Kentucky State Police Retirement System

GASB No. 67 Accounting Valuation Report

As of June 30, 2017

GRS Retirement Consulting

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October 4, 2017

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

Re: GASB 67 Reporting – Actuarial Information

Dear Members of the Board:

This report provided herein contains certain information for the State Police Retirement System (SPRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67, "Financial Reporting for Pension Plans" for the fiscal year ending June 30, 2017. A separate report will provided at a later date with additional accounting information determined in accordance with GASB Statement No. 68, "Accounting and Financial Reporting for Pensions".

The liability calculations presented in this report were performed for the purpose of satisfying the requirements of GASB No. 67 and are not applicable for other purposes, such as determining the plans' funding requirements. The plan's liability for other purposes may produce significantly different results. This report may be provided to parties other than the Board of Trustees of the Kentucky Retirement Systems only in its entirety and only with the permission of the Board.

The total pension liability, net pension liability, and sensitivity information shown in this report are based on an actuarial valuation date of June 30, 2016. The total pension liability was rolled-forward from the valuation date to the plan's fiscal year ending June 30, 2017 using generally accepted actuarial principles. Gabriel Roeder Smith and Company (GRS) did not conduct the June 30, 2016 actuarial valuation; however, GRS did replicate the prior actuary's valuations results on the same assumption, methods, and data, as of that date. The roll-forward is based on the results of our replication. GASB 67 requires Kentucky Retirement Systems to disclose a 10-year history of certain information in the Required Supplementary Information within their comprehensive annual financial report. The exhibits provided in this report include the applicable information for historical years that were calculated in accordance with this accounting standard. Information disclosed for years prior to June 30, 2017 were prepared by KRS's prior actuary.

There was no legislation enacted during the 2017 legislative session that had a material change in benefit provisions for any of the systems. However, subsequently to the actuarial valuation date, but prior to the measurement date, the KRS Board of Trustees adopted updated actuarial assumptions which will for used in performing the actuarial valuation as of June 30, 2017. Specifically, Total Pension Liability as of June 30, 2017 is determined using a 2.30% price inflation assumption, and the assumed rate of return is 5.25%. It is our opinion that this procedure is reasonable, appropriate, and complies with applicable requirements under GASB Statement No. 67.

This report is based upon information, furnished to us by the Retirement System, which includes benefit provisions, membership information, and financial data. We did not audit this data and information, but we did apply a number of tests and concluded that it was reasonable and consistent. GRS is not responsible for the accuracy or completeness of the information provided by the Retirement System. Please see the appendices of this report for a discussion of the basis of the calculations, including information related to economic and demographic assumptions and benefit provisions.

A single discount rate of 5.25% was used to measure the total pension liability for the fiscal year ending June 30, 2017. This single discount rate was based on the expected rate of return on pension plan investments for each system. Based on the stated assumptions and the projection of cash flows as of each fiscal year ending, the pension plan's fiduciary net position and future contributions were projected to be sufficient to finance all the future benefit payments of the current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of the projected benefit payments to determine the total pension liability for each system. The projection of cash flows used to determine the single discount rate assumes that the State contributes the actuarially determined contribution rate in all future years.

Governmental Accounting Standards Board Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*, is a new accounting standard for OPEB plans which is effective for plans with fiscal years ending after June 15, 2017. Based on guidance issued by GASB in connection with this new accounting standard, the 1% of pay member contributions for Tier 2 and Tier 3 members to a 401(h) subaccount is considered as an OPEB asset. As a result, the reported fiduciary net position as of June 30, 2017 is net of the 401(h) asset balance.

To the best of our knowledge, this report is complete and accurate and is in accordance with generally recognized actuarial practices and methods. Mr. Newton and Mr. White are Enrolled Actuaries. All three of the undersigned are independent actuaries and consultants and members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. They are also experienced in performing valuations for large public retirement system. This communication shall not be construed to provide tax advice, legal advice or investment advice.

Sincerely,

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader and Actuary

Daniel J. White, FSA, EA, MAAA
Senior Consultant and Actuary

Janie Shaw, ASA, MAAA
Consultant and Actuary

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SECTION 1

EXHIBIT 1

Schedule of the Employers' Net Pension Liability – SPRS

Year	Total Pension Liability	Plan Fiduciary Net Position	Employers' Net Pension Liability (Asset)	Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	Covered Employee Payroll[1]	Net Pension Liability as a Percentage of Covered Employee Payroll
	(1)	(2)	(1) - (2)	(2) / (1)	(3)	[(1) - (2)] / (3)
2017	$ 943,271,296	$ 255,736,583	$ 687,534,713	27.1%	$ 54,065,181	1,271.7%
2016	795,421,298	218,012,479	577,408,819	27.4%	46,684,796	1,236.8%
2015	734,156,446	247,227,579	486,928,867	33.7%	45,764,515	1,064.0%
2014	681,118,402	260,974,259	420,144,143	38.3%	44,615,885	941.7%

Note:

[1] Based on derived compensation for fiscal year ending 2017 using the provided employer contribution information.

EXHIBIT 2

Schedule of the Employers' Net Pension Liability – SPRS

Change in the Net Pension Liability	2017	2016	2015	2014
Total pension liability				
Service Cost	$ 8,297,052	$ 8,401,685	$ 7,695,435	$ 7,141,935
Interest	51,768,532	52,951,274	50,661,229	50,390,898
Benefit Changes	0	0	0	0
Difference between actual and expected experience	8,142,618	0	9,330,978	0
Assumption Changes	136,601,977	56,190,811	40,200,657	0
Benefit Payments	(56,960,181)	(56,278,918)	(54,850,255)	(53,239,125)
Net Change in Total Pension Liability	147,849,998	61,264,852	53,038,044	4,293,708
Total Pension Liability - Beginning	**$ 795,421,298**	**$ 734,156,446**	**$ 681,118,402**	**$ 676,824,694**
Total Pension Liability - Ending (a)	**$ 943,271,296**	**$ 795,421,298**	**$ 734,156,446**	**$ 681,118,402**
Plan Fiduciary Net Position				
Contributions - Employer	$ 63,239,612	$ 25,822,003	$ 31,989,753	$ 20,279,448
Contributions - Member	5,347,639	5,262,749	5,244,508	5,075,173
Refunds of contributions to members	(25,827)	(11,237)	(85,000)	(213,540)
Retirement benefits	(56,934,354)	(56,267,681)	(54,765,255)	(53,025,585)
Net Investment Income	26,795,248	(3,843,029)	3,425,666	40,373,917
Administrative Expense	(181,214)	(177,909)	(201,108)	(214,953)
Other	(517,000) [1]	0	644,756	0
Net Change in Plan Fiduciary Net Position	37,724,104	(29,215,104)	(13,746,680)	12,274,460
Plan Fiduciary Net Position - Beginning	**$ 218,012,479** [2]	**$ 247,227,579**	**$ 260,974,259**	**$ 248,699,799**
Prior Year Adjustment		$ 4	$ -	$ -
Plan Fiduciary Net Position - Ending (b)	**$ 255,736,583**	**$ 218,012,479**	**$ 247,227,579**	**$ 260,974,259**
Net Pension Liability - Ending (a) - (b)	**687,534,713**	**577,408,819**	**486,928,867**	**420,144,143**
Plan Fiduciary Net Position as a Percentage	27.1%	27.4%	33.7%	38.3%
Covered Employee Payroll	$ 54,065,181 [3]	$ 46,684,796	$ 45,764,515	$ 44,615,885
Net Pension Liability as a Percentage of Covered Employee Payroll	1271.7%	1236.8%	1064.0%	941.7%

Notes:

[1] 401(h) plan asset balance (less 401(h) contributions during FY 2017) that is considered an OPEB asset under GASB 74 for FYE 2017.

[2] Plan fiduciary net position at June 30, 2016 is equal to the amount in the prior year's financials and includes 401(h) plan assets.

[3] Based on derived compensation for fiscal year ending 2017 using the provided employer contribution information.

EXHIBIT 3

Schedule of Employers' Contributions – SPRS

($ thousands)

Fiscal Year Ending	Actuarially Determined Contribution[1]	Total Employer Contributions	Contribution Deficiency (Excess)	Covered Employee Payroll[2]	Actual Contributions as a Percentage of Covered Payroll
2017	$ 35,937	$ 63,240	$ (27,303)	$ 54,065	116.97%
2016	25,723	25,822	(99)	46,685	55.31%
2015	31,444	31,990	(546)	45,765	69.90%
2014	25,808	20,279	5,529	44,616	45.45%
2013	23,117	18,501	4,616	45,256	40.88%
2012	20,498	15,362	5,136	48,373	31.76%
2011	18,463	12,657	5,806	48,693	25.99%
2010	18,765	9,489	9,276	51,507	18.42%
2009	15,952	8,186	7,766	51,660	15.85%
2008	13,823	7,443	6,380	53,269	13.97%

Notes:

[1] Actuarially determined contribution rate for fiscal year ending 2017 is based on the contribution rate calculated with the the June 30, 2015 actuarial valuation.

[2] Based on derived compensation for fiscal year ending 2017 using the provided employer contribution information.

Notes to Schedule of Employers' Contributions

The actuarially determined contribution rates effective for fiscal year ending 2017 that are documented in the schedule on the previous pages are calculated as of June 30, 2015. Based on the June 30, 2015 actuarial valuation report (produced by the prior actuary), the actuarial methods and assumptions used to calculate these contribution rates are below:

Item	SPRS
Actuarial Cost Method:	Entry Age Normal
Asset Valuation Method:	20% of the difference between the market value of assets and the expected actuarial value of assets is recognized
Amortization Method:	Level Percent of Pay
Amortization Period:	28 Years, Closed
Investment Return:	7.50%
Inflation:	3.25%
Salary Increases:	4.00%, average
Mortality:	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)

EXHIBIT 4

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

1.00% Decrease (4.25%)	Current Discount Rate (5.25%)	1.00% Increase (6.25%)
$ 806,574,818	$ 687,534,713	$ 589,650,495

APPENDIX 1

Appendix 1

In general, the assumptions and methods used in the valuation are 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 investment return, price inflation, and payroll growth assumption were adopted by the Board in May and July 2017 for use with the June 30, 2017 valuation in order to reflect future economic expectations.

Investment return rate:

Assumed annual rate of 5.25% net of investment expenses for the pension plan

Assumed annual rate of 6.25% net of investment expenses for the insurance plan

Price Inflation:

Assumed annual rate of 2.30%

Payroll Growth Assumption (used for amortization of unfunded accrued liabilities):

Assumed annual rate of 0.00%

Rates of Annual Salary Increase:

Assumed rates of annual salary increases are shown below.

	Annual Rates of Salary Increases		
Service Years	Merit & Seniority	Price Inflation & Productivity	Total Increase
0	12.50%	3.05%	15.55%
1	7.50%	3.05%	10.55%
2	5.50%	3.05%	8.55%
3	4.50%	3.05%	7.55%
4	3.50%	3.05%	6.55%
5	2.50%	3.05%	5.55%
6	2.00%	3.05%	5.05%
7	2.00%	3.05%	5.05%
8	1.00%	3.05%	4.05%
9	0.50%	3.05%	3.55%
10 & Over	0.00%	3.05%	3.05%

Appendix 1

Retirement rates:

Assumed annual rates of retirement are shown below. Rates are only applicable for members who are eligible for a service retirement.

Service	Members participating before 9/1/2008[1]	Members participating on or after 9/1/2008[2]
20	22.0%	
21	22.0%	
22	22.0%	
23	28.0%	
24	28.0%	
25	28.0%	22.0%
26	28.0%	22.0%
27	28.0%	22.0%
28	44.0%	28.0%
29	44.0%	28.0%
30	44.0%	28.0%
31	58.0%	28.0%
32	58.0%	28.0%
33	58.0%	44.0%
34	58.0%	44.0%
35	58.0%	44.0%
36	58.0%	58.0%
37	58.0%	58.0%
38	58.0%	58.0%
39	58.0%	58.0%
40	58.0%	58.0%

[3] The annual rate of service retirement is 100% at age 55.
[4] The annual rate of service retirement is 100% at age 60.

Appendix 1

Disability rates:

An abbreviated table with assumed rates of disability is show below.

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%

Withdrawal rates (for causes other than death, disability or retirement):

Assumed annual rates of withdrawal are shown below.

Service	Annual Rates of Withdrawal
0	20.00%
1	7.00%
2-8	3.00%
9 & Over	2.50%

Appendix 1

Mortality Assumption:

Pre-retirement mortality: RP-2000 Combined Mortality Table projected with Scale BB to 2013. Male mortality rates are multiplied by 50% and female mortality rates are multiplied by 30%.

Post-retirement mortality (non-disabled): RP-2000 Combined Mortality Table projected with Scale BB to 2013. Female mortality rates are set back one year.

Post-retirement mortality (disabled): RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013. Male mortality rates are set back four years.

These mortality assumptions assume a margin for future mortality improvement.

Marital status:

100% of employees are assumed to be married, with the female spouse 3 years younger than the male spouse.

Line of Duty Disability

0% of disabilities are assumed to occur in the line of duty

Line of Duty Death

25% of deaths are assumed to occur in the line of duty

Dependent Children:

For members in the Hazardous Plan who receive a duty-related death benefit, the member is assumed to be survived by two dependent children, each age 6 with payments for 15 years.

Form of Payment:

Members are assumed to elect a life-only annuity at retirement.

Appendix 1

Actuarial Cost Method:

Entry Age Normal, Level Percentage of Pay, as required by GASB Statement No. 67. The Entry Age Normal actuarial cost method allocates the System's actuarial present value of future benefits to various periods based upon service. The portion of the present value of future benefits allocated to years of service prior to the valuation date is the actuarial accrued liability, and the portion allocated to years following the valuation date is the present value of future normal costs. The normal cost is determined for each active member as the level percent of pay necessary to fully fund the expected benefits to be earned over the career of each individual active member. The normal cost is partially funded with active member contributions with the remainder funded by employer contributions.

Changes in Assumptions since the prior valuation:

The assumed investment return was changed from 6.75% to 5.25% for the pension plan and from 7.50% to 6.25% for the insurance plan. The price inflation assumption was changed from 3.25% to 2.30%, which also resulted in a 0.95% decrease in the salary increase assumption at all years of service. The payroll growth assumption (applicable for the amortization unfunded actuarial accrued liabilities) was changed from 4.00% to 0.00%.

APPENDIX 2

Appendix 2

Summary of Main Pension Plan Benefit Provisions for SPRS Employees

Retirement: Tier 1, Participation before 9/1/2008

Normal Retirement Eligibility	Age 55 with at least 1 month of service credit; or Any age with at least 20 years of service
Benefit Amount	If a member has at least 60 months of service, the monthly benefit is 2.50% times final average compensation times years of service. 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. Final average compensation is based on the member's highest 3 years of compensation.
Early Retirement Eligibility	Age 50 with at least 15 years of service
Early Retirement Reduction	Normal Retirement benefit reduced 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member's retirement date precedes the member's normal retirement eligibility.

Appendix 2

Retirement: Tier 2, Participation on or after 9/1/2008 but before 1/1/2014

Normal Retirement Eligibility	Age 60 with at least 5 years of service; or Any age with at least 25 years of service
Benefit Amount	The monthly benefit is equal to the applicable benefit multiplier times final average compensation times years of service.

Years of Service	Benefit Multiplier
10 or less	1.30%
10-20	1.50%
20-25	2.25%
Greater than 25	2.50%

Final average compensation is based on the member's highest 3 years of compensation.

Early Retirement Eligibility	Age 50 with at least 15 years of service
Early Retirement Reduction	Normal Retirement benefit reduced 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member's retirement date precedes the member's normal retirement eligibility.

Retirement: Tier 3, Participation on or after 1/1/2014

Normal Retirement Eligibility	Age 60 with at least 5 years of service; or Any age with at least 25 years of service
Benefit Amount	Each year that the member is active, a 7.50% employer pay credit and the employee's 8.00% contribution will be credited to each member's hypothetical cash balance account. The hypothetical account will earn interest at a minimum rate of 4%, annually. 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 in that year 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. At retirement, the member's hypothetical account balance may be converted into an annuity based on an actuarial factor.
Early Retirement Eligibility	N/A

Appendix 2

Deferred Vested Benefit: Tier 1, Participation before 9/1/2008

Eligibility	At least 1 month of service credit
Benefit Amount	Normal retirement benefit deferred to normal retirement age, or a reduced retirement benefit at an early retirement age

Deferred Vested Benefit: Tier 2, Participation on or after 9/1/2008 but before 1/1/2014

Eligibility	5 years of service
Benefit Amount	Normal retirement benefit deferred to normal retirement age, or a reduced retirement benefit at an early retirement age

Deferred Vested Benefit Tier 3, Participation on or after 1/1/2014

Eligibility	5 years of service
Benefit Amount	At termination of employment, members may choose to leave their account balance with the System and retire once they are eligible. The hypothetical account balance will earn 4% annual interest after termination. Members may also choose to withdrawal their entire accumulated balance. If a member does not have 5 years of service at termination, the member is eligible to receive a partial refund of their account balance. This refund includes the member's contributions with interest.

Disability Retirement: Participation before 8/1/2004

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	Disability benefits are calculated in the same manner as the normal retirement benefit with years of service and final compensation being determined as of the date of disability, except that if the member has less than 20 years of service at disability, service credit shall be added to the person's total service beginning with the last date of paid employment and continuing to the member's 55^{th} birthday, with total service not exceeding 20 years. Total service credit added shall not be greater than the member's actual service at disability.

Appendix 2

Disability Retirement: Participation on or after 8/1/2004 but before 1/1/2014

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	The higher of 25% of the member's final monthly rate of pay or the member's normal retirement benefit (without reduction for early retirement) with years and final compensation being determined as of the date of disability.

Disability Retirement: Participation on or after 1/1/2014

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	The higher of 25% of the member's final monthly rate of pay or the member's retirement benefit calculated at the member's normal retirement date.

Line of Duty Disability Benefit

Disability Benefit	If the disability is a direct result of an act in the line of duty, the benefit shall not be less than 25% of the member's final monthly rate of pay. Additionally, each eligible dependent child will receive 10% of the member's monthly final rate of pay up to a maximum of 40%.

Pre-Retirement Death Benefit

Eligibility	Eligible for early or normal retirement; or Under age 55 with at least 60 months of service and actively working at the time of death; or At least 144 months of service, if no longer actively working
Spouse Benefit	The member's retirement benefit calculated in the same manner as if the member had retired on the day of the member's death and elected a 100% joint and survivor benefit. The benefit is actuarially reduced if the member dies prior to their normal retirement age.

Pre-Retirement Death Benefit (Death in the Line of Duty)

Eligibility	One month of service credit
Spouse Benefit	A $10,000 lump sum payment plus a monthly payment of 25% of the deceased member's final monthly rate of pay. A spouse may also elect the non-line of duty death benefit.
Non-Spouse Benefit	If the beneficiary is only one person who is a dependent receiving at least 50% of his or her support from the member, the beneficiary may elect a lump sum payment of$10,000.
Child Benefit	Each eligible dependent child will receive 10% of the member's final monthly rate of pay up to a maximum of 40%.

Appendix 2

Post-Retirement Death Benefit

Eligibility	48 months of service, and in receipt of retirement benefits
Death Benefit	A $5,000 lump sum payment

Member Contributions

Tier 1, Participation before 9/1/2008	8% of creditable compensation. Members who do not receive a retirement benefit are entitled to a full refund of contributions with interest. The annual interest rate is set by the KRS board, not less than 2.0%.
Tier 2, Participation on or after 9/1/2008 but before 1/1/2014	8% of creditable compensation plus 1% of creditable compensation, which is deposited into the 401(h) account and is not refundable. Members who do not receive a retirement benefit are entitled to a refund of non-401(h) contributions with interest. The annual interest rate is 2.5%.
Tier 3, Participation after 1/1/2014	8% of creditable compensation plus 1% of creditable compensation, which is deposited into the 401(h) account and is not refundable. Members who do not receive a retirement benefit are entitled to a refund of non-401(h) contributions with interest.

Changes since the Prior Valuation

None.