

**CITY OF PADUCAH
POLICE AND FIREFIGHTERS
PENSION FUND**

VALUATION AS OF JULY 1, 2016

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At the request of the Board of Trustees, Bryan, Pendleton, Swats & McAllister, LLC, has undertaken a valuation of the City's Pension Plan for Police and Firefighters as of July 1, 2016. This Plan has been adopted pursuant to KRS 95.851 to KRS 95.884. KRS 95.872(6) requires a valuation of the Plan at least once every three years. Effective August 1, 1988, the plan was closed to new entrants, and current members were given a choice of remaining in this plan or transferring into the County Employees Retirement System (CERS). This valuation reflects those elections made by current members.

Included in this report is a brief summary of the Plan's provisions, an analysis of recent experience, an explanation of the actuarial assumptions used, a summary of the results of the valuation and tables showing detailed information with regard to the valuation of the plan.

RETIREMENT DATE

Any time after attainment of age 50, provided that at least 20 years of service have been completed.

RETIREMENT INCOME

2½% of average salary times years of service up to and including 30 years. The maximum is 75% of average salary. Average salary is the highest average salary of the member for any 3 consecutive years of service.

VESTING

Rights in a service retirement annuity vest upon completion of 20 years of service. A member withdrawing from service prior to age 50, with 20 years of service or more, may receive a refund of contributions, or in lieu thereof, a service retirement annuity beginning at age 50.

OCCUPATIONAL DEATH BENEFITS

The widow is entitled to immediate income equal to 50% of the member's last rate of pay, regardless of the length of the employee's service. This income ceases at the widow's death or remarriage. In addition, 25% of the member's salary is payable to the widow for each minor child until each child attains age 18. The maximum total payment to the widow and minor children is 75% of the member's salary. However, the Board has established a minimum benefit of \$735.69 per month for certain widows.

If no widow survives or if she remarries, each minor child is entitled to 15% of the member's final salary until the child reaches age 18. The maximum total payment is 50% of the member's salary.

If neither a widow nor minor children survive the member, then each dependent parent is entitled to 25% of the member's salary.

NON-OCCUPATIONAL DEATH BENEFITS

If a member dies after completing at least 3 years of service, his widow is entitled to 1½% of his average salary times his years of service (to a maximum of 50%), subject to the following provisions:

1. The widow and member had been married at least one year prior to his death.
2. Payment is deferred until the widow reaches age 45 unless she becomes disabled or she has minor children in her care.
3. The widow's income ceases if she remarries.
4. The widow's income is increased by ½ for the first minor child and by ¼ for each additional child. Maximum total income to widow and minor children is 75% of average salary.
5. The Board has established a minimum benefit of \$735.69 per month for certain widows.

These benefits are also payable upon the death of a retired member provided marriage was in effect at least one year before retirement.

OCCUPATIONAL DISABILITY BENEFITS

Member receives income equal to 70% of his final rate of pay. Upon his death, his survivors receive benefits under the occupational death benefit provision.

NON-OCCUPATIONAL DISABILITY BENEFITS

If a member becomes disabled after completing at least 10 years of service, then he is entitled to a disability income equal to 2½% of average salary times years of service subject to a minimum payment of 25% of average salary and a maximum payment of 50% of average salary.

EMPLOYEE CONTRIBUTIONS

Each active member contributes 8% of current salary.

POST-RETIREMENT COST-OF-LIVING INCREASE

Each retired member's income may be increased by an amount as determined by the actuarial study. The maximum increase is 5% a year. This increase is made only if supportable on an actuarially sound basis by the fund. KRS 95.859(3) provides:

“(3) Within six (6) months after the performance of the actuarial study required by KRS 95.872(6), the rate of retirement annuity of each annuitant shall be increased annually by an amount determined by the study to reflect so much of the annual increase in the cost of living of the annuitant **as may be supported on an actuarially sound basis by the fund**. So long as the same is published, such studies shall rely on the percentage increase in the annual average of the consumer price index for all items for the most recent calendar year as published by the United States Department of Labor's Bureau of Labor Statistics, not to exceed five percent (5%). In any year that the percentage increase in the annual average of the consumer price index for all items is less than five percent (5%), the board may set the annual increase at a rate higher than the increase of the consumer price index but not in excess of five percent (5%), if the board determines that the increase can be supported on an actuarially sound basis by the fund. The increases shall be payable to all members of the fund on the effective date of the increases, and all increases granted on July 15, 1990, or thereafter shall be compounded.”

KRS 95.859(2) provides that the widow's minimum benefit shall be increased by the same percentage as the increase in Social Security benefits, not to exceed five percent (5%).

REFUND OF EMPLOYEE CONTRIBUTIONS

Upon termination, a member may receive a refund of his accumulated contributions to the fund, without interest.

The ultimate cost of any retirement system will be the amount of benefits paid out over the years plus the expense of administration, minus the investment return of the fund. Under a formal retirement program, it is necessary to set aside funds in advance to provide for the benefits as they come due in order to avoid continual rapidly increasing pension costs. The need for advance funding introduces many complications in attempting to determine the amount of funds that should be set aside annually to provide protection for future retirees and their beneficiaries. It is impossible to determine with certainty the exact future cost of a retirement plan. Thus, an actuarial valuation is an estimate based upon the experience of the actuary with the use of statistical and mathematical tools.

In order to estimate annual pension costs, it is necessary to make projections of a number of future occurrences. These "actuarial assumptions" are used in conjunction with all of the data on pensioners, beneficiaries and active members to project the level of future benefit payments. The following projections must be made:

1. The expected rate of earnings on any funds set aside for payment of benefits.
2. The approximate number of years that a retired employee will live after retirement.
3. The number of deaths, disabilities and withdrawals that will take place from the present working force.
4. The salary level of individuals in the future.
5. The ages at which individuals will retire, and whether these retirements will be for disability or service.
6. The number of employees married at retirement, and how many will be survived by a spouse.
7. The percentage of deaths and disabilities due to occupational causes.

It is the responsibility of the actuary to select each of the assumptions. My determinations are described below.

RATE OF RETURN

This is the most important assumption in determining the required contribution for this plan. Investment return is anticipated to be the major source of additional funds for payment of benefits. The assumed rate of return is a long-term average. It is expected that the fund's actual earnings will be higher in some years, and lower in others. The fund's rate of return is determined primarily by the asset allocation – the classes in which it is invested, and the performance of the associated markets. Prior to July 1, 2007, the assumed rate of return was 7.75%. For the plan years beginning after July 1, 2007 through July 1, 2011, we used an assumed rate of return of 8.00%. For the July 1, 2012 plan year, we returned to the assumed rate of return of 7.75%. For the July 1, 2013 plan year, we changed the assumed rate of return to 7.50%. For the July 1, 2014 plan year, we changed the assumed rate of return to 7.25%. Beginning with the July 1, 2015 plan year, we have changed the assumed rate of return to 7.00%. Beginning with the July 1, 2016 plan year, we have changed the assumed rate of return to 6.75%.

POST-RETIREMENT MORTALITY

After investment return, this assumption has the greatest impact on contribution requirements. The rate of mortality determines the life expectancy of the retiree or beneficiary, and therefore, the total amount of retirement benefits expected to be paid by the Plan. The City of Paducah's Plan does not have a sufficient number of members to establish statistically credible mortality data. In the prior year valuation, we used the 1971 Group Annuity Mortality Table, with distinct rates for males and females, as the best estimate of future post-retirement mortality experience of the plan. The actual experience of the plan to date has

not deviated sufficiently from this table to indicate that a change in the assumption is necessary. Therefore, we have not changed the assumption. Also consistent with last year, we have used the UP-1984 table set forward 5 years for participants retiring due to disability.

PRE-RETIREMENT EMPLOYEE TURNOVER

This includes several distinct assumptions, including

1. Retirement age
2. Employee turnover from resignation or discharge
3. Service related disability
4. Non-service related disability
5. Service related mortality
6. Non-service related mortality

The combination of all of these assumptions has a negligible effect on required plan liabilities, because the majority of plan liabilities relate to beneficiaries in pay status and participants who have already retired. Therefore, in order to simplify the valuation process, we have selected a set of actuarial assumptions that, in combination, produces a reasonable estimate of future liabilities while minimizing the complexity of the valuation.

The assumptions used are as follows.

Retirement age	60
Employee turnover	None
Service related disability	See table below
Non-service related disability	None
Service related mortality	UP-1984 table set forward 2 years
Non-service related mortality	None

Sample rates are shown below.

Age	Service Related Disability	Service Related Mortality
25	.256%	.108%
30	.312%	.117%
35	.393%	.164%
40	.550%	.256%
45	.839%	.418%
50	1.313%	.685%
55	2.018%	1.081%
60	3.254%	1.701%

SALARY INCREASES

Since the plan bases benefits on final average salary, the actuary must project the employee's salary at retirement. Like the turnover assumption, this is a relatively minor assumption for this plan because it affects only the active employee's liability, which is a small part of the total liability of the plan. Generally, the actuary projects future salaries by increasing current salaries by a compound percentage each year. This percentage includes three factors: inflation, productivity increases (on a macroeconomic level), and career advancement. For this valuation we are assuming inflation at the rate of 3%, productivity increases of .5% and career increases of .5%. Therefore, we are projecting future salaries to increase at the compound rate of 4% per year.

During the plan year ending June 30, 2012, active participants received a one time Firefighter Lawsuit payment that was included in pensionable earnings. Because future earnings are expected to return to pre-lawsuit levels, expected 2012-2013 compensation rates were determined without the one time Firefighter Lawsuit payment.

OTHER ASSUMPTIONS

In order to perform the valuation, it is necessary to make a number of other assumptions that have a smaller impact on the results than those discussed above. These assumptions are as follows.

1. **Marriage.** For active employees, it is assumed that 90% will be married upon retirement. We have further assumed the spouse's age would be equal to the employee's age. For retired participants, we have used data supplied by the City regarding the marital status of each participant and the spouse's date of birth. We have assumed no divorce or remarriage.
2. **Dependents.** For purposes of valuing pre-retirement death benefits, we have assumed that all participants would have some dependents. We have approximated this cost by calculating the liability as if each participant were married to a spouse of equal age.
3. **Benefit Elections.** We have assumed that each participant, given a choice of benefits, would choose the benefit of greatest value. Therefore, if a participant is eligible to withdraw employee contributions in lieu of an annuity benefit, we have assumed the employee would select the annuity.

The method of valuation employed is the “entry age normal” method. Under this method, an annual normal cost is established for each employee. This normal cost is the level percent of pay that, if contributed each year from the date of a member's employment until his retirement date, would fully fund his benefits at retirement. The past service liability represents the sum of money that would have been accumulated had these normal costs been contributed for each year in the past for each employee currently with the City, and for all retired employees and beneficiaries. The remainder of the liabilities is for future contribution of the normal cost.

The State statute requires that the Plan's death benefit be funded on a one-year term basis (that is, the cost of providing the protection for the next year only) rather than a level payment spread over an employee's working lifetime. The one-year term method, which can result in rapidly increasing costs, was employed to calculate pre-retirement survivor benefits, but post-retirement death benefits were deemed part of retirement costs and calculated under the level funding approach.

A part of the funding method is the method of valuing plan assets. For purposes of this valuation, assets have been valued at market value.

The plan contains the following provisions for cost of living adjustments:

KRS 95.859(3) provides:

“(3) Within six (6) months after the performance of the actuarial study required by KRS 95.872(6), the rate of retirement annuity of each annuitant shall be increased annually by an amount determined by the study to reflect so much of the annual increase in the cost of living of the annuitant as may be supported on an actuarially sound basis by the fund. So long as the same is published, such studies shall rely on the percentage increase in the annual average of the consumer price index for all items for the most recent calendar year as published by the United States Department of Labor's Bureau of Labor Statistics, not to exceed five percent (5%). In any year that the percentage increase in the annual average of the consumer price index for all items is less than five percent (5%), the board may set the annual increase at a rate higher than the increase of the consumer price index but not in excess of five percent (5%), if the board determines that the increase can be supported on an actuarially sound basis by the fund. The increases shall be payable to all members of the fund on the effective date of the increases, and all increases granted on July 15, 1990, or thereafter shall be compounded.

Note: The increase in the CPI for the plan year ending June 30, 2016 was 1.0%.

KRS 95.868 provides, in part:

“Contributions by City. - The city shall make current contributions to the fund on an actuarially funded basis, toward the annuities and benefits herein provided.”

KRS 95.872(6) provides, in part:

“The board may employ actuarial assistance from time to time ... to determine rates of city contribution.... Within six (6) months after the establishment, an actuarial study shall be made.... At least once every three (3) years thereafter, an actuarial survey and investigation shall be made.... The actuary shall recommend all mortality and interest tables to be adopted by the board, and shall recommend, if appropriate, cost of living increases as provided in KRS 95.859....”

Based on these provisions, it is the responsibility of the actuary to recommend a cost of living increase, if it is supported on an actuarially sound basis by the fund. In some years, a cost of living increase may be supported by the fund only if the City of Paducah increases its annual employer contribution. Based on the decision of the Court of Appeals of the Commonwealth of Kentucky in the case of Keeton v. City of Ashland (July 1, 1994), an increase can be actuarially supported with the consent of the City to make the additional contributions. For the plan year beginning July 1, 2016 utilizing an assumed rate of return of 6.75%, no discretionary cost of living increase can be supported on an actuarially sound basis by the fund without the City having to contribute additional funds to cover the increase.

On November 17, 2005, the City made an additional contribution of \$5,992,751 to the plan. This amount was equal to the unfunded Past Service Liability before reflecting a cost of living adjustment as of July 1, 2005. The intent of the City was to settle its responsibility for all benefits accrued at that time. Going forward, the City will continue to contribute its share of the Normal Cost for actives plus an amortization of any additional unfunded Past Service Liability that arises due to unfavorable actuarial and investment experience. If an actuarial valuation demonstrates that the fund can support it, additional cost of living increases may be approved by the Pension Fund Board of Trustees in accordance with KRS 95.859(3).

During the plan year ending June 30, 2016, the plan experienced actuarial gains of approximately \$111,824 and investment earnings that were approximately \$267,065 less than expected. In general, this means that plan participants experienced higher mortality than projected, and investment returns were less than the 7.00% anticipated. In addition, the change in the discount rate from 7.00% to 6.75% increased the plan liability by \$156,880. The net result of the actuarial and investment experience was a loss of approximately \$312,121. With this loss, the Past Service Liability exceeds the market value of assets by \$4,249,213 (excluding the widow cost of living adjustment) as of July 1, 2016. This deficit will be amortized and funded over a 17 year period beginning July 1, 2016. This deficit means that no discretionary cost of living adjustment can be made without the City having to make additional contributions.

KRS 95.868, which defines the amount of the City's contribution to the fund, provides that the City shall make contributions to the Fund "on an actuarially funded basis...." The statute provides for a minimum contribution equal to the normal cost, plus interest on the unfunded Past Service Liability, but does not require payments towards principal on the Past Service Liability. The result of contributing the statutory minimum would be that the fund would eventually run out of money before all benefits were paid. In order to prevent this problem, it has been the policy of the City in the past to make a contribution equal to the normal cost, plus an amortization payment on the unfunded Past Service Liability. The amortization period is to June 30, 2033. The amortization period has been selected to ensure the continuous solvency of the fund.

On this basis, the minimum actuarially sound contribution for this year is \$434,758. This amount provides for the cost of benefits earned during the 2016-2017 plan year and the amortization of unfunded liabilities. This contribution assumes no cost of living increase is adopted for either the Social Security eligible widows or the regular retirees. Historically, this contribution figure has covered the full cost of the cost of living increase for Social Security eligible widows. This year, a 0.0% cost of living increase was provided for the Social Security eligible widows, so the total minimum actuarially sound contribution for the year remains \$434,758.

Historically, a minimum actuarially sound contribution has been shown for granting a cost of living increase based on the change in the consumer price index. If a cost of living increase were granted based on the change in the consumer price index, a 1.0% cost of living increase would be granted for all retirees and beneficiaries. However, due to the current plan deficit of \$4,249,213, no cost of living increase has been calculated for retirees and beneficiaries under this scenario. Thus, the minimum actuarially sound contribution would remain \$434,758.

In past years, the City has elected to pay the entire cost of a cost of living increase in the year in which it is granted, rather than amortizing the cost. On this basis, the recommended contribution would be \$434,758 assuming a 0.00% cost of living increase is adopted for all retirees and beneficiaries.

Effective July 1, 2005, the City issued Pension Obligation Bonds in order to eliminate the Plan's unfunded Past Service Liability. As of July 1, 2005, this amount was \$5,992,751. This amount did not include the 2005-2006 cost of living increases. Those increases were excluded from the calculation because the City already had included in the 2005-2006 budget an amount sufficient to fund the entire cost of a 1% cost of living increase for pensioners and a Social Security cost of living for Group A widows.

The City will continue to contribute the Normal Cost each year for the remaining active employee. Future actuarial and investment experience will result in either a positive or negative position when comparing the plan's assets to the Past Service Liability. If the results of an actuarial valuation indicate that the plan is in a surplus position, the Pension Board of Trustees will consider granting an additional cost of living increase. If actual experience results in future unfunded Past Service Liability, the City will be responsible for making additional contributions to eliminate the unfunded liability. Further, the City will not be responsible for future unfunded Past Service Liability that arises due to the Pension Board's granting of cost-of-living increases when not supported on an actuarially sound basis as determined by the annual actuarial valuation.

As of July 1, 2016, the plan has a deficit position of \$4,249,213, so no discretionary cost of living increase can be supported without additional contributions. The City should contribute \$434,758 to the Plan to pay the Normal Cost for actives, amortize the unfunded liability and provide for the required cost of living increase for Social Security eligible widows (0.0% this year).

Effect of Firefighter Lawsuit

During the plan year ending June, 30, 2012, a select group of participants received pensionable compensation from a Firefighter Lawsuit. This compensation resulted in a one time payment to the one active employee and increased benefit payment amounts for two retirees.

Assuming compensation returns to pre-lawsuit levels during the plan year ending June 30, 2013, a 4% salary scale after the plan year ending June 30, 2013 and termination of employment within the next 3 years, the projected normal retirement benefit is approximately 7% larger than it otherwise would be without the increased lawsuit compensation. After three years (assuming 4% salary increases), the effect of the increased lawsuit compensation diminishes. Therefore, because the current active employee is assumed to retire at age 60 (in year 2023), the 2011-2012 inflated compensation is not included in the final projected benefit, and the effect of the lawsuit on the active liability and recommended contribution is not material (approximately 0.76% increase). The change in inactive liability due to the increased benefit payments is also immaterial (approximately 0.15% increase).

VALUATION RESULTS

	<u>7/1/2016</u>	<u>7/1/2015</u>	<u>7/1/2014</u>
A. Normal Cost - Entry Age Normal Method			
1. Retirement and Disability Benefits	7,855	8,840	7,423
2. Death Benefits (Term Cost)	3,232	3,961	3,130
3. Less Expected Employee Contributions	(4,494)	(6,088)	(5,354)
4. Interest Adjustment	445	470	377
Total	<u>7,038</u>	<u>7,183</u>	<u>5,576</u>
B. Liability for Prior Service (Entry Age Normal Accrued Liability)			
1. Active Employees	268,522	342,232	276,120
2. Retired Members and Beneficiaries	9,624,952	10,113,334	10,691,632
3. Required COLA – Group A Widows (0.0%)	0	7,345	8,158
4. Discretionary COLA	n/a	n/a	n/a
Total	<u>9,893,474</u>	<u>10,462,911</u>	<u>10,975,910</u>
C. Assets at Market Value	5,644,261	6,408,638	7,135,789
D. Unfunded Prior Service Liability (B - C)	4,249,213	4,054,273	3,840,121
E. Unfunded Prior Service Liability (B - C – B(3)) (Excluding COLA)	4,249,213	4,046,928	3,831,963
F. Minimum Statutory City Contribution			
1. KRS 95.868 - Normal Cost	7,038	7,183	5,576
2. KRS 95.868 - Interest on (D)	286,822	283,799	278,409
Total	<u>293,860</u>	<u>290,982</u>	<u>283,985</u>
G. Minimum Actuarially Sound Contribution			
1. Normal Cost	7,038	7,183	5,576
2. Required COLA – Group A Widows (0.0%)	0	7,345	8,158
3. Amortization of (E) (17 years as of July 1, 2016)	427,720	402,316	377,734
Total Minimum City Contribution	<u>434,758</u>	<u>416,844</u>	<u>391,468</u>

This valuation is based on participant data provided by the City, and asset valuation information provided by the trustees. We have not audited this information.

It is my opinion that the assumptions used in this valuation are appropriate and reasonably related to the experience of the plan. The assumptions are my best estimate of anticipated experience of the plan. The methods employed in this valuation are consistent with generally accepted actuarial principles and practices. It is my opinion that the information presented in this report fully and fairly discloses the actuarial position of the plan.

Respectfully submitted,



S. Kevin Sullivan
Fellow, Society of Actuaries
Enrollment Number 14-6235