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January 14, 2020

Board of Trustees

Lexington-Fayette Urban County Government Policemen's and Firefighters' Pension Plan

Lexington-Fayette Urban County Government

200 East Main Street

Lexington, KY 40507

Dear Members of the Board:

We are pleased to submit herewith the results of the actuarial valuation of the Lexington-Fayette Urban County Government Policemen's and Firefighters' Pension Plan prepared as of July 1, 2019. The purpose of this report is to provide a summary of the funded status of the Plan as of July 1, 2019 and to recommend contribution rates. A separate report will be issued for reporting accounting information under GASB 67. The Lexington-Fayette County Government is solely responsible for the accuracy and comprehensiveness of the data.

The promised benefits of the Plan reflecting the changes in HB 430 are included in the actuarially calculated contribution rates which are developed using the entry age normal cost method. Actuarial value of plan assets is used for actuarial valuation purposes. The assumptions used for this valuation were developed in the experience study for the six-year period ending June 30, 2016 except for the investment rate of return. This valuation uses 7.50% as the investment rate of return. Gains and losses are reflected in the unfunded accrued liability that is being amortized over a closed period on a level dollar basis. The actuarially determined employer contribution rate is 38.63% of payroll for the plan year ending June 30, 2021. The assumptions recommended by the actuary and adopted by the Board are in the aggregate reasonably related to the experience under the Plan and to reasonable expectations of anticipated experience under the Plan.

This is to certify 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 Plan and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the Plan. The investment return assumption, which was set by the Board, is a prescribed assumption defined by Actuarial Standard of Practice No. 27 (ASOP 27). Details and discussion regarding the return assumption are shown in the report of the experience study for the six-year period ending June 30, 2016.



Future actuarial results 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 economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

We trust that the report will meet the approval of the Board and will furnish the desired information concerning the financial condition of the Plan. The undersigned are members of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

A handwritten signature in blue ink that reads 'Todd B. Green' followed by a horizontal flourish.

Todd B. Green ASA, FCA, MAAA
President

A handwritten signature in blue ink that reads 'Beverly Bailey' in a cursive style.

Beverly Bailey ASA, EA, FCA, MAAA
Senior Actuary



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**LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT
POLICEMEN'S AND FIREFIGHTERS' RETIREMENT FUND
REPORT OF ACTUARY
ON THE VALUATION
PREPARED AS OF JULY 1, 2019**

SECTION I – SUMMARY OF PRINCIPAL RESULTS

1. For convenience of reference, the principal results of the current and preceding valuations are summarized below.

Valuation Date	July 1, 2019	July 1, 2018
Active members:		
Number	1,193	1,180
Annualized compensation	\$ 81,651,049	\$ 78,063,051
Retired members and beneficiaries:		
Number	1,261	1,232
Annual benefits	\$ 62,018,546	\$ 59,805,952
Assets:		
Market Value	\$ 766,780,680	\$ 745,170,974
Actuarial Value	756,269,783	725,884,686
Unfunded actuarial accrued liability	\$ 262,549,034	\$ 253,949,666
Amortization Period	24	25
Fiscal Years Ending	2021	2020
Actuarially determined contribution rate (ADC):		
Normal	11.40%	11.84%
Accrued liability	<u>27.23</u>	<u>27.15</u>
Total	38.63%	38.99%
Member contribution rate	12.00%	12.00%



2. The major benefit and contribution provisions of the Plan as reflected in the valuation are summarized in Schedule G. The actual cost-of-living allowances granted through July 1, 2019 were reflected in the valuation.
3. The development of the actuarial value of assets is shown in Schedule C. Schedule E of this report outlines the full set of actuarial assumptions and methods used in the valuation.
4. The entry age normal actuarial cost method was used to prepare the valuation. Schedule F contains a brief description of the actuarial cost method. The cost method produces a contribution rate equal to the sum of the normal contribution rate and the actuarially accrued liability contribution rate which is sufficient to amortize the unfunded actuarially accrued liability over 30 years beginning July 1, 2013 on a level dollar basis. Effective July 1, 2013, and for each fiscal year thereafter, the Government contribution shall not be less than \$20 million unless the Plan is 100% funded.
5. Any member who has at least five years of service as a member of the fund may purchase up to four years of service. The amount required to purchase service is based on an actuarial formula.
6. Comments on the valuation results as of July 1, 2019 are given in Section IV and further discussion of the contributions is set out in Section V.
7. The assumptions used for this valuation were developed in the experience study for the six-year period ending June 30, 2016 except for the investment rate of return. The investment return assumption, which was set by the Board, is a prescribed assumption defined by Actuarial Standard of Practice No. 27 (ASOP 27). Details and discussion regarding the return assumption are shown in the report of the experience study for the six-year period ending June 30, 2016.



SECTION II – MEMBERSHIP DATA

1. Data regarding the membership of the Plan for use as a basis of the valuation were furnished by the Government. The valuation included 1,193 active members with annualized compensation totaling \$81,651,049.
2. The following table shows the number of retired members and beneficiaries as of July 1, 2019 together with the amount of their annual retirement benefits payable under the Plan as of that date.

**THE NUMBER AND ANNUAL BENEFITS OF
RETIRED MEMBERS AND BENEFICIARIES
AS OF JULY 1, 2019**

GROUP	NUMBER	ANNUAL RETIREMENT BENEFITS
Service Retirements	668	\$ 37,671,426
Disability Retirements	416	19,174,810
Beneficiaries of Deceased Members	<u>177</u>	<u>5,172,310</u>
Total	1,261	\$ 62,018,546

3. Table 1 of Schedule H shows the distribution by age and years of membership service of the number of active members included in the valuation, while Table 2 shows the number and annual benefits of retired members and beneficiaries included in the valuation, distributed by age.

SECTION III – ASSETS

As of July 1, 2019, the total market value of assets amounted to \$766,780,680. The actuarial value of assets used for the current valuation was \$756,269,783. Schedule C shows the development of the actuarial value of assets as of July 1, 2019. Schedule D shows the Summary of Receipts and Disbursements.



SECTION IV – COMMENTS ON VALUATION

1. Schedule B of this report contains the valuation balance sheet which shows the present and prospective assets and liabilities of the Plan as of July 1, 2019. The valuation was prepared in accordance with the actuarial assumptions set forth in Schedule E and the actuarial cost method which is described in Schedule F.
2. The valuation balance sheet shows that the Plan has total prospective liabilities of \$1,174,516,007 of which \$742,258,820 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, and \$432,257,187 is for the prospective benefits payable on account of present active members. Against these liabilities, the Plan has a total present actuarial value of assets of \$756,269,783 as of July 1, 2019. The difference of \$418,246,224 between the total liabilities and the total present assets represents the present value of future contributions.
3. The contributions to the Plan consist of normal contributions and accrued liability contributions. The valuation indicates that normal contributions at the rate of 23.40% of payroll are required under the entry age normal method. Of this amount, 12.00% is paid by the members and the remaining 11.40% is required by the Government.
4. Prospective normal contributions at the rate of 23.40% have a present value of \$155,697,190. When this amount is subtracted from \$418,246,224, which is the present value of the total future contributions to be made, there remains \$262,549,034 as the amount of unfunded accrued liability contributions. The development of the unfunded accrued liability is shown in Schedule A.



SECTION V – CONTRIBUTIONS PAYABLE

1. Under Section 67A.520 of the law governing the Fund, the Government shall make current contributions to the Fund on an actuarially funded basis equal to the sum of the normal contribution rate and the actuarially accrued contribution rate that will be sufficient to amortize the total unfunded actuarial accrued liability over a period of thirty years beginning July 1, 2013 using the level-dollar amortization method.
2. The normal contribution rate is calculated as the level percentage of payroll which, if applied for the average new member during the entire period of his anticipated covered service, would be required to meet the cost of all benefits payable on his behalf. On the basis of the valuation, the normal contribution rate was determined to be 23.40%.
3. Each member shall contribute an amount equal to 12.00% of current salary.
4. The Government's normal contribution rate is equal to the difference between the normal contribution rate of 23.40% and the member contribution rate of 12.00%, or 11.40% of payroll.
5. The annual accrued liability contribution rate is determined to be 27.23% of payroll. Contributions at this level would be sufficient to amortize the unfunded accrued liability over a 24 year period on a level dollar basis.
6. The actuarially determined employer contribution rate for the plan years ending June 30, 2021 is, therefore, 38.63% of payroll.
7. The following table on the following page summarizes the employer contributions which were determined by the July 1, 2019 valuation and are recommended for use.



**ANNUAL REQUIRED CONTRIBUTION RATE
FOR PLAN YEARS ENDING JUNE 30, 2021**

CONTRIBUTION	PERCENTAGE OF ACTIVE MEMBERS' COMPENSATION
Normal	11.40%
Accrued Liability	<u>27.23</u>
Total	38.63%

SECTION VI – OTHER DISCLOSURES

1. The information required under the Governmental Accounting Standards (GASB) Statements No. 67 and 68 for the Plan and the City will be issued in separate reports. We are providing the following information for informational purposes only.

**NUMBER OF ACTIVE AND RETIRED PARTICIPANTS
AS OF JULY 1, 2019**

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	1,261
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	0
Active Participants	<u>1,193</u>
Total	2,454



2. Another such item is the schedule of funding progress as shown below.

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
7/01/2014	\$579,749,633	\$760,384,029	\$180,634,396	76.2%	\$63,248,485	285.6%
7/01/2015	623,184,562	794,383,474	171,198,912	78.4	62,102,632	275.7
7/01/2016	645,681,282	830,279,771	184,598,489	77.8	63,869,423	289.0
7/01/2017	686,133,702	947,659,684	261,525,982	72.4	73,559,366	355.5
7/01/2018	725,884,686	979,834,352	253,949,666	74.1	78,063,051	325.3
7/01/2019	756,269,783	1,018,818,817	262,549,034	74.2	81,651,049	321.6

3. Additional information as of July 1, 2019 follows:

Valuation date	July 1, 2019
Actuarial cost method	Entry age normal
Amortization period	Level dollar, closed
Remaining amortization period	24 years
Asset valuation method	Actuarial Related Value
Actuarial assumptions:	
Investment rate of return (includes inflation)	7.50%
Projected salary increases (includes inflation)	9.50% to 3.50%
Inflation	2.75%
Cost-of-living adjustments	Refer to Schedule G



SECTION VII – EXPERIENCE

The following table shows the change in the accrued actuarial liability and the actuarial value of assets from July 1, 2018 to July 1, 2019 .

DETERMINATION OF ACTUARIAL (GAIN) / LOSS

A. Accrued Actuarial Liability (Gain) / Loss Analysis	
1. Actual Accrued Actuarial Liability as of July 1, 2018	\$979,834,352
2. Normal Cost	\$18,607,908
3. Interest on items 1 and 2 [(1+2) x 7.5%]	\$74,883,170
4. Benefit Payments	(\$61,014,042)
5. Interest on item [4 x 7.5% x .5]	(\$2,288,027)
6. Expected Accrued Actuarial Liability as of July 1, 2019 (1. + 2. + 3. + 4. + 5.)	<u>\$1,010,023,361</u>
7. Changes due to:	
a. Assumption changes	\$0
b. Plan amendments	\$0
c. Funding Method	\$0
d. Other	\$0
8. Actual Accrued Actuarial Liability as of July 1, 2019	<u>\$1,018,818,817</u>
9. Liability (Gain) / Loss [8. - 7 - 6.]	\$8,795,456
10 Items Affecting Calculation of Accrued Actuarial Liability:	
a. Plan provisions reflected in the accrued liability (see Schedule G)	
b. Actuarial assumptions and methods used to determine actuarial accrued liability (see Schedule E and Schedule F)	
B. Asset (Gain) / Loss Analysis	
1. Actuarial Value of Assets as of July 1, 2018	\$725,884,686
2. Interest on item [1 x 7.5%]	\$54,441,351
3. Contributions and Other Revenue	\$40,745,909
4. Interest on item [3 x 7.5% x .5]	\$1,527,972
5. Benefit Payments	(\$61,014,042)
6. Interest on item [5 x 7.5% x .5]	(\$2,288,027)
7. Expected Actuarial Value of Assets as of July 1, 2019	<u>\$759,297,849</u>
8. Actuarial Value of Assets as of July 1, 2019	<u>\$756,269,783</u>
9. Asset (Gain) / Loss	\$3,028,066
C. Total Actuarial (Gain) / Loss During 2018 / 2019 Plan Year (A.9 + B.9)	\$11,823,522



ANALYSIS OF (GAIN) / LOSS

1. Expected Unfunded Accrued Liability as of July 1, 2019: (Page 8: A.6 - B.7)		\$250,725,512
2. Change in Unfunded Accrued Liability During 2018/2019 Plan Year:		
a. Due to Salary	\$3,188,799	
b. Due to Investment Performance	\$3,028,066	
c. Due to Turnover	\$745,931	
d. Due to New Retirements	\$8,666,865	
e. Due to Disability Retirements	\$115,377	
f. Due to Data/Service Adjustments/Benefit Payments	(\$4,869,492)	
g. Due to New Members	\$299,611	
h. Due to Mortality	\$648,366	
i. Other	\$0	
j. Due to Assumption Changes	\$0	
k. Due to Method Changes	\$0	
l. Due to Plan Changes	\$0	
3. Total (Gain) / Loss During the 2018/2019 Plan Year (Sum of changes in item 2)		\$11,823,522
4. Unfunded Accrued Liability as of July 1, 2019: (1. + 3.)		\$262,549,034
5. Comments on Change in Unfunded Accrued Liability Contribution Rate:		
<u>Salary/Service:</u> Actual average salary increase of 6.8% compared to expected increases of 6.2%		
<u>Investment Performance:</u> 7.1% actual vs. 7.5% expected return on the actuarial value of assets.		
<u>Turnover:</u> Net effect on the valuation liabilities of actual deaths, terminations of employment and disabilities different from what was anticipated in the aggregate by the assumptions related to those events.		
<u>New retirements:</u> Net effect of differences in expected vs. actual numbers of, and benefits for, new retirements and refund of employee contributions.		
<u>Due to Differences and Timing of Contributions:</u> Due to the one year lag of when the required contribution is determined and when it is deposited into the fund.		
<u>Data/Service Adjustments:</u> Effect of service adjustments, data adjustments, and the difference between actual and expected benefit payments.		
<u>Assumption Changes:</u> None.		
<u>Method Changes:</u> None		
<u>Plan Changes:</u> None		



SECTION VIII – RISK CONSIDERATIONS

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

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

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

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

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. The Plan is primarily funded by member and employer contributions to the trust fund, together with the earnings on these accumulated contributions. These contributions fund benefit accruals for current active members and administrative expenses. The remainder of the contributions amortizes the unfunded actuarial accrued liability. The required contribution rate is the sum of the rates for the normal cost for the plan and the amortization of the unfunded actuarial accrued liability. The required contribution rate is sensitive to increases in the UAAL and periods of lower than expected returns would lead to much higher contribution rates as a percentage of payroll.



The other significant risk factor for the Plan is investment return because of the volatility of returns and the size of plan assets compared to payroll. A perusal of historical returns over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is to be expected, given the underlying capital market assumptions and the Plan's asset allocation. To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results.

A key demographic risk for the Plan is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect a margin for improvement in mortality experience these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The following exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.



**Historical Asset Volatility Ratios
(in 1,000's)**

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

Fiscal Year End	Market Value of Assets (\$ Thousands)	Covered Payroll (\$ Thousands)	Asset Volatility Ratio
2012	\$ 509,410	\$ 54,596	9.33
2013	556,724	62,456	8.91
2014	636,281	63,248	10.06
2015	634,716	62,103	10.22
2016	619,901	63,869	9.71
2017	695,183	73,559	9.45
2018	745,171	78,063	9.55
2019	766,781	81,651	9.39

The assets at June 30, 2019 are 939% of payroll, so underperforming the investment return assumption by 1.00% (i.e., earn 6.50% for one year) is equivalent to 9.39% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAL, this illustrates the risk associated with volatile investment returns.



Historical Cash Flows
(in 1,000's)

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments and administrative expenses. If the Plan has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. The Plan has negative cash flows of around which ranges from 3% to 4% for the prior five years, so there is no immediate concern.

Fiscal Year End	Market Value of Assets (\$ Thousands)	Contributions (\$ Thousands)	Benefit Payments & Expenses (\$ Thousands)	Net Cash Flow (\$ Thousands)	Net Cash Flow as % of Market Value
2012	\$ 509,410	\$ 55,608	\$ 47,050	\$ 8,558	1.68
2013	556,724	33,802	52,696	(18,893)	(3.39)
2014	636,281	37,367	57,512	(20,145)	(3.17)
2015	634,716	32,586	53,953	(21,366)	(3.37)
2016	619,901	34,328	56,432	(22,104)	(3.57)
2017	695,183	40,995	59,950	(18,955)	(2.73)
2018	745,171	38,335	62,529	(24,194)	(3.25)
2019	766,781	40,746	63,636	(22,890)	(2.99)



**Liability Maturity Measurement
(in 1,000's)**

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations, and in some cases declining active populations, resulting in an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the remaining baby boomers over the next decade is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs. Below are two tables which demonstrate the ratio of the System's retiree liability compared to the total accrued liability and the ratio of the number of retirees and beneficiaries to the number of active members.

Fiscal Year End	Retiree Liability (\$ Thousands)	Total Actuarial Liability (\$ Thousands)	Retiree Percentage
2012	\$ 515,328	\$ 687,674	74.94%
2013	549,781	738,343	74.46%
2014	568,740	760,384	74.80%
2015	594,160	794,383	74.80%
2016	627,125	830,280	75.53%
2017	691,861	947,660	73.01%
2018	718,005	979,834	73.28%
2019	742,259	1,018,819	72.85%

Historical Member Statistics

Fiscal Year End	Active Count	Retiree Count	Active to Retiree Ratio
2012	1,014	997	1.02
2013	1,064	1,047	1.02
2014	1,097	1,070	1.03
2015	1,111	1,116	1.00
2016	1,123	1,161	0.97
2017	1,144	1,201	0.95
2018	1,180	1,232	0.96
2019	1,193	1,261	0.95



SCHEDULE A

DEVELOPMENT OF THE UNFUNDED ACTUARIAL ACCRUED LIABILITY

		July 1, 2019
(1)	Present value of prospective benefits:	
(a)	Present active members	\$ 432,257,187
(b)	Present retired members, beneficiaries and former members entitled to deferred vested benefits	<u>742,258,820</u>
(c)	Total	\$ 1,174,516,007
(2)	Present value of future Government and member normal contributions before expenses	<u>155,697,190</u>
(3)	Actuarial accrued liabilities 1(c) – (2)	\$ 1,018,818,817
(4)	Actuarial value of assets	<u>756,269,783</u>
(5)	Unfunded actuarial accrued liability (3) – (4)	\$ 262,549,034



SCHEDULE B
VALUATION BALANCE SHEET

<u>ACTUARIAL LIABILITIES</u>		
Present value of prospective benefits payable on account of present retired members, beneficiaries of deceased members, and terminated members entitled to deferred benefits		\$ 742,258,820
Present value of prospective benefits payable on account of present active members		<u>\$ 432,257,187</u>
Total liabilities		<u>\$1,174,516,007</u>
<u>PRESENT AND PROSPECTIVE ASSETS</u>		
Actuarial value of assets		\$ 756,269,783
Present value of future contributions		
Government and member normal contributions	155,697,190	
Unfunded accrued liability contributions	<u>262,549,034</u>	
Total prospective contributions		\$ 418,246,224
Total assets		<u>\$1,174,516,007</u>



SCHEDULE C
Development of Actuarial Value of Assets

Valuation date June 30:	2018	2019	2020	2021	2022	2023
A. Actuarial Value Beginning of Year	\$ 686,133,702	\$ 725,884,686				
B. Market Value End of Year	745,170,974	766,780,680				
C. Market Value Beginning of Year	695,183,216	745,170,974				
D. Cash Flow						
D1. Contributions	\$ 38,326,772	\$ 40,633,488				
D2. Other Revenue	8,396	112,421				
D3. Benefit Payments	(59,050,010)	(61,014,042)				
D4. Administrative Expenses	(306,716)	(317,040)				
D5. Investment Expenses	<u>(3,172,768)</u>	<u>(2,305,126)</u>				
D6. Net	\$ <u>(24,194,326)</u>	\$ <u>(22,890,299)</u>				
E. Investment Income						
E1. Market Total: B.-C.-D6.	\$ 74,182,084	\$ 44,500,005				
E2. Assumed Rate (Net of Expenses)	7.50%	7.50%				
E3. Amount for Immediate Recognition	54,841,419	57,749,934				
E4. Amount for Phased-In Recognition	19,340,665	(13,249,929)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20 * E4.	\$ 3,868,133	\$ (2,649,986)	\$ -	\$ -	\$ -	\$ -
F2. First Prior Year	9,020,438	3,868,133	(2,649,986)	-	-	-
F3. Second Prior Year	(8,534,428)	9,020,438	3,868,133	(2,649,986)	-	-
F4. Third Prior Year	(6,178,693)	(8,534,428)	9,020,438	3,868,133	(2,649,986)	-
F5. Fourth Prior Year	<u>10,928,441</u>	<u>(6,178,695)</u>	<u>(8,534,429)</u>	<u>9,020,436</u>	<u>3,868,133</u>	<u>(2,649,985)</u>
F6. Total Recognized Investment Gain	\$ 9,103,891	\$ (4,474,538)	\$ 1,704,156	\$ 10,238,583	\$ 1,218,147	\$ (2,649,985)
G. Preliminary Actuarial Value End of Year A.+D6.+E3.+F6.	\$ 725,884,686	\$ 756,269,783				
H. Corridor						
H1. 80% of Market Value	\$ 596,136,779	\$ 613,424,544				
H2. 120% of Market Value	\$ 894,205,169	\$ 920,136,816				
I. Actuarial Value End of Year H. Not Less than H1. or Greater than H2	\$ 725,884,686	\$ 756,269,783				
J. Difference Between Market & Actuarial Values	\$ 19,286,288	\$ 10,510,897	\$ 8,806,745	\$ (1,431,838)	\$ (2,649,985)	\$ -
K. Market Value of Assets Return	10.32%	5.70%				
L. Actuarial Value of Assets Return	8.95%	7.08%				

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 5 consecutive years, actuarial value will become equal to market value.



SCHEDULE D

SUMMARY OF RECEIPTS AND DISBURSEMENTS

<u>Receipts for the Period</u>	
Contributions:	
Members	10,356,318
Employer	30,277,170
Other	<u>112,421</u>
Total	40,745,909
Investment Income	<u>42,194,879</u>
TOTAL	82,940,788
<u>Disbursements for the Period</u>	
Benefit Payments	61,014,042
Administrative Expense	<u>317,040</u>
TOTAL	61,331,082
<u>Excess of Receipts over Disbursements</u>	21,609,706
<u>Reconciliation of Asset Balances</u>	
Market Value of Assets as of BOY	745,170,974
Adjustment to opening fund balance	0
Excess of Receipts over Disbursements	<u>21,609,706</u>
Market Value of Assets as of EOY	766,780,680
Rate of Return on Market Value of Assets	5.70%



SCHEDULE E

OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS

INVESTMENT RATE OF RETURN: 7.50% per year, compounded annually.

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

<u>Service</u>	<u>Wage Inflation</u>	<u>Merit Component</u>	<u>Total Rate</u>
0	3.50%	5.80%	9.50%
1	3.50	4.35	8.00
2	3.50	3.38	7.00
3	3.50	2.42	6.00
4	3.50	1.93	5.50
5-11	3.50	1.45	5.00
12 or more	3.50	0.00	3.50

SEPARATIONS FROM ACTIVE SERVICE: For death rates, the RP-2000 Combined Table projected to the valuation date with scale BB was used. Representative values of the assumed annual rates of separation from active service are as follows:

<u>Age</u>	<u>Annual Rate of</u>		
	<u>Disability</u>	<u>Death</u>	
		<u>Male</u>	<u>Female</u>
20	0.01%	0.03%	0.02%
25	0.01	0.04	0.02
30	0.55	0.04	0.03
35	1.21	0.08	0.05
40	1.91	0.11	0.07
45	2.71	0.15	0.11
50	3.67	0.21	0.17
55	4.77	0.36	0.27



Annual Rate of Termination	
<u>Service</u>	<u>Rate</u>
0	6.00%
1	5.00
2	4.00
3	4.00
4	2.25
5	2.25
6	2.25
7	2.25
8 or more	1.00

SERVICE RETIREMENT: Representative annual rates of assumed service retirement are as follows:

Hired Prior to July 1, 2013		Hired on or after July 1, 2013	
<u>Service</u>	<u>Rate</u>	<u>Service</u>	<u>Rate</u>
20	15.0%		
21	16.0		
22	17.0		
23	18.0		
24	19.0		
25	20.0	25	30.0%
26	30.0	26	30.0
27	30.0	27	30.0
28	30.0	28	30.0
29	30.0	29	30.0
30	100.0	30	100.0



DEATHS AFTER RETIREMENT: The RP-2000 Combined Mortality Table projected to the valuation date using scale BB for the period following service retirement, for beneficiaries of deceased members, and for disabled lives. The assumed rates of mortality provide a margin for future mortality improvements.

OCCUPATIONAL VS. NON OCCUPATIONAL DEATH: 20% of all deaths are assumed to be due to occupational causes.

OCCUPATIONAL VS. NON OCCUPATIONAL DISABILITY: 95% of disabilities are assumed to be due to occupational causes. For occupational disabilities the average benefit percentage is assumed to be 50.0%.

PERCENT MARRIED: 75% of employees who die before retirement are assumed to be married with the husband 3 years older than the wife.

ASSETS: Actuarial value, as developed in Schedule C. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value. The actuarial value of assets cannot be more than 120% or less than 80% of the market value of assets.

VALUATION METHOD: Entry age normal actuarial cost method. See Schedule F for a brief description of this method.

AVERAGE DISABILITY IMPAIRMENT PERCENTAGE: 12.50%



SCHEDULE F

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (currently 7.50%), of each member's expected benefits at retirement or death is determined, based on age, service and sex. The calculations take into account the probability of a member's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service, disability or survivor's benefit. The present value of the expected benefits payable on account of the active members is added to the present value of the expected future payments to retired members and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of members and beneficiaries.
2. The employer contributions required to support the benefits of the Plan are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the entry age normal actuarial cost method. Under this method, a calculation is made to determine the level percentage of payroll which, if applied for the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.
4. The unfunded accrued liability is determined by subtracting the present value of prospective employer normal contributions and member contributions, together with the current actuarial value of assets held, from the present value of expected benefits to be paid from the Plan.



SCHEDULE G

**SUMMARY OF MAIN PLAN PROVISIONS
AS INTERPRETED FOR VALUATION PURPOSES**

Member	Sworn members of the Lexington-Fayette Urban County Government Division of Police and Division of Fire and Emergency Services.
Membership Service	Service rendered on or after the date of establishment of the fund or the fund of a city existing within the boundaries of the government immediately prior to the establishment of the urban-county government.
Total Service	Prior service, membership service, and service credit purchased by a member as provided in KRS 67A.402.
Average Salary	The highest average salary of the member for any three consecutive years of service.
Retirement Annuity	
Hired prior to July 1, 2013 and for retirements commencing prior to July 1, 2013	

Eligibility	Anytime after completion of 20 years of Total Service (including service purchased up to 4 years).
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Benefit	Annuity is 2½% of Average Salary multiplied by years of Total Service. The minimum monthly benefit is \$1,250.
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Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.

Hired prior to July 1, 2013 and for retirements commencing on or after July 1, 2013

Eligibility	Anytime after obtaining age 41 and the completion of 20 years of Total Service (including service purchased up to 4 years).
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Benefit	Annuity is 2½% of Average Salary multiplied by years of Total Service. The minimum monthly benefit is \$1,250.
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Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired



member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.

Hired on or after July 1, 2013

Eligibility

Anytime after obtaining age 50 and the completion of 25 years of Total Service.

Benefit

Annuity is 2.25% of Average Salary multiplied by years of Total Service. The minimum monthly benefit is \$1,250.

Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.

Occupational Disability Benefit

Eligibility

No requirements.

Occur Prior to July 1, 2013

Benefit

Annuity equal to a minimum of 60% of member's last rate of salary, increased above the 60% minimum by $\frac{1}{2}$ the amount by which the member's percentage of disability exceeds 20%, but not greater than 75%. The member's percentage of disability shall be the average of the impairment rating determined by two physicians selected by the Board using the American Medical Association "Guide to the Evaluation of Permanent Impairment". If a member is eligible for a service retirement annuity and the amount of the service retirement annuity exceeds the amount of the disability benefit, then the member may elect to receive an additional service retirement annuity equal to this difference.

Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.



In addition, any minor children will receive benefits as provided under the occupational death benefit provisions.

Occur on or after July 1, 2013

Benefit

Annuity equal to a minimum of 50% of member's last rate of salary. If the member's percentage of disability exceeds 20% then the amount is equal to 60% of the member's last rate of salary plus $\frac{1}{2}$ the amount by which the member's percentage of disability exceeds 20%, but not greater than 75%. The member's percentage of disability shall be the average of the impairment rating determined by two physicians selected by the Board using the American Medical Association "Guide to the Evaluation of Permanent Impairment". If a member is eligible for a service retirement annuity and the amount of the service retirement annuity exceeds the amount of the disability benefit, then the member may elect to receive an additional service retirement annuity equal to this difference.

Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.

In addition, any minor children will receive benefits as provided under the occupational death benefit provisions.

Non-Occupational Disability Benefit

Hired prior to July 1, 2013

Eligibility

5 years of Total Service.

Benefit

$2\frac{1}{2}\%$ of Average Salary times years of Total Service subject to a minimum payment of 25% of Average Salary and a maximum payment of 75% of Average Salary.

Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.



In addition, any minor children will receive benefits provided under the non-occupational death benefit provisions.

Hired on or after July 1, 2013

Eligibility

5 years of Total Service.

Benefit

2.25% of Average Salary times years of Total Service subject to a minimum payment of 22.5% of Average Salary and a maximum payment of 67.5% of Average Salary.

Upon the death of a retired member whose marriage was in effect at least six months before retirement or one year prior to death, the surviving spouse shall receive an annuity equal to 60% of the member's final annuity or final rate of pay, whichever is greater, unless the retired member elected an alternative actuarial equivalent form at the time of retirement of either a joint and 75% or and joint and 100% survivor payment form.

In addition, any minor children will receive benefits provided under the non-occupational death benefit provisions.

Termination Benefit

If a member is terminated with less than 20 years of total service credit, he is entitled to a return of his accumulated contributions, without interest.

Occupational Death Benefit

Eligibility

No requirements.

Benefit

Surviving Spouse receives immediate annuity equal to 75% of the member's last rate of salary until death or remarriage.

In addition, 10% of the member's last rate of salary is payable for each minor child until each child attains age 18 (age 23 if involved in educational activities). Maximum total income is 100% of final rate of salary.

If no surviving spouse or upon remarriage, then minor children will receive a benefit based on the following schedule:

One minor child	50% of Salary
Two minor children	65% of Salary
Three or more minor children	75% of Salary



Non-Occupational Death Benefit

Eligibility 5 Years of Total Service, married 6 months prior to death.

Benefit Surviving spouse received immediate annuity equal to 1½% of the Average Salary multiplied by years of Total Service, until death or remarriage. The minimum benefit is 15% of Average Salary. In addition, this annuity is increased by ½ for the first minor child and by ¼ for each additional child. Maximum total income is 75% of Average Salary.

If no surviving spouse or upon remarriage, then minor children will receive a benefit based on the following schedule:

One minor child	50% of Salary
Two minor children	65% of Salary
Three or more minor children	75% of Salary

Member Contributions

Prior to July 1, 2013, active members contribute 11% of current salary. Effective July 1, 2013 active member contributions will increase from 11% to 12%.

Employer Contributions

The government shall make current contributions to the fund on an actuarially funded basis. Such contributions shall be equal to the sum of:

- (1) An amount resulting from the application of a rate percent of salaries of active members determined under the entry age normal cost funding method, and
- (2) An amount sufficient to amortize the total unfunded liability actuarial accrued liability for the fund over a period of thirty years, using the level dollar amortization method, for a period beginning July 1, 2013 and ending June 30, 2043.

The total contribution of the government shall be at least \$20,000,000 until the actuarial funding level is at least 100%.



Post Retirement Cost-of-Living Increases

COLAs will be granted on the following schedule for both current and future retirees commencing upon the earlier of a member turning age 50 or being retired for five years until the Plan, utilizing the current COLA provisions, is 85% funded. At that time, COLA's will be granted each year by an amount, determined by the Board, of not less than 2.00% nor more than 5.00% compounded annually. In addition, those receiving a pension over \$100,000 will not be eligible to receive a COLA until the later of the proposed conditions or January 1, 2016.

Above \$100,000	1.0%
\$75,000 to \$99,000	1.0%
\$50,000 to \$74,999	1.5%
\$40,000 to \$49,999	1.5%
\$35,000 to \$39,999	2.0%
\$30,000 to \$34,999	2.0%
Under \$30,000	2.0%



SCHEDULE H

TABLE 1

DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND SERVICE GROUPS

AS OF JULY 1, 2019

Attained Age	Completed Years of 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	
Under 25	21	19	1								41
Avg. Pay	41,263	45,549	46,929								43,388
25 to 29	29	152	21	2							204
Avg. Pay	40,252	47,829	55,417	51,062							47,565
30 to 34	18	101	103	13							235
Avg. Pay	41,039	47,705	56,179	66,688							51,958
35 to 39	3	26	73	85	39	1					227
Avg. Pay	42,407	50,584	58,219	70,023	77,417	83,512					64,965
40 to 44		2	26	47	97	26					198
Avg. Pay		51,983	58,208	70,992	81,111	85,584					75,995
45 to 49			8	29	53	83	12				185
Avg. Pay			64,484	73,966	75,494	89,051	100,673				82,494
50 to 54			1	12	22	20	20	1			76
Avg. Pay			60,786	73,004	77,540	90,300	106,212	148,705			88,443
55 to 59					9	8	5				22
Avg. Pay					84,496	88,632	116,614				93,299
60 to 64							1	2			3
Avg. Pay							87,683	99,489			95,554
65 to 69					2						2
Avg. Pay					69,862						69,862
70 & up											
Avg. Pay											
Total	71	300	233	188	222	138	38	3			1,193
Avg. Pay	40,842	47,909	57,241	70,631	78,803	88,514	105,344	115,894			65,338



TABLE 2
NUMBER OF RETIRED MEMBERS AND BENEFICIARIES
AND THEIR BENEFITS BY AGE

<u>Attained Age</u>	<u>Number of Members</u>	<u>Total Annual Benefits</u>	<u>Average Annual Benefit</u>
50 & Under	185	\$ 7,240,181	\$ 39,136
51 – 55	161	8,324,909	51,708
56 – 60	177	9,971,548	56,336
61 – 65	155	9,271,512	59,816
66 – 70	167	8,687,058	52,018
71 – 75	183	8,690,436	47,489
76 – 80	120	5,377,774	44,815
Over 80	<u>113</u>	<u>4,455,126</u>	<u>39,426</u>
Total	1,261	\$ 62,018,545	\$ 49,182