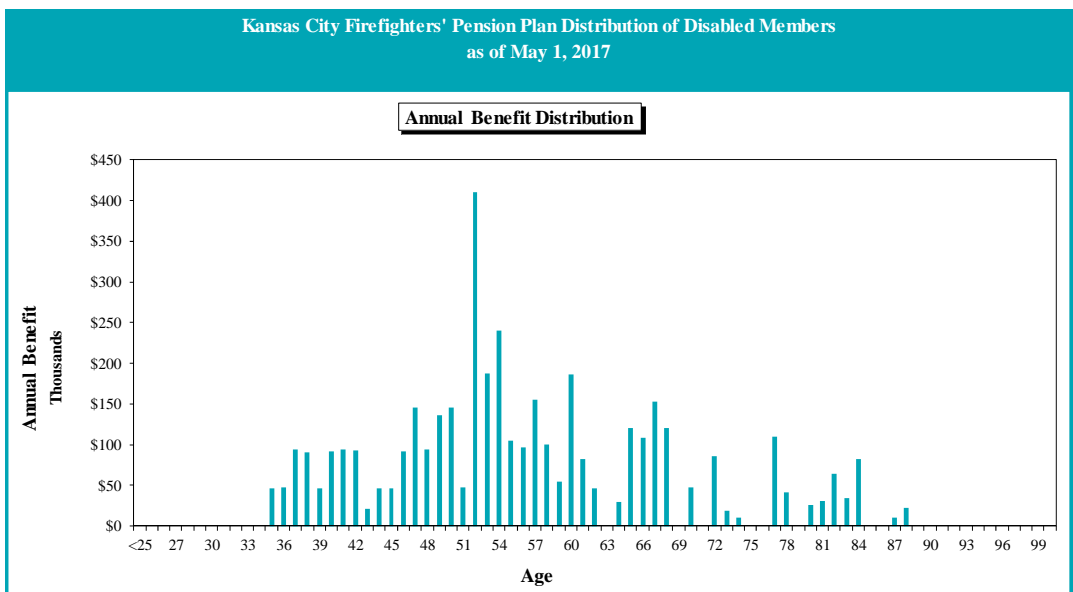


**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

Kansas City Firefighters' Pension Plan Distribution of Disabled Members as of May 1, 2017								
Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	\$0	57	3	\$155,444	89	0	\$0
25	0	0	58	2	100,475	90	0	0
26	0	0	59	1	54,964	91	0	0
27	0	0	60	5	186,036	92	0	0
28	0	0	61	2	82,801	93	0	0
29	0	0	62	1	46,275	94	0	0
30	0	0	63	0	0	95	0	0
31	0	0	64	1	29,755	96	0	0
32	0	0	65	3	120,261	97	0	0
33	0	0	66	3	108,143	98	0	0
34	0	0	67	5	152,259	99	0	0
35	1	46,381	68	3	120,196	100	0	0
36	1	47,662	69	0	0	101	0	0
37	2	94,499	70	1	47,662	102	0	0
38	2	90,910	71	0	0	103	0	0
39	1	46,381	72	3	86,339	104	0	0
40	2	91,334	73	1	18,951	105	0	0
41	2	94,608	74	1	10,413	106	0	0
42	2	92,575	75	0	0	107	0	0
43	1	21,027	76	0	0	108	0	0
44	1	46,549	77	4	110,210	109	0	0
45	1	46,605	78	2	41,488	110	0	0
46	2	92,396	79	0	0	111	0	0
47	3	145,409	80	1	26,034	112	0	0
48	2	94,456	81	2	30,833	113	0	0
49	3	135,857	82	3	64,053	114	0	0
50	3	145,324	83	2	34,518	115	0	0
51	1	47,602	84	3	82,111	116	0	0
52	8	409,985	85	0	0	117	0	0
53	4	188,106	86	0	0	118	0	0
54	5	240,354	87	1	10,489	119	0	0
55	2	104,956	88	1	21,851	120	0	0
56	2	96,476						
<b>Totals</b>							<b>105</b>	<b>\$4,161,013</b>

The above counts exclude 271 persons who elected disability retirement after becoming eligible for normal retirement.



**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX A – MEMBERSHIP INFORMATION**

Kansas City Firefighters' Pension System Change in Plan Membership							
Tier 1							
	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
<b>May 1, 2016</b>	<b>865</b>	<b>3</b>	<b>9</b>	<b>93</b>	<b>594</b>	<b>239</b>	<b>1,803</b>
New Entrants	0	0	0	0	0	0	0
Rehires	0	0	0	0	0	0	0
Vested Terminations	0	0	0	0	0	0	0
Terminated with Refund Due	(3)	0	3	0	0	0	0
Return of Contributions	(2)	0	(1)	0	0	0	(3)
Disabilities	(8)	0	0	8	0	0	0
Retirements	(17)	(1)	0	0	18	0	0
Deaths	(1)	0	(4)	(2)	(25)	(15)	(47)
New Survivor	0	0	0	0	0	11	11
Benefit Ceased	0	0	0	0	0	0	0
Miscellaneous Adjustments	(4)	2	(2)	6	(5)	0	(3)
<b>May 1, 2017</b>	<b>830</b>	<b>4</b>	<b>5</b>	<b>105</b>	<b>582</b>	<b>235</b>	<b>1,761</b>
Tier 2							
	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
<b>May 1, 2016</b>	<b>57</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57</b>
New Entrants	89	0	0	0	0	0	89
Rehires	0	0	0	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	0	0	0	0	0	0	0
Disabilities	0	0	0	0	0	0	0
Retirements	0	0	0	0	0	0	0
Deaths	0	0	0	0	0	0	0
New Survivor	0	0	0	0	0	0	0
Benefit Ceased	0	0	0	0	0	0	0
Miscellaneous Adjustments	3	0	0	0	0	0	3
<b>May 1, 2017</b>	<b>148</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>149</b>
Total							
	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
<b>May 1, 2016</b>	<b>922</b>	<b>3</b>	<b>9</b>	<b>93</b>	<b>594</b>	<b>239</b>	<b>1,860</b>
New Entrants	89	0	0	0	0	0	89
Rehires	0	0	0	0	0	0	0
Vested Terminations	0	0	0	0	0	0	0
Terminated with Refund Due	(4)	0	4	0	0	0	0
Return of Contributions	(2)	0	(1)	0	0	0	(3)
Disabilities	(8)	0	0	8	0	0	0
Retirements	(17)	(1)	0	0	18	0	0
Deaths	(1)	0	(4)	(2)	(25)	(15)	(47)
New Survivor	0	0	0	0	0	11	11
Benefit Ceased	0	0	0	0	0	0	0
Miscellaneous Adjustments	(1)	2	(2)	6	(5)	0	0
<b>May 1, 2017</b>	<b>978</b>	<b>4</b>	<b>6</b>	<b>105</b>	<b>582</b>	<b>235</b>	<b>1,910</b>

\*Widows, QDROs, and Children

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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**

<b>Disability Rates before Retirement</b>	
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.*

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**5. Percentage of Disability Retirements that are Duty Related**

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

**6. Termination Rates**

<b>Termination Rates before Retirement Termination*</b>		
<b>Service</b>	<b>Tier 1</b>	<b>Tier 2</b>
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	---	---

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**7. Retirement Rates for Active Employees**

Years of Service	Rates of Active Employees	
	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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
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**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.

<b>Service</b>	<b>Rate</b>
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. Interest on Employee Contributions**

3.00% per year, compounded annually

**16. Change in Assumptions**

All assumptions have been revised based on the results of the experience study conducted for the period May 1, 2011 to April 30, 2016.



**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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**

A five year phase-in was adopted for contribution changes that occurred as a result of the actuarial assumption changes as of May 1, 2017.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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, 2017, the City is contributing 30.05% 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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**5. Normal 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, 2017 is \$6,214.

**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

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

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, 2017 is \$6,214. 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.

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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**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 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.
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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**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 27<sup>th</sup> 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

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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:

$$\frac{\text{Amount}}{\text{Probability of Payment}} \times \frac{1}{(1+\text{Investment Return})} = \text{Present Value}$$

$$\$100 \times \frac{1}{(1 - .01)} \times \frac{1}{(1+.1)} = \$90$$

**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.

**CITY OF KANSAS CITY, MISSOURI FIREFIGHTERS' PENSION SYSTEM  
ACTUARIAL VALUATION AS OF MAY 1, 2017**

**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.



*Classic Values, Innovative Advice*