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Police and Fire Retirement System of Wichita, Kansas

Actuarial Valuation as of December 31, 2017





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March 29, 2018

The Board of Trustees
Police and Fire Retirement System of Wichita, Kansas
City Hall, 12th Floor
455 N. Main Street
Wichita, KS 67202

Dear Members of the Board:

In accordance with your request, we have completed an actuarial valuation of the Police and Fire Retirement System of Wichita, Kansas as of December 31, 2017. The major findings of the valuation are contained in this report, including the employer contribution rate for fiscal year 2019. The plan provisions and the actuarial assumptions and methods are the same as the prior valuation.

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

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

Actuarial computations presented in this report are for purposes of determining the actuarial contribution rates for funding the System which have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in a separate report.



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

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and have experience in performing valuations for public retirement plans, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement plan and on actuarial assumptions that we believe are internally consistent and reasonably based on the actual experience of the System. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

We respectfully submit the following report and look forward to discussing it with the Board.

Sincerely,

A handwritten signature in blue ink that reads 'Patrice Beckham'.

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

A handwritten signature in blue ink that reads 'Brent A. Banister'.

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Actuary



SECTION I: EXECUTIVE SUMMARY

This report presents the results of the December 31, 2017 actuarial valuation of the Police and Fire Retirement System of Wichita, Kansas. The primary purposes of performing a valuation are to:

- estimate the liabilities for the benefits provided by the System;
- determine the employer contribution rate required to fund the System on an actuarial basis;
- disclose certain asset and liability measures as of the valuation date;
- monitor any deviation between actual plan experience and experience projected by the actuarial assumptions, so that recommendations for assumption changes can be made when appropriate; and
- analyze and report on any significant trends in contributions, assets and liabilities over the past several years.

There were no changes to the actuarial assumptions and methods or the benefit provisions from the last valuation. The actuarial valuation results, which provide a “snapshot” view of the System’s financial condition on December 31, 2017, reflect favorable experience for the past plan year largely due to an investment return of 17% for 2017. As a result, the unfunded actuarial liability decreased, the funded ratio increased, and the actuarial contribution rate decreased. A summary of the current valuation results, compared to the prior year, is shown below (dollar amounts in millions):

	December 31,		Change
	2017	2016	
Actuarial Liability	\$710.0	\$681.6	\$28.4
Actuarial Assets	<u>677.6</u>	<u>640.5</u>	<u>37.1</u>
Unfunded Actuarial Liability	\$32.4	\$41.1	(\$8.7)
Funded Ratio			
- Actuarial Value	95.4%	94.0%	1.4%
- Market Value	98.3%	90.1%	8.2%
City Contribution Rate			
- Normal Cost	15.7%	15.7%	0.0%
- Amortization of UAL	<u>3.2%</u>	<u>4.2%</u>	(1.0%)
- Total	18.9%	19.9%	(1.0%)

In the following pages, changes in the assets, liabilities, and contributions of the System over the last year are discussed in more detail.

ASSETS

As of December 31, 2017, the System had total assets of \$698.1 million when measured on a market value basis. This was an increase of \$84.1 million from the December 31, 2016 figure of \$614.0 million. The market value of assets is not used directly in the calculation of the City’s contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation, called the “actuarial value of assets”. The actuarial value of assets is equal to the expected value (calculated using the actuarial assumed rate of 7.75%) plus 25% of the difference between the actual market value and the expected value. See Table 3 for a detailed development of the actuarial value of assets. The rate of return on the actuarial value of assets was 8.8% which resulted in an



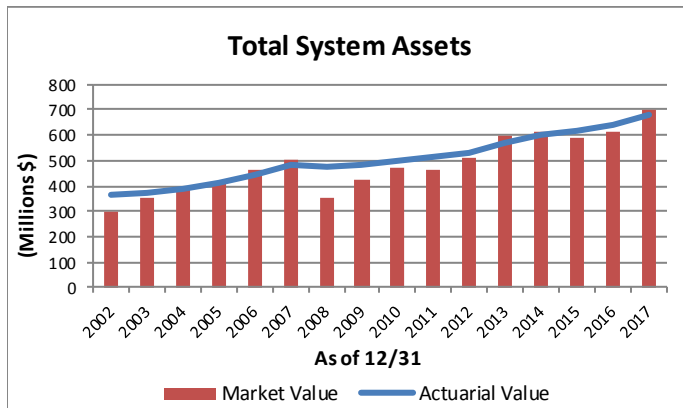
SECTION I: EXECUTIVE SUMMARY

actuarial gain since the actual return exceeded the assumed return of 7.75%. Due to deferred investment experience, the market value of assets exceeds the actuarial value by \$20 million.

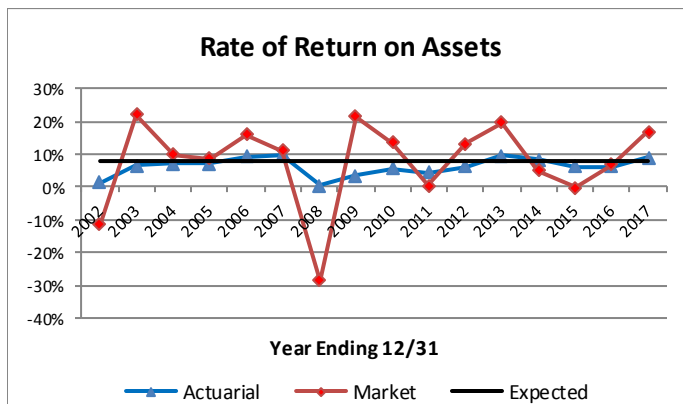
The components of the change in the market and actuarial value of assets for the System (in millions) are set forth below:

	Market Value (\$M)	Actuarial Value (\$M)
Assets, December 31, 2016	\$614.0	\$640.5
- City and Member Contributions	18.3	18.3
- Benefit Payments and Refunds	(36.9)	(36.9)
- Investment Income (net of expenses)	<u>102.7</u>	<u>55.7</u>
Assets, December 31, 2017	\$698.1	\$677.6
Estimated Net Return	17.0%	8.8%

The unrecognized investment gain represents about 3% of the market value of assets. Unless offset by future investment losses or other unfavorable experience, the recognition of the deferred gain of \$20 million is expected to have a positive impact on the future funded ratio and actuarial contribution requirement. If the deferred gain was recognized immediately (actuarial value of assets set equal to market value), the funded percentage would increase from 95% to 98% and the actuarially determined contribution rate for the City would decrease from 18.9% to 16.9% of payroll.



The actuarial value of assets has both been greater than and less than the market value of assets during this period, which is expected when using a smoothing method.



The rate of return on the actuarial value of assets has been less volatile than the market value return, which is the main reason for using an asset smoothing method.



SECTION I: EXECUTIVE SUMMARY

LIABILITIES

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

The Actuarial Liability and Unfunded Actuarial Liability for the System as of December 31, 2017 are:

Actuarial Liability	\$710,017,157
Actuarial Value of Assets	<u>677,616,328</u>
Unfunded Actuarial Liability	\$ 32,400,829

Between December 31, 2016 and December 31, 2017, the change in the unfunded actuarial liability for the System was as follows (in millions):

Change in Unfunded Actuarial Liability	(\$M)
UAL, December 31, 2016	\$41.1
• Expected change in UAL	0.1
• Investment experience	(6.8)
• Liability experience	(1.8)
• Other experience	(0.2)
UAL, December 31, 2017	\$32.4

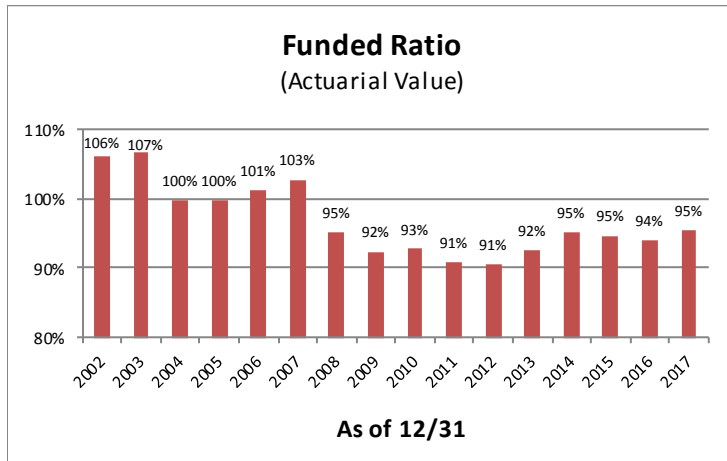
The aggregate experience gain for the 2017 plan year of \$8.6 million reflects the combined impact of an actuarial gain of \$6.8 million on System assets (actuarial value) and an actuarial gain of \$1.8 million on System liabilities. The gain on assets was discussed earlier in this report. The gain on System liabilities was primarily due to salary increases that were lower than expected.

Analysis of the unfunded actuarial liability strictly as a dollar amount can be misleading. Another way to evaluate the unfunded actuarial liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial liability. This information for recent years is shown below (in millions). Longer term historical information is shown in the graph following the chart. Note that the funded ratio does not indicate whether or not the System has sufficient funds to settle all current obligations, nor is it necessarily indicative on its own of the need for future funding.

	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017
Actuarial Liability (\$M)	\$617.7	\$631.9	\$655.1	\$681.6	\$710.0
Actuarial Value of Assets (\$M)	571.3	600.9	620.1	640.5	677.6
Funded Ratio (Actuarial Value)	92.5%	95.1%	94.7%	94.0%	95.4%
Funded Ratio (Market Value)	96.9%	96.7%	90.5%	90.1%	98.3%



SECTION I: EXECUTIVE SUMMARY



The funded ratio has generally declined over this period due to various reasons including assumption changes, and more significantly, investment experience. However, the System's funded ratio has remained strong (above 90%) even given the impact of the investment returns on the actuarial value of assets that have generally been below the assumed rate since 2008.

As mentioned earlier in this report, due to the asset smoothing method there is currently a \$20 million difference between the actuarial value and the market value of assets. To the extent there is not unfavorable investment experience to offset the deferred gain, it will be recognized in future years and the System's funded status is expected to increase. The System's funded status will continue to be heavily dependent on future investment experience.

CONTRIBUTION RATES

Generally, contributions to the System consist of:

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

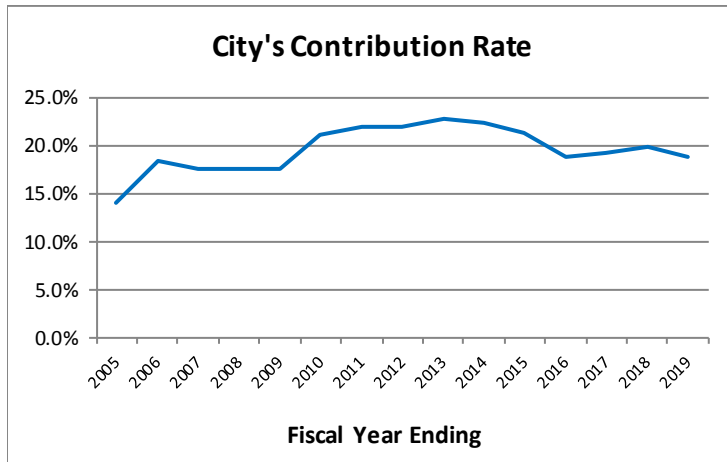
Contribution rates are computed with the objective of developing costs that are level as a percentage of covered payroll. The contribution rate for fiscal year 2019 is based on the December 31, 2017 actuarial valuation results.

As of December 31, 2017, the actuarial liability exceeds the actuarial value of assets so an unfunded actuarial liability (UAL) exists. When amortized over a rolling 20-year period, in accordance with state statute, the resulting contribution is 3.2% of pay. The City's contribution rate is the sum of the employer normal cost rate and the UAL amortization contribution. This valuation indicates the City's contribution should be 18.9% of pay (15.7% employer normal cost rate plus 3.2% UAL contribution).



SECTION I: EXECUTIVE SUMMARY

A summary of the City's historical contribution rate is shown below:



After decreasing for FY 2013 through FY 2016, the City's contribution rate rose slightly for FY 2017 and FY 2018 before decreasing for FY 2019. The City's contribution rate is 19.9% and 18.9% for the fiscal years ending 12/31/2018 and 12/31/2019, respectively.

COMMENTS

The System does not use the actual market value of assets in developing the actuarial contribution rate, but utilizes an asset valuation method to smooth out the peaks and valleys in investment returns from year to year. Under the asset valuation method, the actuarial value of assets is determined as 75% of the expected value (using the actuarial assumed rate of return) and 25% of the actual market value. The net return on the market value of assets for 2017 was 17.0%. However, due to deferred asset losses the return on the actuarial value of assets was 8.8%. Because the return on the actuarial value of assets is more than the 7.75% assumed rate, the System experienced an actuarial gain on assets of \$6.8 million. This gain and the actuarial gain on liabilities of \$1.8 million resulted in a total actuarial gain of \$8.6 million.

The actuarial gain resulting from experience on the smoothed value of assets (actuarial value) was the main driver in the City's contribution rate decreasing from 19.9% in the December 31, 2016 valuation to 18.9% in the current valuation. The actuarial contribution rate for the City has been, and will continue to be, heavily impacted by actual investment returns from year to year. Investment performance that is different from the 7.75% assumption tends to create volatility in the City's contribution rate. Given the expected volatility associated with the System's portfolio, which is measured by the standard deviation, actual returns that vary by 10% to 12% from the assumed rate of return in one year are not unexpected. Even with asset smoothing and amortization of the actuarial loss recognized in the first year over 20 years, such variation in the investment experience would impact the City's contribution rate by around 1.75% of payroll.

The deferred investment gain (market value greater than actuarial value of assets) is \$20 million as of December 31, 2017. Absent investment losses in future years, the deferred investment gain of \$20 million will eventually be reflected in the actuarial value of assets in future years. While the use of an asset smoothing method is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. This is accomplished by comparing the key valuation results from the December 31, 2017 actuarial valuation using both the actuarial and market value of assets (see table on next page).



SECTION I: EXECUTIVE SUMMARY

	Using Actuarial Value of Assets	Using Market Value of Assets
Actuarial Liability	\$710,017,157	\$710,017,157
Asset Value	677,616,328	698,083,949
Unfunded Actuarial Liability	32,400,829	11,933,208
Funded Ratio	95.4%	98.3%
Normal Cost Rate	22.7%	22.7%
UAL Contribution Rate	<u>3.2%</u>	<u>1.2%</u>
Total Contribution Rate	25.9%	23.9%
Employee Contribution Rate	<u>(7.0%)</u>	<u>(7.0%)</u>
Employer Contribution Rate	18.9%	16.9%

Note that the funded ratio does not indicate whether or not the System has sufficient funds to settle all current obligations, nor is it necessarily indicative of the need for future funding.



SECTION I: EXECUTIVE SUMMARY

SUMMARY OF PRINCIPAL RESULTS

	12/31/2017 <u>Valuation</u>	12/31/2016 <u>Valuation</u>	% <u>Change</u>
1. PARTICIPANT DATA			
Number of:			
Active Members			
Police	630	610	3.3%
Fire	452	453	(0.2%)
Total	<u>1,082</u>	<u>1,063</u>	1.8%
Retired Members and Beneficiaries	1,000	987	1.3%
Inactive Vested Members	33	35	(5.7%)
Inactive Non-Vested Members	<u>0</u>	<u>0</u>	0.0%
Total Members	2,115	2,085	1.4%
Annual Projected Payroll			
Police	\$ 44,518,765	\$ 41,941,218	6.1%
Fire	<u>28,289,307</u>	<u>28,273,609</u>	0.1%
Total	\$ <u>72,808,072</u>	\$ <u>70,214,827</u>	3.7%
Annual Projected Payments for Retired Members and Beneficiaries	\$ 33,526,716	\$ 31,914,576	5.1%
2. ASSETS AND LIABILITIES			
Total Actuarial Liability	\$ 710,017,157	\$ 681,644,488	4.2%
Market Value of Assets	698,083,949	614,047,281	13.7%
Actuarial Value of Assets	677,616,328	640,508,756	5.8%
Unfunded Actuarial Liability	\$ 32,400,829	\$ 41,135,732	(21.2%)
Funded Ratio	95.4%	94.0%	1.5%
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost	22.7%	22.7%	0.0%
Member Financed	<u>(7.0%)</u>	<u>(7.0%)</u>	0.0%
Employer Normal Cost	15.7%	15.7%	0.0%
Amortization of Unfunded Actuarial Liability or (Surplus)	<u>3.2%</u>	<u>4.2%</u>	(23.8%)
Employer Contribution Rate	18.9%	19.9%	(5.0%)



SECTION II: SCOPE OF THE REPORT

This report presents the actuarial valuation of the Police and Fire Retirement System of Wichita, Kansas as of December 31, 2017. This valuation was prepared at the request of the System's Board of Trustees. The report is based on plan provisions, actuarial assumptions and actuarial methods that are unchanged from last year.

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

A summary of the findings resulting from this valuation is presented in the previous section. Section III describes the assets and investment experience of the System. Sections IV and V describe how the obligations of the System are to be met under the actuarial cost method in use. Section VI includes additional information regarding the System's funding history.

This report includes several appendices:

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



SECTION III: ASSETS

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is December 31, 2017. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the System assets and liabilities.

MARKET VALUE OF ASSETS

The current market value represents the “snapshot” or “cash-out” value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time. On December 31, 2017, the market value of assets for the System was \$698 million. Table 1 is a comparison, at market values, of System assets as of December 31, 2017, and December 31, 2016, in total and by investment category. Table 2 summarizes the change in the market value of assets from December 31, 2016 to December 31, 2017.

ACTUARIAL VALUE OF ASSETS

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

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. This methodology, first adopted for the December 31, 2002 valuation, smoothes market experience by recognizing 25% of the difference between the expected value (based on the actuarial assumption) and the actual market value. Table 3 shows the development of the actuarial value of assets (AVA) as of December 31, 2017.



SECTION III: ASSETS

TABLE 1

Analysis of Net Assets at Market Value

**As of
December 31, 2017**

	<u>Amount</u> <u>(\$ Millions)</u>	<u>% of</u> <u>Total</u>	
Cash and Equivalents	\$ 0.0	0.2	%
Government Securities	5.2	0.7	
Fixed Income	111.2	15.9	
Domestic Equity	300.4	43.0	
International Equity	192.1	27.5	
Real Estate	41.4	5.9	
Timber	28.0	4.0	
Commodities	19.3	2.8	
Receivables	1.0	0.1	
Liabilities	<u>(0.7)</u>	<u>(0.1)</u>	
Total	\$ 698.0	100.0	%

** Numbers may not add due to rounding.*



SECTION III: ASSETS

TABLE 2

**Summary of Changes in Net Assets
During Year Ended December 31, 2017**

(Market Value)

1. Market Value of Assets as of December 31, 2016	\$ 614,047,281
2. Adjustment to Tie to Audited Financial Statements	\$ 0
3. Contributions:	
a. Members	\$ 4,915,378
b. City	13,369,785
c. Total	<u>\$ 18,285,163</u>
4. Investment Income:	
a. Interest and Dividends	\$ 11,122,938
b. Net Appreciation (Depreciation) in Fair Value	95,565,916
c. Commission Recapture	13,491
d. Net Securities Lending Income	123,984
e. Investment Expenses	<u>(3,589,650)</u>
f. Net Investment Income (Loss)	\$ 103,236,679
5. Expenditures:	
a. Refunds of Member Contributions	\$ 173,975
b. Benefits Paid:	
(1) Pension and Death Benefits	32,477,098
(2) BackDROP Payments	4,279,460
c. Administrative Expenses	<u>554,641</u>
d. Total	<u>\$ 37,485,174</u>
6. Net Change [3(c) + 4(f) - 5(d)]	\$ 84,036,668
7. Market Value of Assets as of December 31, 2017 [(1) + (2) + (6)]	\$ 698,083,949



SECTION III: ASSETS

TABLE 3

**Development of Actuarial Value of Assets
as of December 31, 2017**

1. Actuarial Value of Assets as of December 31, 2016	\$ 640,508,756
2. Actual Contributions/Disbursements	
a. Contributions	\$ 18,285,163
b. Benefit Payments and Refunds	(36,930,533)
c. Net	\$ (18,645,370)
3. Expected Value of Assets as of December 31, 2017 [(1) * 1.0775] + [2(c) * (1.0775) ⁻⁵]	\$ 670,793,788
4. Market Value of Assets as of December 31, 2017	\$ 698,083,949
5. Difference Between Actual and Expected Values	\$ 27,290,161
6. Initial Actuarial Value of Assets (3) + [(5) * 0.25]	\$ 677,616,328
7. Corridor for Actuarial Value of Assets	
a. 80% of Market Value of Assets	\$ 558,467,159
b. 120% of Market Value of Assets	837,700,739
8. Actuarial Value of Assets as of December 31, 2017	\$ 677,616,328
9. Actuarial Value of Assets Divided by Market Value of Assets	97.1%
10. Market Value of Assets Minus Actuarial Value of Assets	\$ 20,467,621



SECTION IV: SYSTEM LIABILITIES

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date, December 31, 2017. In this section, the discussion will focus on the commitments of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries.

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

All liabilities reflect the benefit provisions in place as of December 31, 2017.

ACTUARIAL LIABILITY

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

1. That which is attributable to the past and
2. That which is attributable to the future.

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



SECTION IV: SYSTEM LIABILITIES

TABLE 4

**Present Value of Future Benefits (PVFB)
as of December 31, 2017**

	Plans		
	<u>A and B</u>	<u>Plan C</u>	<u>Total</u>
1. Active Employees			
a. Retirement Benefit	\$ 1,818,613	\$ 402,561,767	\$ 404,380,380
b. Pre-Retirement Death Benefit	0	4,679,734	4,679,734
c. Withdrawal Benefit	0	8,601,898	8,601,898
d. Disability Benefit	0	47,912,825	47,912,825
e. Total	\$ <u>1,818,613</u>	\$ <u>463,756,224</u>	\$ <u>465,574,837</u>
2. Inactive Vested Members	\$ 0	\$ 9,005,702	\$ 9,005,702
3. Inactive Nonvested Members	\$ 0	\$ 0	\$ 0
4. In Pay Members			
a. Retirees	\$ 138,942,436	\$ 157,453,089	\$ 296,395,525
b. Disabled Members	14,889,400	40,029,528	54,918,928
c. Beneficiaries	25,384,195	7,603,106	32,987,301
d. Total	\$ <u>179,216,031</u>	\$ <u>205,085,723</u>	\$ <u>384,301,754</u>
5. Total Present Value of Future Benefits 1(e) + 2 + 3 + 4(d)	\$ 181,034,644	\$ 677,847,649	\$ 858,882,293

**SECTION IV: SYSTEM LIABILITIES**

TABLE 5**Actuarial Liability
as of December 31, 2017**

	<u>Plans A and B</u>	<u>Plan C</u>	<u>Total</u>
1. Active Employees			
a. Present Value of Future Benefits	\$ 1,818,613	\$ 463,756,224	\$ 465,574,837
b. Present Value of Future Normal Costs	0	148,865,136	148,865,136
c. Actuarial Liability 1(a) - 1(b)	\$ 1,818,613	\$ 314,891,088	\$ 316,709,701
2. Inactive Vested Members	\$ 0	\$ 9,005,702	\$ 9,005,702
3. Inactive Nonvested Members	\$ 0	\$ 0	\$ 0
4. In Pay Members			
a. Retirees	\$ 138,942,436	\$ 157,453,089	\$ 296,395,525
b. Disabled Members	14,889,400	40,029,528	54,918,928
c. Beneficiaries	25,384,195	7,603,106	32,987,301
d. Total	\$ 179,216,031	\$ 205,085,723	\$ 384,301,754
5. Total Actuarial Liability 1(c) + 2 + 3 + 4(d)	\$ 181,034,644	\$ 528,982,513	\$ 710,017,157



SECTION V: EMPLOYER CONTRIBUTIONS

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

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

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

DESCRIPTION OF CONTRIBUTION RATE COMPONENTS

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

In general, contributions are computed in accordance with a level percent-of-payroll funding objective. The contribution rates based on this December 31, 2017 actuarial valuation will be used to determine the employer contribution rate to the Police and Fire Retirement System of Wichita, Kansas for fiscal year 2019. In this context, the term “contribution rate” means the percentage, which is applied to a particular active member payroll to determine the actual employer contribution amount (i.e., in dollars) for the group.

As of December 31, 2017, the valuation assets were less than the actuarial liability so an unfunded actuarial liability exists. State statutes require any unfunded actuarial liability in municipal police and fire retirement systems to be amortized over a rolling 20-year period. The amortization of the UAL results in an employer contribution that is more than the employer normal cost rate.

CONTRIBUTION RATE SUMMARY

In Table 6, the amortization payment related to the unfunded actuarial liability, as of December 31, 2017, is developed. Table 7 develops the normal cost rate for the System. The derivation of the total contribution rate for the City is shown in Table 8. Table 9 shows the historical summary of the City’s contribution rates. Table 10 develops the experience gain/(loss) for the year ended December 31, 2017.

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



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 6

Derivation of Unfunded Actuarial Liability Contribution Rate

1. Actuarial Liability	\$	710,017,157
2. Actuarial Value of Assets	\$	677,616,328
3. Unfunded Actuarial Liability	\$	32,400,829
4. Payment (Adjusted to Mid-Year) to Amortize Unfunded Actuarial Liability Over 20 Years*	\$	2,306,005
5. Total Projected Payroll for the Year	\$	72,808,072
6. Amortization Payment as a Percent of Payroll		3.2%

** The UAL is amortized as a level percent of payroll over a rolling 20-year period.*



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 7

Derivation of Normal Cost Rate

Normal Cost as of December 31, 2017	
Service Pensions	\$ 11,132,070
Disability Pensions	2,969,917
Survivor Pensions	313,448
Termination Benefits	706,654
Total Normal Cost	\$ 15,122,089
Expected Payroll in 2018 for Current Actives	\$ 66,720,679
Total Normal Cost Rate for Year	22.7%



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 8

**Employer Contribution Rates
for Fiscal Year Commencing in 2019**

	Contribution Requirement as a % of Payroll
Normal Cost	
Service pensions	16.6 %
Disability pensions	4.5 %
Survivor pensions	0.5 %
Termination pensions	1.1 %
Total Normal Cost	<u>22.7 %</u>
Unfunded Actuarial Liability	
Retired members and beneficiaries ⁽¹⁾	0.0 %
Active and former members ⁽²⁾	3.2 %
Total UAL Contribution	<u>3.2 %</u>
Total Contribution Requirement	
Member Financed Portion ⁽³⁾	7.0 %
City Financed Portion	18.9 %
Total	<u>25.9 %</u>

⁽¹⁾ Actuarial liability for retired members and beneficiaries was fully funded as of December 31, 2017.

⁽²⁾ The excess of the actuarial liability over actuarial value of assets is amortized as a level percent of active member payroll over a rolling 20-year period.

⁽³⁾ The weighted average of member contribution rates: 8.0% for Plan A and 7.0% for Plan C.



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 9

Historical Summary of City Contribution Rates

Contribution rates are computed in accordance with a level percent of payroll funding objective. As of December 31, 2017, the actuarial value of assets is less than actuarial liabilities resulting in an unfunded actuarial liability (UAL). The UAL is amortized over a rolling 20-year period.

Valuation Date	Fiscal Year	City Contributions as Percents of Active Member Pensionable Payroll	
		Funding Objective	Amortization (Credit)/Payment
11/30/1992	1994	23.3%	0.0%
11/30/1993	1995	22.7	0.0
11/30/1994	1996	22.6	0.0
12/31/1995	1997	18.3 ⁽¹⁾	0.0
12/31/1996	1998	17.5	0.0
12/31/1997	1999	15.2 - 15.9	(0.7)
12/31/1998	2000	12.3 - 15.9	(3.6)
12/31/1999 ⁽²⁾	2001	9.6 - 16.8	(7.2)
12/31/2000	2002	8.2 - 16.8	(8.7)
12/31/2001	2003	10.0 - 16.8	(6.8)
12/31/2002	2004	14.0 - 17.0	(3.0)
12/31/2003	2005	13.6 - 17.0	(3.4)
12/31/2004 ⁽³⁾	2006	18.4	0.1
12/31/2005	2007	17.5	0.2
12/31/2006	2008	16.8 - 17.5	(0.7)
12/31/2007	2009	16.0 - 17.5	(1.5)
12/31/2008	2010	20.8	2.7
12/31/2009 ⁽⁴⁾	2011	22	4.3
12/31/2010	2012	22	4.2
12/31/2011	2013	22.8	5.6
12/31/2012	2014	22.4	5.9
12/31/2013	2015	21.3	4.8
12/31/2014 ⁽⁴⁾	2016	18.8	3.3
12/31/2015	2017	19.2	3.6
12/31/2016	2018	19.9	4.2
12/31/2017	2019	18.9	3.2

⁽¹⁾ Reflects allocation of assets to fully fund retired life liabilities.
⁽²⁾ Includes benefit provision and assumption changes and 1% decrease in member contribution rate.
⁽³⁾ Reflects assumption changes and elimination of surplus assets.
⁽⁴⁾ Reflects assumption changes.



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 10

Derivation of System Experience Gain/(Loss)

Liabilities

1. Actuarial liability as of December 31, 2016	\$ 681,644,488
2. Normal cost as of December 31, 2016	14,568,340
3. Interest at 7.75% on (1) and (2) to December 31, 2017	53,956,494
4. Benefit payments during 2017	(36,930,533)
5. Interest on benefit payments	(1,404,356)
6. Expected actuarial liability as of December 31, 2017	\$ 711,834,433
7. Actuarial liability as of December 31, 2017	\$ 710,017,157

Assets

8. Actuarial value of assets as of January 1, 2017	\$ 640,508,756
9. Contributions during 2017	18,285,163
10. Benefit payments during 2017	(36,930,533)
11. Interest on items (8), (9) and (10)	48,930,402
12. Expected actuarial value of assets as of December 31, 2017	\$ 670,793,788
13. Actual actuarial value of assets as of December 31, 2017	\$ 677,616,328

Gain / (Loss)

14. Expected unfunded actuarial liability (6) – (12)	\$ 41,040,645
15. Actual unfunded actuarial liability (7) – (13)	\$ 32,400,829
16. Actuarial Gain / (Loss) (14) – (15)	\$ 8,639,816
17. Actuarial Gain / (Loss) on Actuarial Assets (13) – (12)	\$ 6,822,540
18. Actuarial Gain / (Loss) on Actuarial Liability (6) – (7)	\$ 1,817,276



SECTION VI: OTHER INFORMATION

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

The Entry Age Normal actuarial liability was determined as part of an actuarial valuation of the System as of December 31, 2017. Significant actuarial assumptions used in determining the actuarial liability include:

- (a) A rate of return on the investment of present and future assets of 7.75% per year compounded annually,
- (b) Projected salary increases of 4.00% per year compounded annually, (3.25% attributable to inflation, and 0.75% attributable to productivity),
- (c) Additional projected salary increases of 1.00% to 2.75% per year attributable to seniority/merit, and
- (d) The assumption that benefits will increase 2.00% per year, non-compounded, commencing 36 months after retirement.

Actuarial Liability:

Active members	\$316,709,701
Retired members and beneficiaries currently receiving benefits	384,301,754
Nonvested terminated members due a refund	0
Vested terminated members not yet receiving benefits	<u>9,005,702</u>
Total Actuarial Liability	\$710,017,157
Actuarial Value of Assets (market value was \$698,083,949)	\$677,616,328
Unfunded Actuarial Liability	\$ 32,400,829

During the year ended December 31, 2017, the System experienced a net increase of \$28.4 million in the actuarial liability.



SECTION VI: OTHER INFORMATION

TABLE 11

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (AL) (b)	Unfunded AL (UAL) (b)-(a)	Funded Ratio (a)/(b)	Active Member Covered Payroll (c)	UAL as a Percentage of Active Member Covered Payroll [(b)-(a)]/(c)
11/30/1992	\$165,132	\$198,656	\$33,524	83.1 %	\$25,000	134.1 %
11/30/1993	180,457	208,966	28,509	86.4	26,008	109.6
11/30/1994	192,668	220,596	27,928	87.3	27,819	100.4
12/31/1995 ⁽¹⁾	213,431	231,372	17,941	92.2	29,749	60.3
12/31/1996	237,554	247,408	9,854	96.0	33,366	29.5
12/31/1997	262,815	258,706	(4,109)	101.6	35,502	(11.6)
12/31/1998	295,625	274,900	(20,725)	107.5	36,566	(56.7)
12/31/1999 ⁽¹⁾	330,072	291,633	(38,439)	113.2	37,969	(101.2)
12/31/2000	354,044	308,894	(45,150)	114.6	38,613	(116.9)
12/31/2001	362,493	325,335	(37,158)	111.4	42,286	(87.9)
12/31/2002	361,687	340,524	(21,163)	106.2	45,696	(46.3)
12/31/2003	374,171	350,444	(23,727)	106.8	45,876	(51.7)
12/31/2004 ⁽¹⁾	392,485	393,387	902	99.8	50,414	1.8
12/31/2005	412,823	414,027	1,204	99.7	52,207	2.3
12/31/2006	444,498	439,179	(5,319)	101.2	53,530	(9.9)
12/31/2007	480,820	468,115	(12,705)	102.7	57,310	(22.2)
12/31/2008	472,345	496,561	24,216	95.1	60,282	40.2
12/31/2009 ⁽¹⁾	480,556	519,934	39,378	92.4	63,055 ⁽²⁾	62.5 ⁽²⁾
12/31/2010	497,926	536,908	38,982	92.7	63,077	61.8
12/31/2011	510,946	562,488	51,542	90.8	62,759	82.1
12/31/2012	533,381	589,074	55,693	90.5	64,150	86.8
12/31/2013	571,262	617,748	46,486	92.5	65,306	71.2
12/31/2014 ⁽¹⁾	600,860	631,904	31,044	95.1	64,572	48.1
12/31/2015	620,149	655,136	34,987	94.7	65,560	53.4
12/31/2016	640,509	681,644	41,136	94.0	66,946	61.4
12/31/2017	677,616	710,017	32,401	95.4	69,634	46.5

Dollar amounts are in thousands. Numbers may not add due to rounding.

Note: Years prior to 12/31/2012 were provided by prior actuary.

⁽¹⁾ After changes in benefits and/or actuarial assumptions and/or actuarial cost methods.

⁽²⁾ These amounts have been revised from the \$63,479,000 and 62.0% amounts reported in the December 31, 2009 actuarial valuation report.

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



SECTION VI: OTHER INFORMATION

TABLE 12

Schedule of Employer Contributions

Fiscal Year	Actuarial Valuation Date	Annual Required Contribution	Percent Contributed
1997	12/31/1995	\$6,343,027	100 %
1998	12/31/1996	6,427,744	100
1999	12/31/1997	6,043,455	100
2000	12/31/1998	5,540,575	100
2001	12/31/1999	4,796,863	100
2002	12/31/2000	4,746,504	100
2003	12/31/2001	5,043,505	100
2004	12/31/2002	6,925,467	100
2005	12/31/2003	7,308,916	100
2006	12/31/2004	9,849,536	100
2007	12/31/2005	10,029,253	100
2008	12/31/2006	10,549,401	100
2009	12/31/2007	11,034,552	100
2010	12/31/2008	13,119,984	100
2011	12/31/2009	13,806,880	100
2012	12/31/2010	14,113,014	100
2013	12/31/2011	14,889,714	100
2014	12/31/2012	14,464,181	100
2015	12/31/2013	13,964,379	100
2016	12/31/2014	12,585,895	100
2017	12/31/2015	13,369,785	100

Note: Years prior to 2012 were provided by prior actuary.

Summary of Actuarial Methods and Assumptions

Valuation Date	December 31, 2017
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level percent of payroll, open
Remaining Amortization Period	20 years
Asset Valuation Method	Expected Value + 25% of (Market – Expected Values)
Actuarial Assumptions:	
Investment Rate of Return*	7.75%
Projected Salary Increases*	5.00% to 6.75%
*Includes Inflation at	3.25%
Cost-of-Living Adjustment Provisions	2.00% non-compounding commencing 36 months after retirement



SECTION VI: OTHER INFORMATION

TABLE 13
Solvency Test

Valuation Date	Aggregate Actuarial Liability For				Portion of Actuarial Liabilities Covered by Reported Assets					
	(1)	(2)	(3)	Reported Valuation Assets	(1)		(2)		(3)	
	Active Member Contributions	Retirants and Beneficiaries*	Active Members (Employer Financed Portion)			%		%	%	
12/31/1995	\$19,597,012	\$132,215,980	\$79,559,050	\$213,431,416	100.0	%	100.0	%	77.4	%
12/31/1996	20,807,624	141,902,560	84,497,686	237,553,602	100.0		100.0		88.6	
12/31/1997	22,518,199	146,068,362	90,119,236	262,814,796	100.0		100.0		104.6	
12/31/1998	23,845,658	157,021,415	94,033,395	295,624,986	100.0		100.0		122.0	
12/31/1999	24,759,118	170,478,501	96,395,412	330,071,866	100.0		100.0		139.9	
12/31/2000	27,152,206	183,463,718	98,277,967	354,044,311	100.0		100.0		145.9	
12/31/2001	27,694,761	183,034,623	114,605,637	362,493,060	100.0		100.0		132.4	
12/31/2002	34,440,696	182,063,498	124,019,921	361,687,109	100.0		100.0		117.1	
12/31/2003	37,027,041	186,930,565	126,486,746	374,170,781	100.0		100.0		118.8	
12/31/2004	40,959,525	201,051,248	151,375,876	392,484,697	100.0		100.0		99.4	
12/31/2005	44,057,922	210,560,068	159,408,592	412,822,760	100.0		100.0		99.2	
12/31/2006	48,361,719	216,449,174	174,368,239	444,497,827	100.0		100.0		103.1	
12/31/2007	53,686,866	230,893,426	183,634,348	480,820,001	100.0		100.0		106.9	
12/31/2008	58,050,319	238,590,747	199,920,080	472,345,191	100.0		100.0		87.9	
12/31/2009	60,326,408	257,298,665	202,309,181	480,555,562	100.0		100.0		80.5	
12/31/2010	63,515,814	270,693,677	202,698,947	497,925,786	100.0		100.0		80.8	
12/31/2011	66,390,179	293,730,691	202,367,017	510,946,217	100.0		100.0		74.5	
12/31/2012	70,527,705	305,985,839	212,559,831	533,380,618	100.0		100.0		73.8	
12/31/2013	74,238,693	325,096,785	218,412,805	571,261,929	100.0		100.0		78.7	
12/31/2014	74,684,418	348,915,979	208,304,004	600,860,146	100.0		100.0		85.1	
12/31/2015	77,222,492	364,943,124	212,970,051	620,148,816	100.0		100.0		83.6	
12/31/2016	81,765,281	377,864,418	222,014,789	640,508,756	100.0		100.0		81.5	
12/31/2017	85,753,036	393,307,456	230,956,665	677,616,328	100.0		100.0		86.0	

*Includes vested and non-vested terminated members
Note: Years prior to 12/31/2012 were provided by prior Actuary.

During the twelve months ended December 31, 2017, the Police and Fire Retirement System of Wichita, Kansas generated an actuarial gain of \$8.6 million. This amount is 1.3% of the actuarial liability at the beginning of the year.



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

MEMBER DATA RECONCILIATION

December 31, 2016 to December 31, 2017

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

	Active Participants		Retirees, Beneficiaries and Disableds		Inactive Vested		Inactive Non-Vested	Total
	Police	Fire	Police	Fire	Police	Fire	Police	
Members as of 12/31/2016	610	453	495	492	28	7	0	2,085
New Members	+41	+14	+3	+7	0	0	0	+65
Transfers	-1	+1	0	0	0	0	0	0
Rehires	0	0	0	0	0	0	0	0
Terminations								
Refunded	-5	-1	0	0	0	0	0	-6
Refund Due	0	0	0	0	0	0	0	0
Deferred Vested	-1	-1	0	0	+1	+1	0	0
Completion of payments to minor child	0	0	0	0	0	0	0	0
Retirements								
Service	-14	-12	+17	+13	-3	-1	0	0
Disability	0	-1	0	+1	0	0	0	0
Deaths								
Cashed Out	0	0	0	0	0	0	0	0
With Beneficiary	0	-1	-3	-6	0	0	0	-10
Without Beneficiary	0	0	-11	-8	0	0	0	-19
Data Adjustments	0	0	0	0	0	0	0	0
Members as of 12/31/2017	630	452	501	499	26	7	0	2,115



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

HISTORICAL ACTIVE DATA
as of December 31, 2017

Valuation Date	Number of Members			Annual Covered Payroll (\$000's)*	Average Annual Pay	% Increase In Average Annual Pay
	Plan A	Plan C-79	Total Members			
12/31/2005	62	988	1,050	\$52,207	\$49,721	4.90 %
12/31/2006	59	1,021	1,080	53,530	49,565	(0.31)
12/31/2007	57	1,035	1,092	57,310	52,482	5.89
12/31/2008	47	1,029	1,076	60,282	56,024	6.75
12/31/2009	32	1,068	1,100	63,055	57,323	2.32
12/31/2010	21	1,068	1,089	63,077	57,922	1.04
12/31/2011	14	1,074	1,088	62,759	57,683	(0.41)
12/31/2012	11	1,073	1,084	64,150	59,179	2.59
12/31/2013	9	1,076	1,085	65,306	60,190	1.71
12/31/2014	8	1,060	1,068	64,572	60,461	0.45
12/31/2015	5	1,045	1,050	65,560	62,439	3.27
12/31/2016	4	1,059	1,063	66,946	62,979	0.86
12/31/2017	2	1,080	1,082	69,634	64,357	2.19

* Actual covered payroll is imputed from actual employee contributions for the year.



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

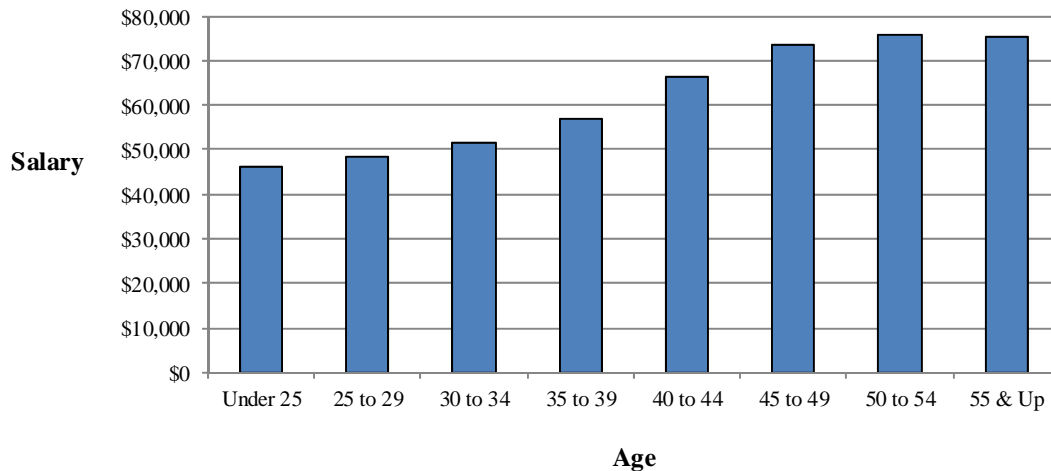
SUMMARY OF ACTIVE MEMBERS
as of December 31, 2017

Total

Age	Number			Valuation Salaries*		
	Police	Fire	Total	Police	Fire	Total
Under 25	19	6	25	\$ 900,460	\$ 258,322	\$ 1,158,782
25 to 29	82	35	117	4,066,095	1,576,894	5,642,989
30 to 34	89	74	163	4,776,497	3,623,316	8,399,813
35 to 39	80	98	178	4,878,041	5,290,475	10,168,516
40 to 44	102	62	164	7,135,111	3,782,149	10,917,260
45 to 49	132	74	206	10,291,640	4,886,219	15,177,859
50 to 54	84	62	146	6,735,181	4,349,320	11,084,501
55 & Up	42	41	83	3,311,287	2,938,638	6,249,925
Total	630	452	1,082	\$42,094,312	\$26,705,333	\$68,799,645

* Actual salary as reported by System for year ending 12/31/2017

Average Salary by Age





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

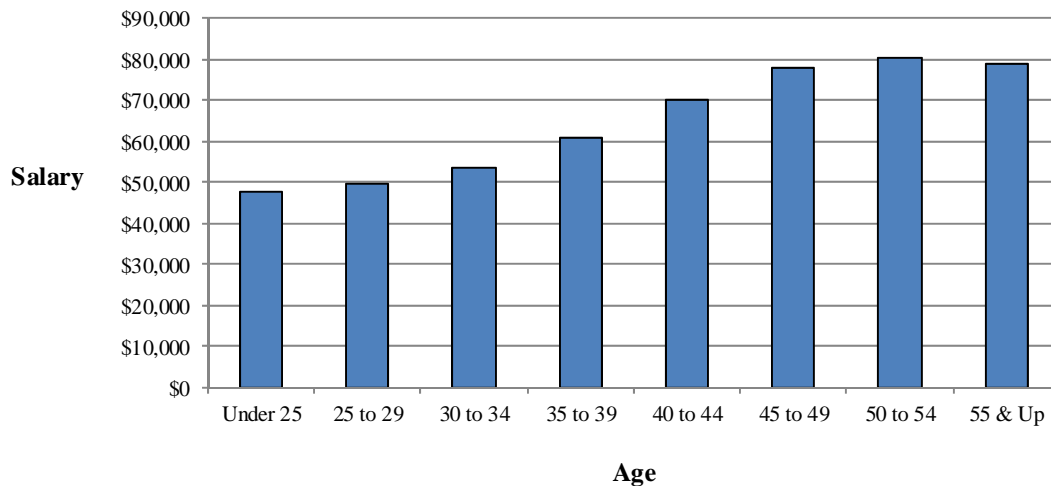
SUMMARY OF ACTIVE MEMBERS
as of December 31, 2017

Police

Age	Number			Valuation Salaries*		
	Male	Female	Total	Male	Female	Total
Under 25	14	5	19	\$ 659,667	\$ 240,793	\$ 900,460
25 to 29	70	12	82	3,457,603	608,492	4,066,095
30 to 34	80	9	89	4,299,122	477,375	4,776,497
35 to 39	70	10	80	4,250,203	627,838	4,878,041
40 to 44	86	16	102	6,080,664	1,054,447	7,135,111
45 to 49	117	15	132	9,170,242	1,121,398	10,291,640
50 to 54	80	4	84	6,410,651	324,530	6,735,181
55 & Up	39	3	42	3,096,025	215,262	3,311,287
Total	556	74	630	\$37,424,177	\$4,670,135	\$42,094,312

* Actual salary as reported by System for year ending 12/31/2017

Average Salary by Age





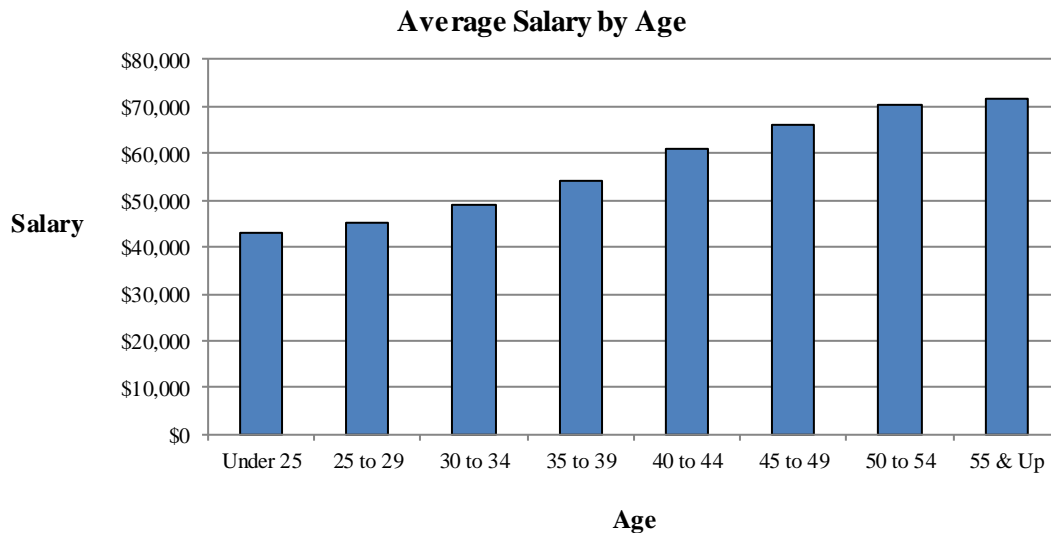
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of December 31, 2017

Fire

Age	Number			Valuation Salaries*		
	Male	Female	Total	Male	Female	Total
Under 25	5	1	6	\$ 216,139	\$ 42,183	\$ 258,322
25 to 29	34	1	35	1,532,946	43,948	1,576,894
30 to 34	72	2	74	3,539,676	83,640	3,623,316
35 to 39	96	2	98	5,189,435	101,040	5,290,475
40 to 44	62	0	62	3,782,149	0	3,782,149
45 to 49	74	0	74	4,886,219	0	4,886,219
50 to 54	61	1	62	4,287,922	61,398	4,349,320
55 & Up	40	1	41	2,816,874	121,764	2,938,638
Total	444	8	452	\$26,251,360	\$453,973	\$26,705,333

* Actual salary as reported by System for year ending 12/31/2017





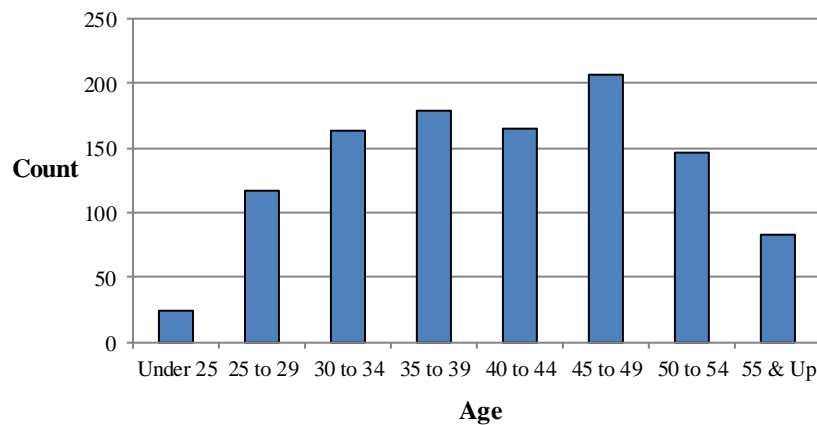
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of December 31, 2017

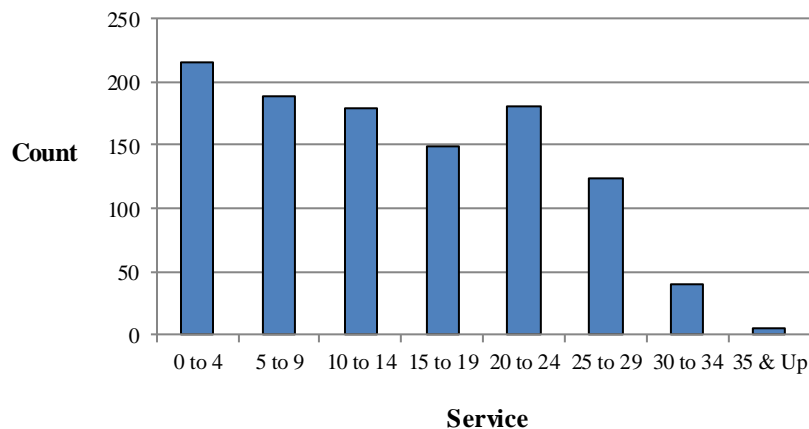
Total

Age	Years of Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	25	0	0	0	0	0	0	0	25
25 to 29	100	17	0	0	0	0	0	0	117
30 to 34	62	80	21	0	0	0	0	0	163
35 to 39	20	63	77	18	0	0	0	0	178
40 to 44	6	20	49	67	22	0	0	0	164
45 to 49	3	5	25	53	93	27	0	0	206
50 to 54	0	2	3	9	53	64	15	0	146
55 & Up	0	1	4	2	13	32	25	6	83
Total	216	188	179	149	181	123	40	6	1,082

Age Distribution



Service Distribution





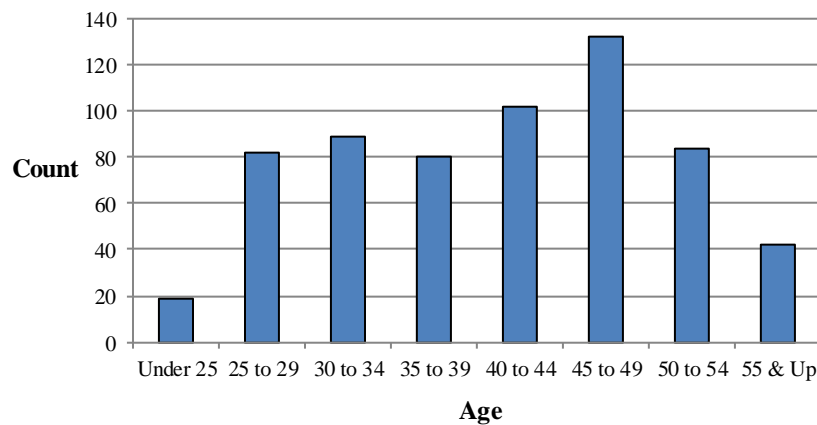
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of December 31, 2017

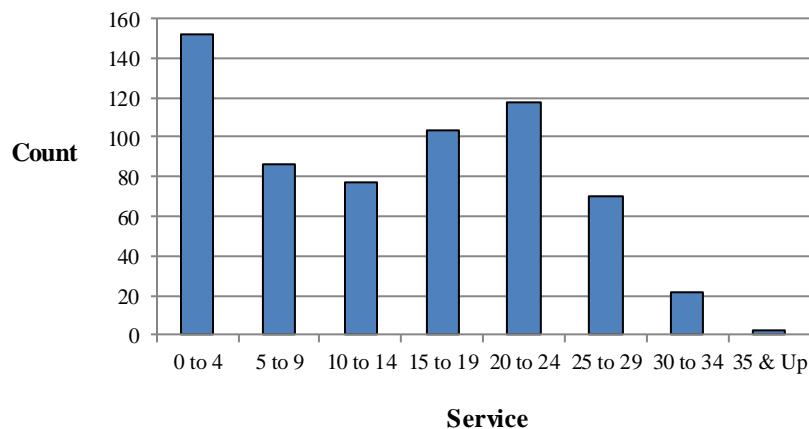
Police

Age	Years of Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	19	0	0	0	0	0	0	0	19
25 to 29	73	9	0	0	0	0	0	0	82
30 to 34	42	39	8	0	0	0	0	0	89
35 to 39	10	24	34	12	0	0	0	0	80
40 to 44	5	9	22	50	16	0	0	0	102
45 to 49	3	2	9	36	63	19	0	0	132
50 to 54	0	2	2	4	32	38	6	0	84
55 & Up	0	1	2	1	7	13	16	2	42
Total	152	86	77	103	118	70	22	2	630

Age Distribution



Service Distribution





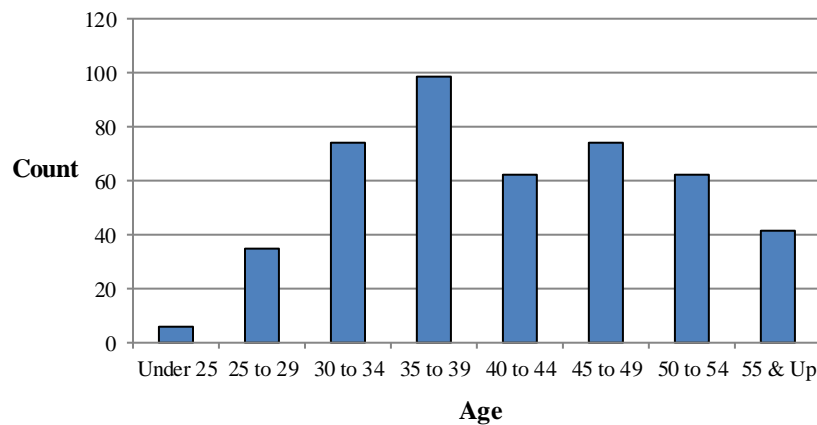
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of December 31, 2017

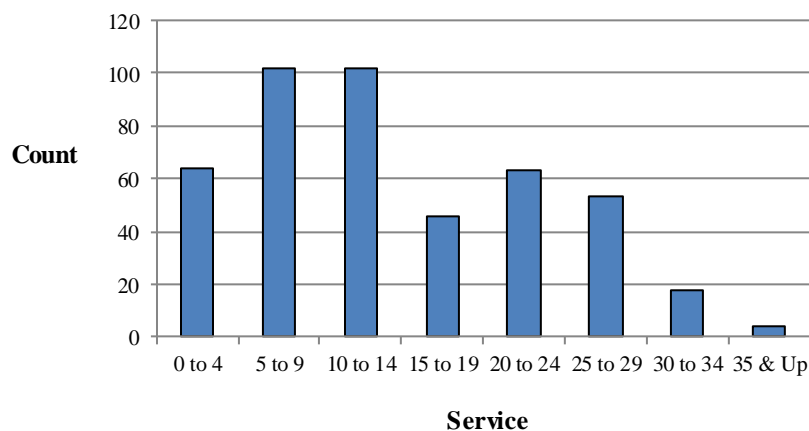
Fire

Age	Years of Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	6	0	0	0	0	0	0	0	6
25 to 29	27	8	0	0	0	0	0	0	35
30 to 34	20	41	13	0	0	0	0	0	74
35 to 39	10	39	43	6	0	0	0	0	98
40 to 44	1	11	27	17	6	0	0	0	62
45 to 49	0	3	16	17	30	8	0	0	74
50 to 54	0	0	1	5	21	26	9	0	62
55 & Up	0	0	2	1	6	19	9	4	41
Total	64	102	102	46	63	53	18	4	452

Age Distribution



Service Distribution





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

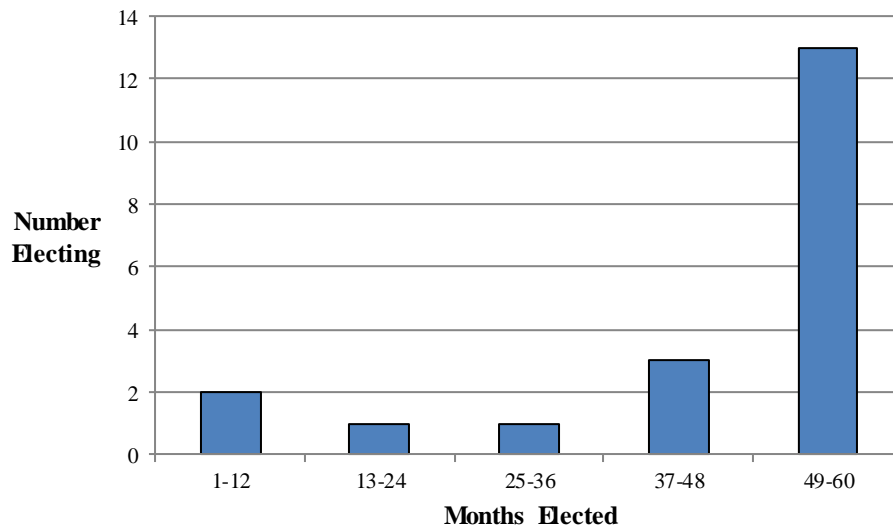
BackDROP Experience for the 2017 Plan Year

Total

Number Electing BackDROP

Distribution of BackDROP Election Period

Age	Final Benefit as a Proportion of Final Average Pay					Total
	Under 55%	55%-60%	60%-65%	65%-70%	70%-75%	
Under 55	1	0	1	2	1	5
55-59	2	1	5	0	1	9
60-64	1	1	1	0	1	4
65 & Up	0	0	0	0	2	2
Total	4	2	7	2	5	20





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

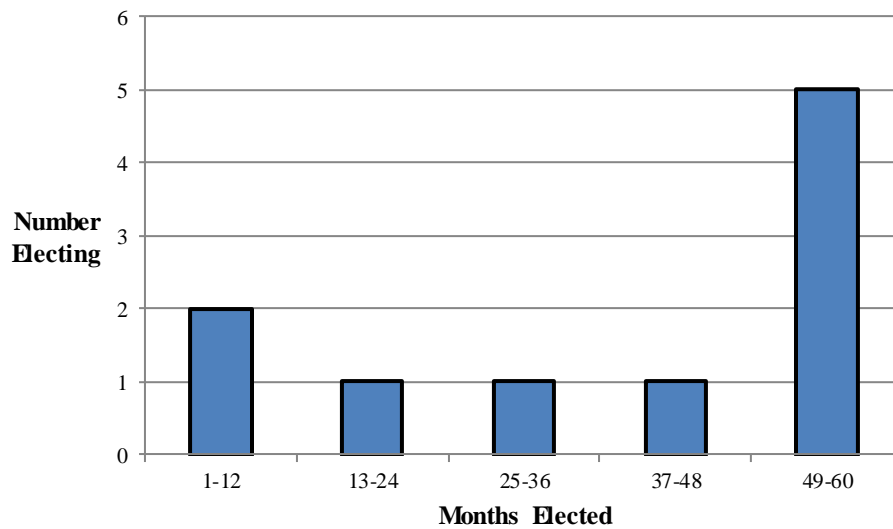
BackDROP Experience for the 2017 Plan Year

Police

Number Electing BackDROP

Distribution of BackDROP Election Period

Age	Final Benefit as a Proportion of Final Average Pay					Total
	Under 55%	55%-60%	60%-65%	65%-70%	70%-75%	
Under 55	0	0	0	2	1	3
55-59	1	0	4	0	1	6
60-64	0	1	0	0	0	1
65 & Up	0	0	0	0	0	0
Total	1	1	4	2	2	10





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

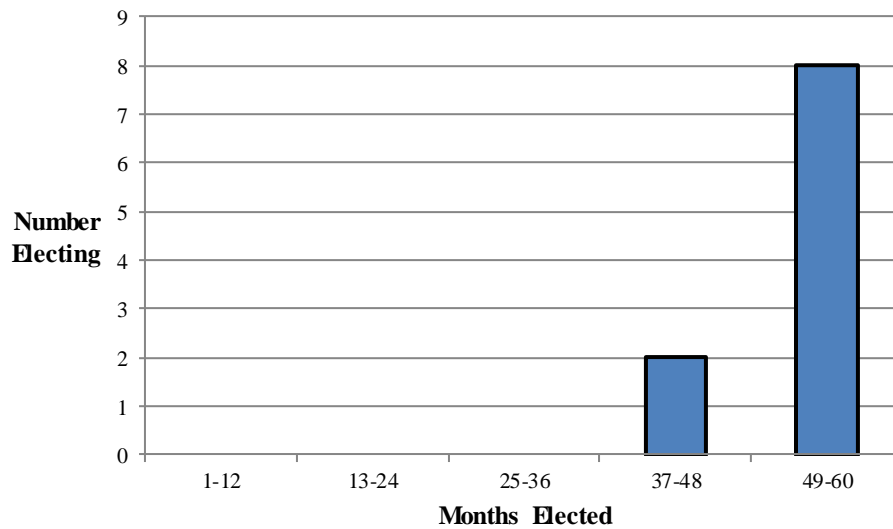
BackDROP Experience for the 2017 Plan Year

Fire

Number Electing BackDROP

Distribution of BackDROP Election Period

Age	Final Benefit as a Proportion of Final Average Pay					Total
	Under 55%	55%-60%	60%-65%	65%-70%	70%-75%	
Under 55	1	0	1	0	0	2
55-59	1	1	1	0	0	3
60-64	1	0	1	0	1	3
65 & Up	0	0	0	0	2	2
Total	3	1	3	0	3	10





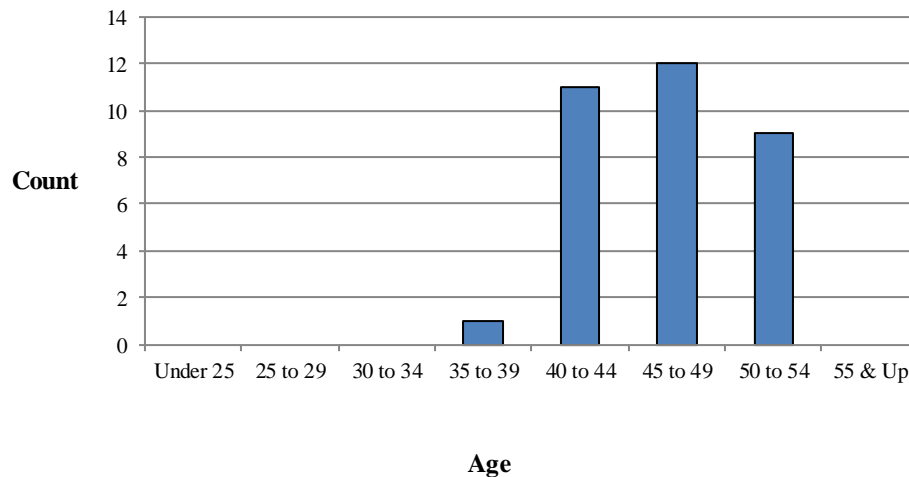
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF INACTIVE VESTED MEMBERS
as of December 31, 2017

Total – By Group

Age	Number			Current Annual Benefit at Retirement		
	Police	Fire	Total	Police	Fire	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0
35 to 39	1	0	1	43,149	0	43,149
40 to 44	7	4	11	274,838	131,839	406,677
45 to 49	10	2	12	408,027	62,807	470,834
50 to 54	8	1	9	222,752	19,137	241,889
55 & Up	0	0	0	0	0	0
Total	26	7	33	\$948,766	\$213,783	\$1,162,549

Age Distribution





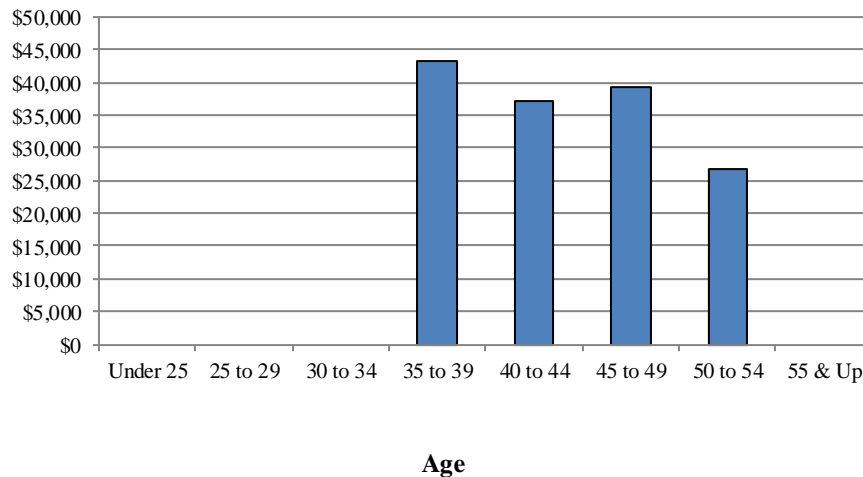
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF INACTIVE VESTED MEMBERS
as of December 31, 2017

Total – By Gender

Age	Number			Current Annual Benefit at Retirement		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0
35 to 39	1	0	1	43,149	0	43,149
40 to 44	7	4	11	232,109	174,568	406,677
45 to 49	10	2	12	398,391	72,443	470,834
50 to 54	9	0	9	241,889	0	241,889
55 & Up	0	0	0	0	0	0
Total	27	6	33	\$915,538	\$247,011	\$1,162,549

Average Benefit





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF IN-PAY MEMBERS
as of December 31, 2017

Amount of Monthly Benefit	Non- Service Disability	QDRO¹	Recalc. Service Disability	Service	Service Disability	Survivor	Total
\$ 0-500	0	3	0	5	0	4	12
500-1,000	2	8	0	11	4	23	48
1,000-1,500	4	8	1	52	0	35	100
1,500-2,000	0	1	2	101	0	42	146
2,000-2,500	0	0	1	125	0	42	168
2,500-3,000	0	0	6	104	5	12	127
3,000-3,500	0	0	6	82	7	3	98
3,500-4,000	0	0	17	73	13	1	104
4,000-4,500	0	0	18	67	9	1	95
4,500-5,000	0	0	3	45	0	1	49
>5,000	0	0	5	47	0	1	53
Total	6	20	59	712	38	165	1000

¹ *Qualified Domestic Relations Order*



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**RETIRANTS AND BENEFICIARIES
ADDED TO AND REMOVED FROM ROLLS**

Valuation Date	Added to Rolls		Removed from Rolls		End of Year Rolls		Annual Pensions	
	No.	Annual Pensions ¹	No.	Annual Pensions ¹	No.	Annual Pensions ¹	Average Pension	Percentage Increase (Decrease)
12/31/2005	24	\$704,201	21	\$213,529	835	\$17,829,449	\$21,302	4.0 %
12/31/2006	29	715,353	26	389,856	840	18,349,917	21,845	2.5
12/31/2007	21	548,513	28	452,202	833	18,777,464	22,542	3.2
12/31/2008	39	510,543	32	417,236	840	19,492,053	23,205	2.9
12/31/2009	57	1,959,741	24	398,908	873	21,357,569	24,465	5.4
12/31/2010	47	1,439,435	28	541,662	892	22,570,141	25,303	3.4
12/31/2011	48	1,615,338	29	525,289	911	24,030,607	26,378	4.2
12/31/2012	33	1,201,800	23	435,120	921	25,226,219	27,390	3.8
12/31/2013	48	1,938,485	17	380,985	952	27,143,376	28,512	4.1
12/31/2014	63	2,400,693	42	850,741	971	29,165,652	30,037	5.3
12/31/2015	44	1,652,860	26	494,625	989	30,774,324	31,117	3.6
12/31/2016	31	1,286,489	33	629,314	987	31,914,576	32,335	3.9
12/31/2017	41	1,757,606	28	694,600	1,000	33,526,716	33,527	3.7

¹ Values are estimated based on annualized pension amounts.



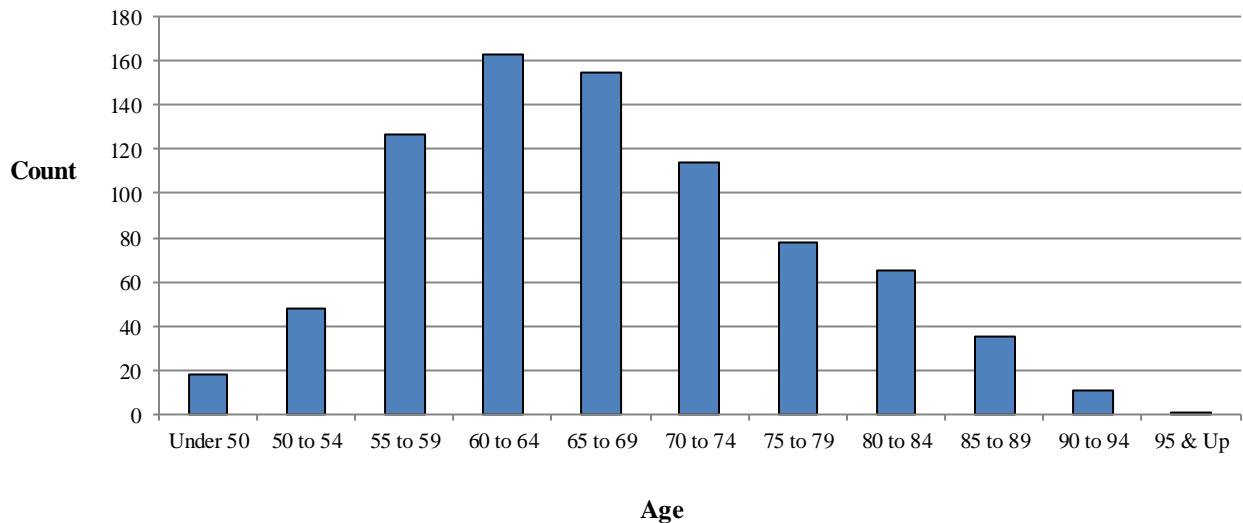
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF RETIRED MEMBERS
as of December 31, 2017

Total – By Group

Age	Number			Current Monthly Benefit at Retirement		
	Police	Fire	Total	Police	Fire	Total
Under 50	14	4	18	\$ 49,974	\$ 15,267	\$ 65,241
50 to 54	34	14	48	141,711	48,742	190,453
55 to 59	74	53	127	303,905	188,638	492,543
60 to 64	80	83	163	292,195	287,758	579,953
65 to 69	64	91	155	194,181	277,733	471,914
70 to 74	64	50	114	158,125	140,894	299,019
75 to 79	34	44	78	79,273	94,103	173,376
80 to 84	27	38	65	51,923	78,770	130,693
85 to 89	14	21	35	23,451	35,260	58,711
90 to 94	3	8	11	4,933	14,151	19,084
95 & Up	1	0	1	921	0	921
Total	409	406	815	\$1,300,592	\$1,181,316	\$2,481,908

Age Distribution





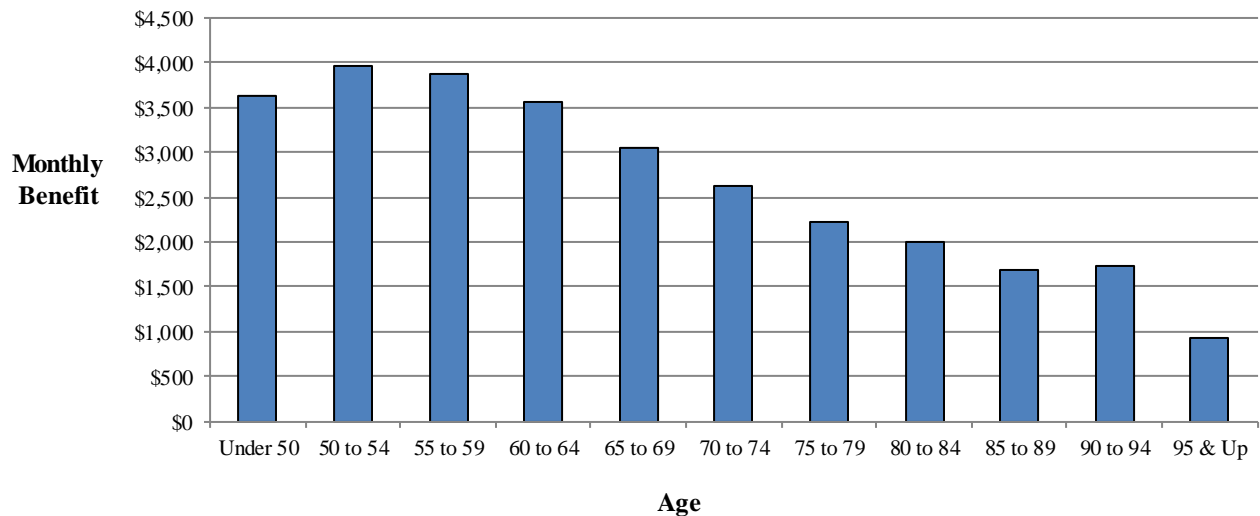
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF RETIRED MEMBERS
as of December 31, 2017

Total – By Gender

Age	Number			Current Monthly Benefit at Retirement		
	Male	Female	Total	Male	Female	Total
Under 50	10	8	18	\$ 35,532	\$ 29,709	\$ 65,241
50 to 54	43	5	48	171,342	19,111	190,453
55 to 59	122	5	127	469,256	23,287	492,543
60 to 64	156	7	163	555,798	24,155	579,953
65 to 69	154	1	155	469,692	2,222	471,914
70 to 74	111	3	114	292,929	6,090	299,019
75 to 79	76	2	78	169,586	3,790	173,376
80 to 84	63	2	65	127,465	3,228	130,693
85 to 89	34	1	35	56,525	2,186	58,711
90 to 94	11	0	11	19,084	0	19,084
95 & Up	1	0	1	921	0	921
Total	781	34	815	\$2,368,130	\$113,778	\$2,481,908

Average Benefit





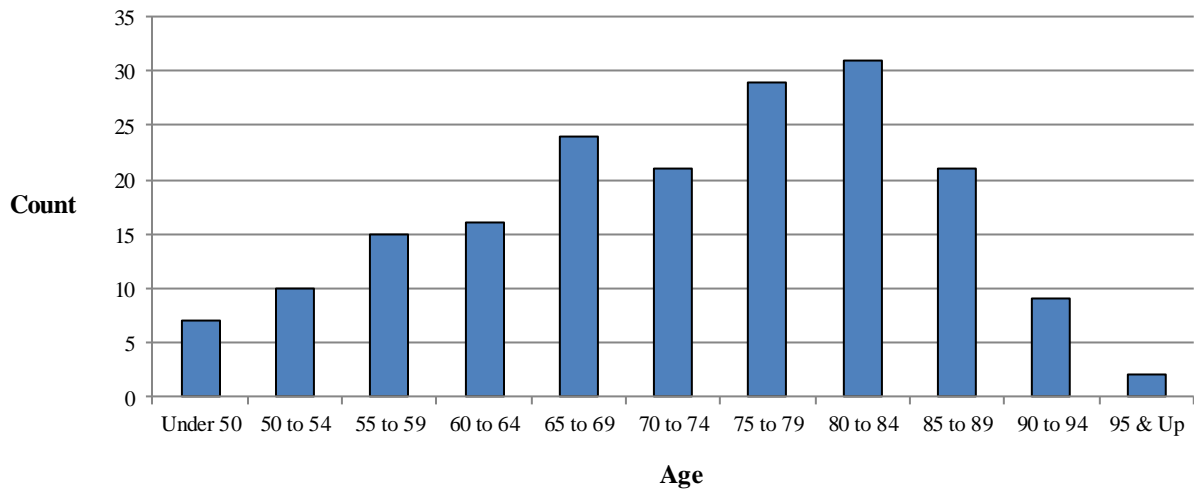
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF BENEFICIARIES
as of December 31, 2017

Total – By Group

Age	Number			Current Monthly Benefit at Retirement		
	Police	Fire	Total	Police	Fire	Total
Under 50	3	4	7	\$ 1,080	\$ 2,334	\$ 3,414
50 to 54	5	5	10	6,180	11,101	17,281
55 to 59	8	7	15	9,097	14,353	23,450
60 to 64	8	8	16	18,723	16,924	35,647
65 to 69	9	15	24	19,232	27,898	47,130
70 to 74	14	7	21	24,307	12,744	37,051
75 to 79	13	16	29	20,263	34,195	54,458
80 to 84	15	16	31	23,975	26,411	50,386
85 to 89	11	10	21	16,699	15,385	32,084
90 to 94	4	5	9	3,953	5,254	9,207
95 & Up	2	0	2	1,877	0	1,877
Total	92	93	185	\$145,386	\$166,599	\$311,985

Age Distribution





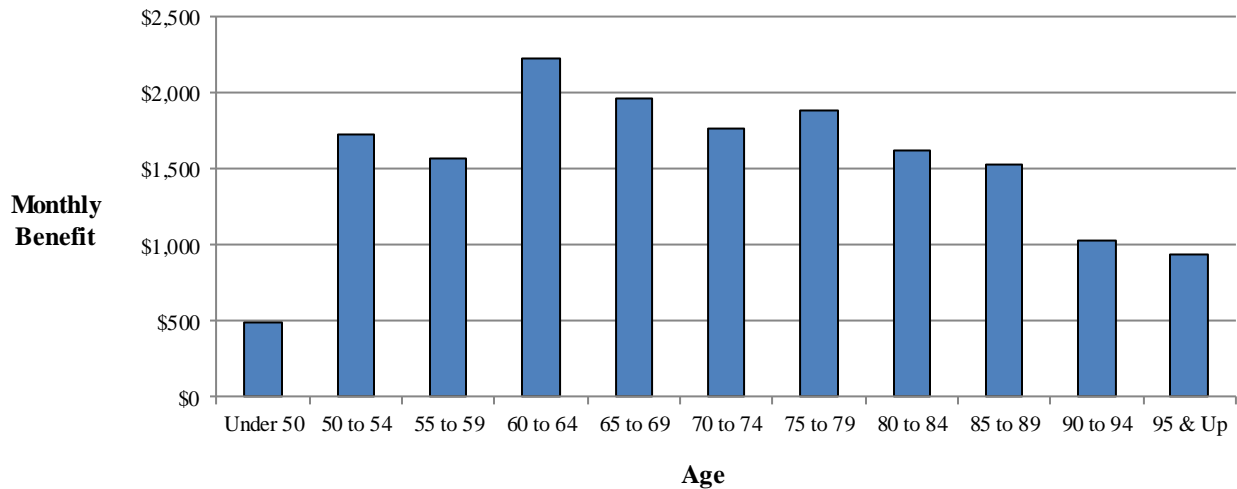
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF BENEFICIARIES
as of December 31, 2017

Total – By Gender

Age	Number			Current Monthly Benefit at Retirement		
	Male	Female	Total	Male	Female	Total
Under 50	4	3	7	\$1,897	\$ 1,517	\$ 3,414
50 to 54	1	9	10	976	16,305	17,281
55 to 59	0	15	15	0	23,450	23,450
60 to 64	0	16	16	0	35,647	35,647
65 to 69	0	24	24	0	47,130	47,130
70 to 74	1	20	21	2,421	34,630	37,051
75 to 79	0	29	29	0	54,458	54,458
80 to 84	0	31	31	0	50,386	50,386
85 to 89	0	21	21	0	32,084	32,084
90 to 94	0	9	9	0	9,207	9,207
95 & Up	0	2	2	0	1,877	1,877
Total	6	179	185	\$5,294	\$306,691	\$311,985

Average Benefit





APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Summary of Benefit Provisions

Plan A is applicable to members who entered the System between January 1, 1965 and December 31, 1978 and members who entered prior to January 1, 1965 and elected Plan A coverage.

Plan B is applicable to members who entered the System prior to January 1, 1965 and elected Plan B coverage.

Plan C is applicable to members entering the System after December 31, 1978.

SERVICE RETIREMENT

Eligibility – Plan A and Plan B: 20 years of service, regardless of age.

Eligibility – Plan C: 30 years of service, regardless of age; or 20 years of service at age 50; or 10 years of service, but less than 20 years at age 55.

Amount of Pension – all plans: Service times 2.5% of Final Average Salary to a maximum of 75% of Final Average Salary.

Final Average Salary – all plans: Average for the 3 consecutive years of service which produce the highest average and which are within the last 10 years of service.

DEFERRED RETIREMENT (VESTED TERMINATION)

Eligibility – all plans: 10 years of service; 20 years of service required to be eligible for survivor benefits.

Amount of Pension – all plans: 2.5% of Final Average Salary times years of service with payments deferred until age 55 (age 50 for Plan C members with 20 or more years of service). Vested deferred pensions for Plan C are adjusted during the deferral period based on changes in National Average Earnings, up to 5.5% annual adjustments (effective for post-1999 terminations).

SERVICE-CONNECTED DISABILITY

Eligibility – all plans: Permanent inability to perform the duties of position; no service requirement.

Amount of Pension – all plans: 75% of final salary rate if accident, 50% if disease.

Miscellaneous Conditions – all plans: Pension plus earnings from gainful employment cannot exceed current salary for rank held at time of disability. Pension recomputed at age 55 using service retirement formula, updated final average salary and service credit for period of disability.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

NON-SERVICE DISABILITY

Eligibility – all plans: Permanent inability to perform duties of position; requires 7 years of service and under age 55.

Amount of Pension – all plans: 30% of Final Average Salary plus 1% of Final Average Salary times service over 7 years; maximum is 50% of Final Average Salary.

Miscellaneous Conditions – all plans: Pension plus earnings from gainful employment cannot exceed current salary for rank held at time of disability.

SERVICE-CONNECTED DEATH

Eligibility – all plans: Death resulting directly from service-connected causes; no service requirement.

Amount of Pension – all plans: Surviving spouse – 50% of final Salary plus 10% of final Salary for each child under age 18 to a maximum of 75% of final Salary; terminates upon remarriage prior to age 40 for pensions effective prior to January 1, 2000.

Children (no surviving spouse's pension payable) – 20% of final Salary for each child under age 18 to a maximum of 60% of final Salary.

NON-SERVICE DEATH

Eligibility – Plan A and Plan C: Death after 3 years of service.

Eligibility – Plan B: Death after 20 years of service.

Amount of Pension – Plan A and Plan C: Surviving spouse – 35% of Final Average Salary plus 1% of Final Average Salary for each year of service over 3 to a maximum of 50% of Final Average Salary, plus 10% of Final Average Salary for each child under age 18 to an overall maximum of 66 2/3% of Final Average Salary; terminates upon remarriage prior to age 40 for pensions effective prior to January 1, 2000.

Children (no surviving spouse's pension payable) – 15% of Final Average Salary for each child under age 18 to a maximum of 50% of Final Average Salary.

Amount of Pension – Plan B: Surviving spouse – 50% of final Salary.

Children (no surviving spouse's pension payable) – children under 18 share equally a benefit of 50% of final Salary.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

DEATH AFTER RETIREMENT

Eligibility – all plans: Surviving spouse must have been married to retired employee for one year or more at time of death, if retired after January 1, 2000. If retired prior to January 1, 2000, must have been married to retired employee at retirement. Member must have retired with at least 20 years of service.

Amount of Pension – Plan A and Plan C: Surviving spouse – 35% of Final Average Salary plus 1% of Final Average Salary times Service over 3 years to a maximum of 50% of Final Average Salary, plus 10% of Final Average Salary for each child under 18 to an overall maximum of 66 2/3% of Final Average Salary. Post-retirement adjustments are granted from date of retirement to date of death. Terminates upon remarriage prior to age 40 for those retiring prior to January 1, 2000.

Children (no surviving spouse's pension payable) – 15% of Final Average Salary for each child under age 18 to a maximum of 50% of Final Average Salary.

Amount of Pension – Plan B: Surviving spouse – 50% of final Salary.

Children (no surviving spouse's pension payable) – children under 18 share equally a benefit of 50% of final Salary.

NON-VESTED TERMINATION

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

Amount of Benefit – all plans: Refund of member's contributions plus 5% annual interest.

FUNERAL BENEFIT

Eligibility – Plan A and Plan C: Death of member who retired after November 21, 1973.

Eligibility – Plan B: Death of retired member.

Amount of Benefit – Plan A and Plan C: \$750

Amount of Benefit – Plan B: \$100 if member retired on or prior to November 21, 1973; \$750 if member retired after November 21, 1973.

POST-RETIREMENT ADJUSTMENTS OF PENSIONS

Eligibility – all plans: Completion of 36 months of retirement.

Annual Amount – all plans: 2% of the original base amount of benefit (simple COLA).



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

BACKDROP (DEFERRED RETIREMENT OPTION PLAN)

Eligibility: Member must be eligible to retire under service retirement provisions at the effective date of the BackDROP.

Amount: Under the BackDROP, the member may elect a benefit based on a retirement date up to 60 months prior to the current date. The monthly benefit is computed based on service, Final Average Salary and benefit formula at the selected prior date. The DROP account available to the retiring member is the computed benefit multiplied by the number of months of BackDROP plus applicable post-retirement adjustments and 5% annual interest, compounded monthly. Members are eligible to elect a sixty month BackDROP beginning January 1, 2003.

EMPLOYEE CONTRIBUTIONS

Plan A: 8% of Salary
Plan B: 6% of Salary
Plan C: 7% of Salary

These member contribution rates include the 1% decrease effective in 1998 in recognition of the full funding of actuarial liabilities.

CITY CONTRIBUTIONS

Actuarially determined amounts sufficient to satisfy K.S.A. 1977 Suppl. 12-5002.

UNUSED SICK LEAVE

Each bi-weekly service credit of accumulated unused sick leave is converted to a service credit for the purpose of computing annual benefit amounts.



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

ACTUARIAL COST METHOD

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

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered compensation.

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

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called actuarial liability. Deducting actuarial assets from the actuarial liability determines the unfunded actuarial liability or (surplus). The unfunded actuarial liability/(surplus) is financed as a level percent of member payroll over an open 20-year period.

ACTUARIAL ASSUMPTIONS

Retirement System contribution requirements and actuarial present values are calculated by applying experience assumptions to the benefit provisions and membership information of the Retirement System, using the actuarial cost method.

The principal areas of risk which require experience assumptions about future activities of the Retirement System are:

- (i) Long-term rates of investment return to be generated by the assets of the System
- (ii) Patterns of pay increases to members
- (iii) Rates of mortality among members, retirees and beneficiaries
- (iv) Rates of termination of employment of active members
- (v) Rates of disability among active members
- (vi) The age patterns of actual retirements



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

In making a valuation, the monetary effect of each assumption is calculated for as long as a present current member survives – a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time, one or more of the assumptions are modified to reflect experience trends (but not random or temporary year-to-year fluctuations). A complete review of the actuarial assumptions was completed in 2014. The use of updated assumptions was first effective with the December 31, 2014 valuation.

Investment Rate of Return (net of administrative expenses): This assumption is 7.75% a year, compounded annually and consists of 3.25% long-term price inflation and a 4.50% real rate of return over price inflation. This assumption, used to equate the value of payments due at different points in time, was adopted by the Board and was first used for the December 31, 1980 valuation, although the allocation between inflation and real return has changed periodically, most recently in 2014.

Salary Increase Rates: These rates are used to project current salary amounts to those upon which a benefit will be based.

Years of Service	Annual Rate of Salary Increase for Sample Service Durations			
	Inflation Component	Productivity Component	Merit and Longevity	Total
1	3.25%	0.75%	2.75%	6.75%
5	3.25	0.75	2.75	6.75
10	3.25	0.75	2.75	6.75
15	3.25	0.75	2.75	6.75
20	3.25	0.75	1.00	5.00
25	3.25	0.75	1.00	5.00
30	3.25	0.75	1.00	5.00

The assumption was first used for the December 31, 2014 valuation.

The salary increase assumptions are expected to produce 4.00% annual increases in active member payroll (the inflation and productivity base rate) given a constant active member group size. This is the same payroll growth assumption used to amortize the unfunded actuarial liability. The real rate of return over assumed wage growth is 3.75% per year.

Changes actually experienced in average pay and total payroll have been as follows:

	Year Ended					5 Year (Average) Compounded Annual Increase
	12/31/17	12/31/16	12/31/15	12/31/14	12/31/13	
Average Payroll	1.9%	1.5%	2.7%	(0.2%)	2.0%	1.6%
Total Payroll	3.7%	2.8%	0.9%	(1.7%)	2.1%	1.5%



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

Mortality Table: This assumption is used to measure the probabilities of members dying.

Healthy Retirees
And Beneficiaries: RP-2000 Healthy Annuitant Table for Males and Females

Disabled Retirees: RP-2000 Disabled Table for Males and Females

Active Members: RP-2000 Employee Table for Males and Females

The RP-2000 Tables are used with generational mortality.

Sample Ages ⁽¹⁾	Present Value of \$1 Monthly for Life		Future Life Expectancy (Years)	
	Men	Women	Men	Women
50	\$138.63	\$141.98	32.3	34.6
55	132.05	135.41	27.6	29.7
60	122.80	127.04	23.0	25.1
65	111.13	116.91	18.5	20.7
70	97.31	104.80	14.5	16.7
75	81.63	90.90	10.9	13.0
80	65.36	75.76	7.9	9.8
85	49.97	60.20	5.6	7.1

(1) Reflects values from the basic table based on ages in 2000

This table was first used for the December 31, 2004 actuarial valuation.

Rates of Retirement and BackDROP (Deferred Retirement Option Plan) Elections: This assumption is used to measure the probability of eligible members retiring from active employment and applicable elections under the BackDROP program.

Percent Retiring within Year

Service of Member	Plans A & B		Age of Member	Plan C			
	Police	Fire		Less Than 30 YOS		30 or More YOS	
				Police	Fire	Police	Fire
28 or less	5%	5%	50	10%	10%	10%	20%
29	5	5	51	10	10	10	20
30	10	5	52	10	10	10	20
31	10	5	53	20	15	10	20
32	30	25	54	20	15	10	20
33	50	25	55	20	10	10	25
34	50	25	56	20	10	30	25
35	100	100	57	20	20	30	30
Over 35	100	100	58	20	15	30	50
			59	20	15	30	50
			60	100	100	100	100
			Over 60	100	100	100	100

These rates were first used for the December 31, 2014 valuation.



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

In addition, we assumed members who retire under service retirement provisions elect a BackDROP of up to 60 months which maximizes the actuarial value of the retirement benefit determined as of the retirement date. For the determination of actuarial value, the funding valuation assumptions are used.

Rates of Separation from Active Membership: This assumption measures the probabilities of a member terminating employment. The rates do not apply to members who are eligible to retire.

Years of Service	Percent Separating Within Year	
	Police	Fire
0-4	5.50%	3.00%
5-7	3.00	3.00
8-13	3.00	2.00
14-15	1.00	2.00
16-22	1.00	0.00
Over 22	0.00	0.00

These rates were first used for the December 31, 2014 valuation.

Forfeiture of Vested Benefits: The assumption is that a percentage of the actuarial present value of vested termination benefits will be forfeited by a withdrawal of accumulated contributions.

Years of Service	Percent Forfeiting
10-14	75%
15-19	10
20 or more	0

This table were first used for the December 31, 2014 actuarial valuation.

Rates of Disability: This assumption measures the probabilities of a member becoming disabled.

Sample Ages	% of Active Members Becoming Disabled During Next Year	
	Police	Fire
20	0.09%	0.07%
25	0.15	0.12
30	0.30	0.24
35	0.49	0.39
40	0.69	0.54
45	0.88	0.70
50	1.08	0.85
55	1.28	0.91

These rates were first used for the December 31, 2014 valuation.



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

Rates of Recovery from Disability: Assumed to be zero.

Administrative Expenses: Assumed to be paid from investment earnings.

Active Member Group Size: Assumed to remain constant.

Vested Deferred Pensions: Amounts for Plan C are assumed to increase during the deferral period at 4.0% per year, compounded annually. This assumption was changed with the December 31, 2009 valuation.

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Marriage Assumption: 80% of non-retired participants are assumed to be married for purposes of death benefits. In each case, the male was assumed to be three years older than the female.

Service Related Death and Disability: All active member deaths and 75% of active member disablements are assumed to be service related.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year at the start of the year in which the decrement is assumed to occur.

Benefit Service: Service calculated to the nearest month, as of the decrement date, is used to determine the amount of benefit payable.

Other: The termination of employment decrement does not operate during retirement eligibility.

Miscellaneous Loading Factors: The calculated normal retirement benefits were increased by 3% to account for the inclusion of unused sick leave in the calculation of Service. This assumption was first used for the December 31, 2014 valuation.

BackDROP Election: 100% of eligible participants are assumed to elect the BackDROP option upon retirement, and for the maximum DROP period possible.



APPENDIX D: GLOSSARY OF TERMS

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