Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

GASB STATEMENT NO. 67 REPORT

FOR THE

STATE POLICE RETIREMENT SYSTEM

PREPARED AS OF JUNE 30, 2016

www.CavMacConsulting.com

August 30, 2016

Board of Trustees
Kentucky Retirement System
Perimeter Park West
1260 Louisville Road
Frankfort, KY 40601

Ladies and Gentlemen:

Presented in this report is information to assist the State Police Retirement System (SPRS) in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 67. The information is presented for the period ending June 30, 2016.

The annual actuarial valuation used as a basis for much of the information presented in this report was performed as of June 30, 2015. The valuation was based upon data, furnished by the Executive Director and the Kentucky Retirement System staff, concerning active, inactive and retired members along with pertinent financial information.

To the best of our knowledge, this report is complete and accurate. The necessary calculations were performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems.

The calculations were prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, and, in our opinion, meet the requirements of GASB 67.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the calculations were completed in compliance with the laws governing the System. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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.

Respectfully submitted,

Todd B. G

Beverly V Bailey

Todd B. Green, ASA, FCA, MAAA
Principal and Consulting Actuary

Beverly V. Bailey, ASA, EA, FCA, MAAA
Senior Actuary

TBG:bvb

TABLE OF CONTENTS

REPORT OF THE ANNUAL GASB STATEMENT NO. 67
REQUIRED INFORMATION FOR THE
STATE POLICE RETIREMENT SYSTEM
PREPARED AS OF JUNE 30, 2016

SECTION I – INTRODUCTION

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), "*Financial Reporting For Pension Plans*", in June 2012. GASB 67's effective date is for plan years beginning after June 15, 2013. This report, prepared as of June 30, 2014 (the Measurement Date), presents information to assist the State Police Retirement System in meeting the requirements of GASB 67. Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of the State Police Retirement System as of June 30, 2015. The results of that valuation were detailed in a report dated November 10, 2015.

GASB 67 divorces accounting and funding, creating disclosure and reporting requirements that may or may not be consistent with the basis used for funding the System.

A major change in GASB 67 is the requirement to determine the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial funding method. The Net Pension Liability (NPL) is then set equal to the TPL minus the System's Fiduciary Net Position (FNP) (basically the market values of assets). The benefit provisions recognized in the calculation of the TPL are summarized in Schedule B.

Among the assumptions needed for the liability calculation is a Single Equivalent Interest Rate (SEIR). To determine the SEIR, the FNP must be projected into the future for as long as there are anticipated benefits payable under the plan's provision applicable to the membership and beneficiaries of the System on the Measurement Date. If the FNP is projected to not be depleted at any point in the future, the long term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the SEIR.

If, however, the FNP is projected to be depleted, the SEIR is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. The rate used, if necessary, for this purpose is the Bond Buyer General Obligation 20-year

Municipal Bond Index published monthly by the Board of Governors of the Federal Reserve System.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information (RSI).

SECTION II – FINANCIAL STATEMENT NOTES

The material presented herein will follow the order presented in GASB 67. Paragraph numbers are provided for ease of reference.

Paragraphs 30(a) (1)-(3): The information required is to be supplied by the System.

Paragraph 30(a) (4): The data required regarding the membership of the State Police Retirement System were furnished by the furnished by the Executive Director and the Kentucky Retirement System staff. The following table summarizes the membership of the system as of June 30, 2015, the Valuation Date.

Membership

	Number
Inactive Members Or Their Beneficiaries Currently Receiving Benefits	1,379
Inactive Members Entitled To But Not Yet Receiving Benefits	262
Active Members	924
Total	2,565

Paragraphs 30(a)(5)-(6) and Paragraphs 30(b)-(f): The information required is to be supplied by the System.

Paragraphs 31(a) (1)-(4): The information is provided in the following table. As stated above, the NPL is equal to the TPL minus the FNP. That result as of June 30, 2016 is presented in the table below.

	Fiscal Year Ending June 30, 2016
Total Pension Liability	$795,421,298
Fiduciary Net Position	218,012,479
Net Pension Liability	$577,408,819
Ratio of Fiduciary Net Position to Total Pension Liability	27.41%

Paragraph 31(b) (1)(a)-(f): This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The actuarial assumptions utilized in developing the TPL are outlined in Schedule C. The total pension liability was determined by an actuarial valuation as of June 30, 2015, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.25 percent
Salary increases	4.0 percent, average, including inflation
Investment rate of return	6.75 percent, net of pension plan investment expense, including inflation

The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females). For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females). For disabled members, the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. There is some margin in the current mortality tables for possible future improvement in mortality rates and that margin will be reviewed again when the next experience investigation is conducted.

The actuarial assumptions used in the June 30, 2015 valuation were based on the results of an actuarial experience study for the period July 1, 2008 – June 30, 2013. The long-term assumed rate of return is based on an analysis adopted by the Board on December 3, 2015.

Paragraph 31.b.(1)

- **(a) Discount rate:** The discount rate used to measure the total pension liability was 6.75%
- **(b) Projected cash flows:** The projection of cash flows used to determine the discount rate assumed that the employer would contribute the actuarially determined contribution rate of projected compensation. The remaining amortization period of the unfunded actuarial accrued liability is 28 years. Once the unfunded actuarial accrued liability is fully amortized, the employer will only contribute the normal cost rate and the administrative expense rate on the closed payroll for existing members.
- **(c) Long term rate of return:** The long-term expected return on plan assets is reviewed as part of the regular experience studies prepared every five years for the System. The most recent analysis was dated December 3, 2015. Several factors are considered in evaluating the long-term rate of return assumption including long term historical data, estimates inherent in current market data, and a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed by the investment consultant for each major asset class. These ranges were combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The assumption is intended to be a long term assumption and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.
- **(d) Municipal bond rate:** the discount rate determination does not use a municipal bond rate.
- **(e) Periods of projected benefit payments:** projected future benefit payments for all current plan members were projected through 2117.

(f) **Assumed Asset Allocation:** The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Global Equity	54%	5.30%
Intermediate Duration Fixed Income	9	1.00
Custom KRS Fixed Income	9	3.33
Core Real Estate	5	4.25
Diversified Hedge Funds	10	4.00
Private Equity	2	8.00
Diversified Inflation Strategy	8	3.15
Cash Equivalent	3	-0.25
Total	100%	

Paragraph 31(b) (1) (g): This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of percent, as well as what the System's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate:

	1% Decrease (5.75%)	Current Discount Rate (6.75%)	1% Increase (7.75%)
System's net pension liability	$665,253,333	$577,408,819	$503,953,106

Paragraph 31(c): June 30, 2015 is the actuarial valuation date upon which the TPL is based. An expected TPL is determined as of June 30, 2016 using standard roll forward techniques. The roll forward calculation adds the annual normal cost (also called the service cost), subtracts the actual benefit payments and refunds for the plan year and then applies the expected investment rate of return for the year. The procedure was used to determine the TPL as of June 30, 2016, as shown in the table below:

	TPL Roll Forward	(1) TPL Reported for Fiscal Year Ended 2015	(2) TPL Reported for Fiscal Year Ended 2016
(a)	Interest Rate	7.50%	6.75%
(b)	Valuation Date for Measurement	June 30, 2015	June 30, 2015
(c)	TPL as of June 30, 2015	$734,156,446	$790,462,092
(d)	Entry Age Normal Cost for the period July 1, 2015 – June 30, 2016	$7,815,521	$9,162,854
(e)	Actual Benefit Payments and Refunds for the period July 1, 2015 – June 30, 2016	$56,278,918	$56,278,918
(f)	TPL as of July 1, 2016 =[(c+d) x (1 + (a))] – [e x (1 + (a)/2)]	$739,230,487	$795,421,298
(g)	Assumption Change: =(2f) – (1f)		$56,190,811

SECTION III – REQUIRED SUPPLEMENTARY INFORMATION

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements:

> **Paragraphs 32(a)-(c):** The required tables are provided in Schedule A.
> **Paragraph 32(d):** The money-weighted rates of return required are to be supplied by the System.

Paragraph 34: In addition the following should be noted regarding the RSI:

Changes of benefit terms: none.

Changes of assumption: The following changes were adopted by the Board and reflected in the valuation performed as of June 30, listed below:

2016

- The assumed investment rate of return was decreased from 7.50% to 6.75%.

2015

- The assumed investment rate of return was decreased from 7.75% to 7.50%.
- The assumed rate of inflation was reduced from 3.50% to 3.25%.
- The assumed rate of wage inflation was reduced from 1.00% to 0.75%.
- Payroll growth assumption was reduced from 4.50% to 4.00%.
- The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).
- For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females). For disabled members, the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. There is some margin in the current mortality tables for possible future improvement in mortality rates and that margin will be reviewed again when the next experience investigation is conducted.
- The assumed rates of Retirement and Withdrawal were updated to more accurately reflect experience.

Method and assumptions used in calculations of actuarially determined contributions. The actuarially determined contribution rates are determined on an annual. The amortization period of the unfunded liability has been reset as of July 1, 2013 to a closed 30-year period. The following actuarial methods and assumptions were used to determine contribution rates reported in that schedule:

Actuarial cost method	Entry age
Amortization method	Level percentage of payroll, closed
Remaining amortization period	28 years
Asset valuation method	5-year smoothed market
Inflation	3.25 percent
Salary increase	4.0 percent, average, including inflation
Investment rate of return	6.75 percent, net of pension plan investment expense, including inflation

SCHEDULE A

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY
GASB 67 Paragraph 32(a)

	2016	2015	2014
Total pension liability			
Service Cost	8,401,685	7,695,435	7,141,935
Interest	52,951,274	50,661,229	50,390,898
Benefit changes	0	0	0
Difference between expected and actual experience	0	9,330,978	0
Changes of assumptions	56,190,811	40,200,657	0
Benefit payments	(56,267,681)	(54,765,255)	(53,025,585)
Refunds of contributions	(11,237)	(85,000)	(213,540)
Net change in total pension liability	61,264,852	53,038,044	4,293,708
Total pension liability - beginning	734,156,446	681,118,402	676,824,694
Total pension liability - ending (a)	795,421,298	734,156,446	681,118,402
Plan net position			
Contributions - employer	25,822,003	31,989,753	20,279,448
Contributions - member	5,262,749	5,244,508	5,075,173
Net investment income	(3,843,029)	3,425,666	40,373,917
Benefit payments	(56,267,681)	(54,765,255)	(53,025,585)
Administrative expense	(177,909)	(201,108)	(214,953)
Refunds of contributions	(11,237)	(85,000)	(213,540)
Other	0	644,756	0
Net change in plan net position	(29,215,104)	(13,746,680)	12,274,460
Plan net position - beginning	247,227,579	260,974,259	248,699,799
Prior Period Adjustment	4	0	0
Plan net position - ending (b)	218,012,479	247,227,579	260,974,259

SCHEDULE OF THE NET PENSION LIABILITY
GASB 67 Paragraph 32(b)

	2016	2015	2014
Total pension liability	795,421,298	734,156,446	681,118,402
Plan net position	218,012,479	247,227,579	260,974,259
Net pension liability	577,408,819	486,928,867	420,144,143
Ratio of plan net position to total pension liability	27.41%	33.68%	38.32%
Covered-employee payroll	46,684,796	45,764,515	44,615,885
Net pension liability as a percentage of covered-employee payroll	1,236.82%	1,063.99%	941.69%

SCHEDULE OF EMPLOYER CONTRIBUTIONS

GASB 67 Paragraph 32(c)

($ in Thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Actuarially determined employer contribution	25,723	31,444	25,808	23,117	20,498	18,463	18,765	15,952	13,823	9,024
Actual employer contributions	25,822	31,990	20,279	18,501	15,362	12,657	9,489	8,186	7,443	6,142
Annual contribution deficiency (excess)	(99)	(546)	5,529	4,616	5,136	5,806	9,276	7,766	6,381	2,882
Covered-employee payroll	46,685	45,765	44,616	45,256	48,373	48,693	51,507	51,660	53,269	49,248
Actual contributions as a percentage of covered-employee payroll	55.31%	69.90%	45.45%	40.88%	31.76%	25.99%	18.42%	15.85%	13.97%	12.47%

<u>**SCHEDULE B**</u>

SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

This schedule summarizes the major retirement benefit provisions of SPRS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year: July 1 through June 30

Normal Retirement:

Members whose participation began before 9/1/2008

Age Requirement 55

Service Requirement At least one month of hazardous duty service credit

Amount If a member has at least 60 months of service, the monthly benefit is 2.50% multiplied by final average compensation, multiplied by years of service.

Final compensation is calculated by taking the average of the highest three (3) fiscal years of salary. If the number of months of service credit during the three (3) year period is less than twenty-four (24), one (1) or more additional fiscal years shall be used.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

Members whose participation began on or after 9/1/2008 but before 1/1/2014

Age Requirement 60

Service Requirement At least 60 months of hazardous duty service credit

Amount The monthly benefit is the following benefit factor based on service credit at retirement, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.30%
10+ – 20 years	1.50%
20+ – 25 years	2.25%
25+ years	2.50%

Final compensation is calculated by taking the average of the highest three (3) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

Members whose participation began on or after 1/1/2014

Age Requirement

60

Service Requirement

At least 60 months of hazardous duty service credit or 25 or more years of service, with no age requirement

Amount

Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 8.00% and 7.50% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.

Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.

Early Retirement:

Members whose participation began before 9/1/2008

Requirement	Age 50 with 15 years of service or any age with 20 years service.
Amount	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 55 or has less than 20 years service, whichever is smaller.

Members whose participation began on or after 9/1/2008 but before 1/1/2014

Requirement	Age 50 with 15 years of service or any age with 25 years service.
Amount	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 60 or has less than 25 years service, whichever is smaller.

Disability:

Age Requirement	None
Service Requirement	60 months (waived if in line of duty disability)
Members whose participation began before 8/1/2004	Normal retirement benefit except if the member's total service credit is less than 20 years, service credit will be added for the period from the last day of paid employment to the member's 55th birthday. The maximum service credit added will not exceed the total service the member had on this last day of paid employment and the maximum service credit for calculating his retirement allowance, including total service and service added will not exceed 20 years. May not apply if eligible for an unreduced retirement allowance.

A member in a hazardous position who is disabled in the line of duty is entitled to the normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty), except that the monthly retirement allowance payable shall not be less than 25% of the member's monthly final monthly rate of pay. Each dependent child shall receive 10% of the disabled member's monthly final rate of pay; however the total maximum dependent children's benefit shall not exceed 40% of the member's monthly final rate of pay.

Members whose participation began on or after 8/1/2004 but before 1/1/2014

Normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty) or, if larger, 25% of the member's monthly final rate of pay.

Members whose participation began on or after 1/1/2014

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

Vesting:

Members whose participation began before 9/1/2008

Age Requirement None

Service Requirement 60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits. Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.

Amount	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.
Normal Retirement Age	55

Members whose participation began on or after 9/1/2008 but before 1/1/2014

Age Requirement	None
Service Requirement	60 months.
Amount	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.

Members whose participation began on or after 1/1/2014

Age Requirement	None
Service Requirement	60 months.
Amount	Upon termination the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or the member can elect to leave the hypothetical account balance in the System. If the member does not withdraw the account balance, it will continue to earn 4% interest. Upon reaching normal retirement age the member can apply for retirement and receive the account balance as a lump sum payment or annuitize the account balance into a single life annuity.

Pre-Retirement Death Benefit (not in line of duty):

Members whose participation began before 1/1/2014

Requirement	Eligible for Normal or Early Retirement, or any age in active employment with 60 months service, or

any age and not in active employment with at least 144 months of service.

Amount | Benefit equal to the benefit the member would have received had the member retired on the day before the date of death and elected a 100% joint and survivor form. Benefit is actuarially reduced if member is less than normal retirement age at the date of death.

Members whose participation began on or after 1/1/2014

Requirement | 60 months service

Amount | The maximum of the benefit equal to the benefit the member would have received had the member retired on the day before the date of death.

Spouse's Pre-Retirement Death Benefit (in line of duty):

Requirement | None

Amount | The spouse may choose (1) a $10,000 lump sum payment and monthly payments of 25% of the member's final monthly rate of pay or (2) benefit options offered under death not in line of duty.

Dependent Non-Spouse's Death Benefit (in line of duty):

Requirement | None

Amount | The non-spouse may choose (1) a $10,000 lump sum payment or (2) benefit options offered under death not in line of duty.

Dependent Child's Death Benefit (in line of duty):

Requirement | None

Amount | 10% of member's final monthly rate of pay. Dependent child payments cannot exceed 40% of the member's monthly final rate of pay.

Post-Retirement Death Benefit:

Requirement	Retired member in receipt of monthly benefit based on at least 48 months or more of combined service with KERS, CERS or SPRS.
Amount	$5,000

Member Contributions:

Members whose participation began before 9/1/2008	8% of all creditable compensation. Interest paid on the members' accounts is currently set at 2.5% and per statute, shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.
Members whose participation began on or after 9/1/2008 and up to 1/1/2014	9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.
Members whose participation began on or after 1/1/2014	9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.

SCHEDULE C

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the valuation were based on the actuarial experience study for the five-year period ending June 30, 2013, submitted April 30, 2014, and adopted by the Board on December 4, 2014. The assumed rate of return was adopted by the board on December 3, 2015

INVESTMENT RATE OF RETURN: 6.75% per annum, compounded annually for retirement and insurance benefits.

PRICE INFLATION: 3.25% per annum, compounded annually.

PAYROLL GROWTH: 4.00% per annum, compounded annually.

SALARY INCREASES: The assumed annual rates of future salary increases are as follows and include inflation at 4.00% per annum:

Service Years	Annual Rates of Salary Increases Merit & Seniority	 Base (Economy)	 Increase Next Year
0-1	12.02%	4.00%	16.50%
1-2	7.21%	4.00%	11.50%
2-3	5.29%	4.00%	9.50%
3-4	4.33%	4.00%	8.50%
4-5	3.37%	4.00%	7.50%
5-6	2.40%	4.00%	6.50%
6-7	1.92%	4.00%	6.00%
7-8	1.92%	4.00%	6.00%
8-9	0.96%	4.00%	5.00%
9-10	0.48%	4.00%	4.50%
10 & Over	0.00%	4.00%	4.00%

DISABILITY: Representative assumed annual rates of disability are as follows:

Nearest Age	Annual Rates of Disability	
	Male	Female
20	0.05%	0.05%
30	0.09%	0.09%
40	0.20%	0.20%
50	0.56%	0.56%
60	1.46%	1.46%

RETIREMENT: The assumed annual rates of retirement are as follows:

Annual Rates of Retirement		
Service	Those Eligible for Service Retirement+	Those Eligible for Service Retirement++
20	22.00%	
21	22.00%	
22	22.00%	
23	28.00%	
24	28.00%	
25	28.00%	22.00%
26	28.00%	22.00%
27	28.00%	22.00%
28	44.00%	28.00%
29	44.00%	28.00%
30	44.00%	28.00%
31	58.00%	28.00%
32	58.00%	28.00%
33	58.00%	44.00%
34	58.00%	44.00%
35	58.00%	44.00%
36	58.00%	58.00%
37	58.00%	58.00%
38	58.00%	58.00%
39	58.00%	58.00%
40	58.00%	58.00%

+ For members participating before September 1, 2008. The annual rate of service retirement is 100% at age 55.
++ For members participating on or after September 1, 2008. The annual rate of service retirement is 100% at age 60.

WITHDRAWAL: The assumed annual rates of withdrawal are as follows:

Service Years	Annual Rates of Withdrawal
0-1	20.00%
1-2	7.00%
2-9	3.00%
9 & Over	2.50%

DEATH BEFORE RETIREMENT: The rates of mortality for the period before retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).

DEATH AFTER RETIREMENT: The rates of mortality for the period after service retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females) for all healthy retired members and beneficiaries. The RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. These assumptions are used to measure the probabilities of each benefit payment being made after retirement. These assumptions contain margin for mortality improvements.

PERCENT MARRIED: 100% of employees are assumed to be married, with the wife 3 years younger than the husband.

DEPENDENT CHILDREN: For hazardous members' duty-related death benefits, it is assumed that the member is survived by two dependent children each age 6.

FORM OF PAYMENT: Participants are assumed to elect a life-only form of payment.

ASSET VALUATION METHOD: For funding purposes, five-year market related actuarial value. 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 ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value. For GASB 67 purposes only, market value of assets.

ACTUARIAL COST METHOD: Costs were determined using the Entry Age Normal, Level Percentage of Pay Actuarial Cost Method. Under this method, a calculation is made for retirement benefits to determine the uniform and constant percentage rate of contribution which, if applied to the compensation of the average new member during the entire period of his or her anticipated covered service, would be required to meet the cost of benefits payable. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability.