



COMPREHENSIVE ANNUAL

FINANCIAL REPORT

Prepared by the Accounting, Investment and Communications Divisions

2018

For the Fiscal Year Ended June 30, 2018

Kentucky Retirement Systems
A component unit of the Commonwealth of Kentucky

David L. Eager, Executive Director
Karen D. Roggenkamp, Deputy Executive Director

Kentucky Employees Retirement System (KERS)
County Employees Retirement System (CERS)
State Police Retirement System (SPRS)

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Management's Responsibility for Financial Reporting

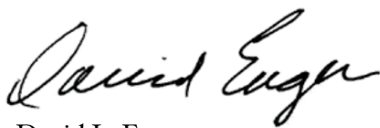
Management has prepared the combining financial statements of Kentucky Retirement Systems and is responsible for the integrity and fairness of the information presented.

November 29, 2018 Management has prepared the combining financial statements of Kentucky Retirement Systems (KRS) and is responsible for the integrity and fairness of the information presented. Some amounts included in the combining financial statements may be based upon estimates and judgments. These estimates and judgments were made utilizing the best business practices available. The accounting policies followed in the preparation of these combining financial statements conform to U.S. Generally Accepted Accounting Principles. Financial information presented throughout the annual report is consistent with the combining financial statements.

Responsibility Ultimate responsibility for the combining financial statements and annual report rests with the Board of Trustees. The Executive Director and KRS staff assist the Board in its responsibilities.

Systems of internal control and supporting procedures are maintained to provide assurance that transactions are authorized, assets safeguarded, and proper records maintained. These controls include standards in hiring and training employees, the establishment of an organizational structure, and the communications of policies and guidelines throughout the organization. The cost of a control should not exceed the benefits to be derived; the objective is to provide reasonable, rather than absolute, assurance that the combining financial statements are free of any material misstatements. These internal controls are reviewed by internal audit programs. All internal audit reports are submitted to the Audit Committee and Board of Trustees.

The Kentucky Auditor of Public Accounts (APA) has conducted an independent audit of the combining financial statements in accordance with U.S. Generally Accepted Government Auditing Standards. This audit is described in the APA's Report on pages 17, 18, and 19 in the Financial Section. Management has provided the APA with full and unrestricted access to KRS' staff to discuss their audit and related findings as to the integrity of the plan's financial reporting and the adequacy of internal controls for the preparation of combining financial statements.



David L. Eager
Executive Director



Karen D. Roggenkamp
Deputy Executive Director



Connie A. Davis, CIA, CGAP, CRMA
Director of Accounting



Letter of Transmittal

November 29, 2018

Dear Kentucky Retirement Systems Members, Beneficiaries, and Employers:

On behalf of the Board of Trustees, Management, and Staff of Kentucky Retirement Systems (KRS), it is my honor to present the KRS' Comprehensive Annual Financial Report (CAFR) for the Fiscal Year Ending June 30, 2018. This annual report is provided as a resource for understanding the structure and financial status of the Systems.

Fiscal Year 2018 was one for the record books. KRS experienced a 17.5% increase in retirements this year over Fiscal Year 2017, our investments earned more than \$1.4 billion, and our Board of Trustees continued to take actions designed to improve the transparency, governance, and stability of the Systems. Through it all, KRS staff rose to the occasion and successfully managed the workload while continuing to provide the exceptional customer service that our members and retirees have come to expect. I am proud of their dedication and professionalism, and am very pleased with the progress our agency is making.

Here are a few highlights of this rather eventful Fiscal Year:

Legislation

The 2018 General Assembly produced several pieces of significant KRS-related legislation:

House Bill 185 (HB 185) made changes regarding death in the line of duty benefits for KRS participants.

House Bill 200 (HB 200), the State Executive Branch Budget Bill, established the KERS and SPRS plans' actuarially determined contribution rates for the next two years. Significantly, contribution rates for Fiscal 2019 will increase by approximately 50%. We owe a debt of gratitude to the legislators and the Governor for providing KRS with this much needed increase in funding.

House Bill 265 (HB 265) froze the employer contribution rate for the Quasi State Agencies at 49.47% for one year. In FY 2020, their contribution will increase to the same 83.43% rate as other KERS Non-Hazardous employers currently pay.

House Bill 362 (HB 362) provides a phase-in of the higher contribution rates for the CERS employers. Rates can only rise by 12% until reaching the actuarially determined rate of 27.28% for CERS Non-Hazardous and 46.50% for CERS Hazardous. For Fiscal 2018, the pension contribution rates were 19.18% and 31.55% respectively.

This bill originally provided Quasi State agencies (like County Health Departments) an opportunity to leave KRS and pay for their unfunded liability with an (up to) 40 year interest-free loan. That provision was struck because the added cost to the remaining agencies was estimated to be about \$2 Billion. The General Assembly asked KRS to present an alternative plan to the existing "opt out" provisions in state law by December 2018 for possible consideration during the 2019 Regular Session.

Finally, **Senate Bill 151 (SB 151)**, the pension reform bill, has three major components:

First, it establishes a 401(a) Tier 4 plan which acts much like the private sector's 401(k) plans. All new employees will continue to go into Tier 3, but may roll into Tier 4 after a 90 day waiting period. All current employees also have the irreversible right to go into Tier 4 for all future contributions.

Second, member earnings in Tier 3 will change from a guaranteed 4% plus 75% their system's five year geometric average rate of return, to no guarantee and 85% of their system's 10 year geometric average rate of return, but in no event will the earnings be less than 0.0%.

Importantly, the bill also changes the method of funding the unfunded liability from a percent of payroll basis to a level dollar method.

The Attorney General of Kentucky filed a suit barring the implementation of SB 151. The suit has been heard in the Kentucky Supreme Court, but no ruling has been issued.

If the Attorney General's suit prevails, KRS will seek support of the level dollar funding through other legislation. That funding method is critical for the longer-term financial health of the pension systems, particularly KERS Non-Hazardous.

Letter of Transmittal

Funding

The funded ratios increased modestly in three of the five pension plans, and meaningfully in all five insurance plans. The two exceptions were the KERS Non-Hazardous and CERS Non-Hazardous pension funds. The KERS Non-Hazardous funded ratio declined from 13.6% as of June 30, 2017 to 12.9% as of June 30, 2018, while the CERS Non-Hazardous funded ratio declined slightly from 52.8% as of June 30, 2017 to 52.7% as of June 30, 2018.

Funding for the five Retiree Health Insurance Plans improved dramatically, with increases in funded statuses averaging 8.5%. With over \$5 billion in assets and nearly \$8 billion in liabilities, these insurance systems are a meaningful part of the KRS responsibility to provide members with their benefits.

Barring any major decline in asset values, the funded status for the KERS and SPRS pensions and all of the insurance plans is expected to go up in Fiscal 2019 as a result of the higher contribution rates. The improvement in the CERS pension plans will be less certain until the higher contribution rates are fully enacted.

Governance

Several Board of Trustees actions and statutory changes strengthened KRS' Governance:

- Increased the size of our Investment Committee from five to nine per the requirements of Senate Bill 2 (2017 Regular Session). SB 2 now requires six investment professionals, up from four previously;
- Formed a seven-member Actuarial Subcommittee;
- Began Facebook live-streaming Board and Committee meetings and posting them to our website;
- Established a new Trustee Education Policy and education compliance reporting system;
- Elected a new Chair of the Board, Dave Harris and Vice Chair, Keith Peercy;
- Made the Interim Executive Director, David Eager, the Executive Director;
- Re-wrote the Bylaws; and
- Began an audit by the Auditor of Public Accounts.

KRS plans to seek legislation in the 2019 General Assembly to consolidate the dates of the CERS elections with the CERS Fall election every fourth year, being consistent with the Spring election, thereby saving approximately \$100,000 every election. We will also propose providing for electronic balloting to each of the four elections over the election cycle to improve participation rates and reduce expenses.

Technology

KRS continued to invest in applications and infrastructure to improve member services and increase staff productivity. During FY 2018 our technology team accomplished the following:

- Disaster Recovery-successfully tested our functionality and replication;
- Information Security-expanded all software monitoring applications and improved internal staff awareness of threats;
- Successfully implemented software modifications to administer pension spiking statutory changes;
- Expanded use of business intelligence software to facilitate reporting and better correct employer reporting errors; and
- Improved process and documentation of IT procurement as we transition to the State Model Procurement Code.

Letter of Transmittal

Investments

Investment returns were favorable again this fiscal year, with each plan's returns exceeding its interest rate assumption. Four out of five pension and four out of five insurance plan's returns exceeded their market benchmarks.

During the year we adjusted our target asset allocations. The new policy targets are as follows:

Target Asset Allocations		
	KERS Non-Hazardous and SPRS	CERS Non-Hazardous, CERS Hazardous, KERS Hazardous and all five insurance plans
Domestic and Foreign Equities	31.5%	37.5%
Fixed Income	35.5%	28.5%
Real Estate	5.0%	5.0%
Alt. (Real Return, AB Return, RE)	10.0%	13.0%
Cash	3.0%	1.0%
Other (Real Return, TIPS, etc.)	15.0%	15.0%
TOTAL	100.0%	100.0%

Litigation

KRS has been involved in a number of important legal actions this fiscal year. Further descriptions and details of legal matters are included in our Financial Notes.

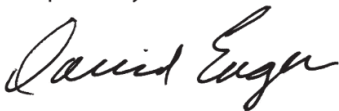
Looking Forward

Greatly improved funding (up nearly 70% for KERS Non-Hazardous and SPRS) and about 50% for the other three pension funds after a four year phase-in will greatly strengthen the financial health of all of the plans. Projections show that it will take upwards of 25 years or more before all of our funds are fully funded. But, Fiscal 2019 should prove to be the year that all of the pension funds finally began to improve financially, provided the present level of funding continues and barring a major (i.e. 20% or more) market decline. The insurance plans should also continue their positive trend which began in FY 2006.

Acknowledgments

The preparation of this report has been a collaborative effort of Executive Management and the Accounting, Investments, and Communications Divisions. KRS takes responsibility for all of the information contained in the report and confidently presents it as a basis for making management decisions that promote the responsible stewardship of the assets of the Systems.

Respectfully submitted,



David L. Eager

Executive Director



2019 BOARD MEETING SCHEDULE

Regular
 February 21
 May 16
 September 12
 November 14
 December 5
 Annual
 April 18

*Dates subject to change.

Please visit our website for updates.
 Board meetings and Audit Committee meetings begin at 10 am Eastern; all other Committee meetings begin at 9 am Eastern unless otherwise noted.

COMMITTEE MEETING SCHEDULE

AUDIT	INVESTMENT
February 7	February 5
May 2	May 7
August 22	August 27
November 7	November 6

RETIREE HEALTH PLAN	ADMINISTRATIVE & DISABILITY APPEALS
February 12	Check website for dates and times.
May 14	
September 5	
November 12	

Board of Trustees as of November 29, 2018

Appointed Members:

David L. Harris, Chair
 Governor Appointee
 Term ends 6/17/22

W. Joe Brothers
 Governor Appointee
 Term ends 7/1/21

John E. Chilton
 Governor Appointee
 Term ends 6/17/22

William S. Cook
 Governor Appointee
 Term ends 6/17/19

Kelly Downard
 Governor Appointee
 Term ends 6/17/19

John R. Farris
 Governor Appointee
 Term ends 6/17/19

J.T. Fulkerson
 Governor Appointee
 Term ends 7/1/21

David M. Gallagher
 Governor Appointee
 Term ends 7/1/21

Matthew Monteiro
 Governor Appointee
 Term ends 6/17/19

Neil P. Ramsey
 Governor Appointee
 Pending Replacement

Thomas B. Stephens
 Personnel Secretary
 Ex-Officio

Elected Members:

Raymond Campbell Connell
 Elected by KERS
 Term ends 3/31/22

Sherry Lynn Kremer
 Elected by KERS
 Term ends 3/31/22

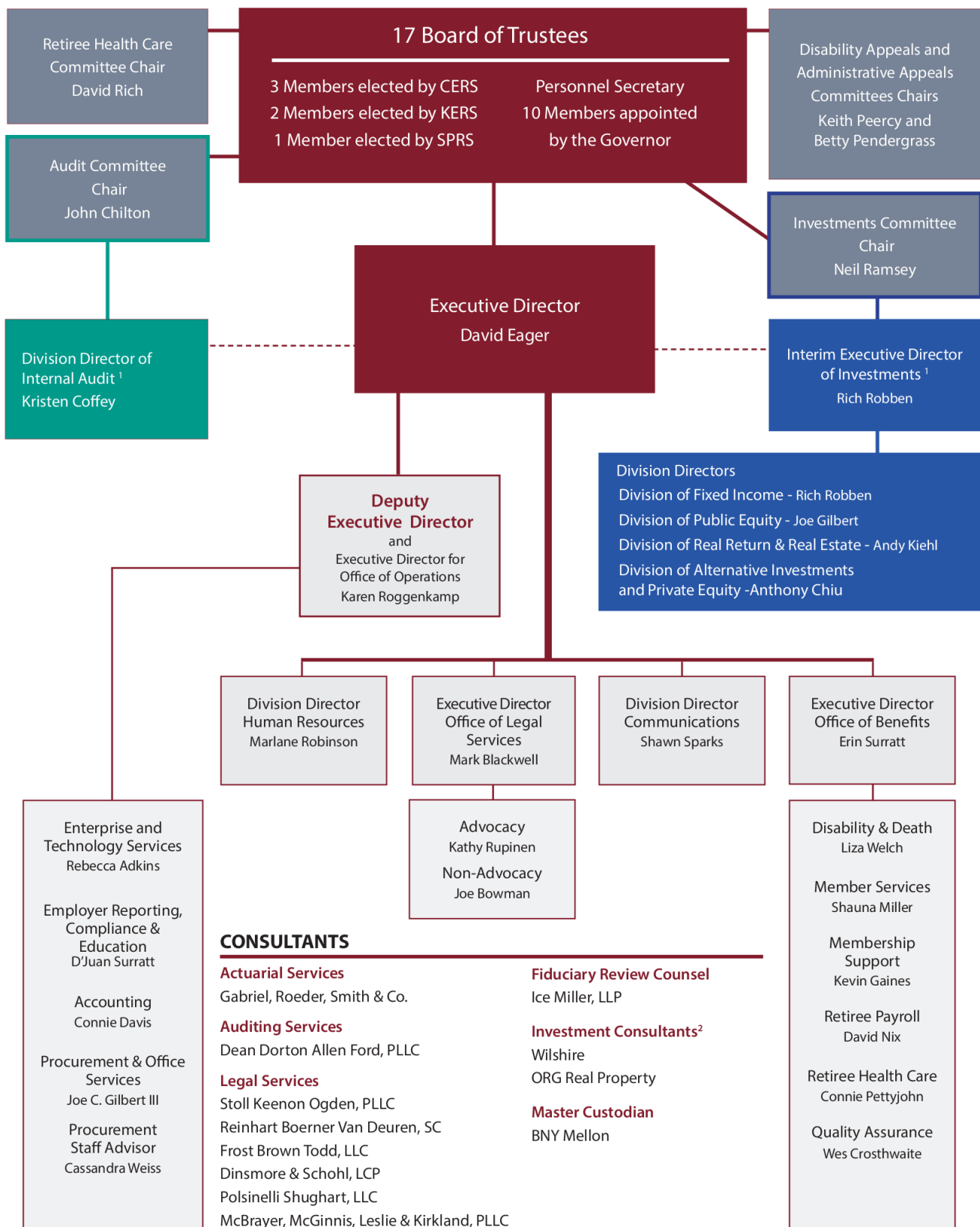
Keith Peercy, Vice Chair
 Elected by SPRS
 Term ends 3/31/19

Betty Pendergrass
 Elected by CERS
 Term ends 3/31/21

Jerry W. Powell
 Elected by CERS
 Term ends 3/31/21

David Rich
 Elected by CERS
 Term ends 10/31/21

Agency Structure as of November 29, 2018



¹ The Executive Director of Investments and the Division Director of Internal Audit report to the Executive Director for administrative purposes.

² See pages 127-138 for additional information regarding investment professionals and the Schedules of Fees and Commissions.



Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Kentucky Retirement Systems

For its Comprehensive Annual
Financial Report
for the Fiscal Year Ended

June 30, 2017

Christopher P. Morill

Executive Director/CEO

Certificate of Achievement

The Government Finance Officers Association (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the Kentucky Retirement Systems for its Comprehensive Annual Financial Report (CAFR) for the fiscal year ended June 30, 2017. The Certificate of Achievement is a prestigious national award recognizing excellence in the preparation of state and local government financial reports and is valid for a period of one year. This was the 19th consecutive award earned by KRS. In order to be awarded a Certificate of Achievement, a government unit must publish an easily readable and efficiently organized document. The report must satisfy both generally accepted accounting principles and applicable legal requirements. We believe our 2018 CAFR will continue to meet the Certificate of Achievement Program's requirements, and we will be submitting it to the GFOA for their consideration.

2018 Total Fiscal Year KRS Pension Benefits Paid by County

County	Payees*	Total	County	Payees*	Total	County	Payees*	Total
Adair	462	\$7,449,889	Grant	556	\$10,128,969	McLean	295	\$4,273,372
Allen	394	5,200,626	Graves	827	12,460,068	Meade	426	5,862,580
Anderson	1,322	32,840,147	Grayson	690	10,357,850	Menifee	205	2,807,645
Ballard	229	3,107,680	Green	273	3,710,635	Mercer	729	12,944,716
Barren	997	15,508,389	Greenup	617	8,235,626	Metcalfe	294	3,784,137
Bath	357	5,323,067	Hancock	220	2,727,382	Monroe	250	2,834,843
Bell	641	10,010,261	Hardin	2,041	33,450,921	Montgomery	613	9,521,154
Boone	1,665	33,492,701	Harlan	606	9,441,452	Morgan	589	10,053,121
Bourbon	523	8,592,168	Harrison	444	6,577,160	Muhlenberg	748	9,125,335
Boyd	1,013	16,478,032	Hart	295	4,303,266	Nelson	967	16,116,364
Boyle	844	14,720,633	Henderson	1,010	16,682,005	Nicholas	205	2,701,531
Bracken	216	2,710,239	Henry	897	19,761,701	Ohio	614	6,437,838
Breathitt	468	7,116,755	Hickman	91	1,711,184	Oldham	1,246	25,684,018
Breckinridge	437	6,272,755	Hopkins	1,187	18,108,152	Owen	515	11,716,512
Bullitt	1,440	25,594,316	Jackson	303	3,999,850	Owsley	205	3,033,893
Butler	309	4,202,494	Jefferson	15,860	338,380,910	Pendleton	338	5,512,127
Caldwell	506	7,586,347	Jessamine	1,006	17,048,293	Perry	743	10,873,665
Calloway	1,028	14,267,469	Johnson	604	8,959,881	Pike	1,196	17,400,119
Campbell	1,464	26,934,689	Kenton	2,163	44,736,168	Powell	331	4,271,386
Carlisle	112	1,522,938	Knott	417	6,382,919	Pulaski	2,126	35,481,447
Carroll	304	4,745,742	Knox	572	9,024,149	Robertson	67	1,049,939
Carter	764	9,779,908	LaRue	335	5,232,274	Rockcastle	375	4,963,320
Casey	345	4,386,774	Laurel	1,174	19,112,743	Rowan	831	14,070,484
Christian	1,492	25,544,533	Lawrence	308	3,792,499	Russell	544	8,203,026
Clark	783	13,160,609	Lee	227	3,221,756	Scott	1,175	23,922,577
Clay	567	8,093,547	Leslie	236	3,430,612	Shelby	1,607	39,755,858
Clinton	240	3,059,773	Letcher	567	7,562,681	Simpson	267	3,023,742
Crittenden	200	2,606,436	Lewis	310	3,727,447	Spencer	450	9,672,121
Cumberland	179	2,609,053	Lincoln	640	7,951,228	Taylor	600	8,560,151
Daviess	2,502	43,628,048	Livingston	243	4,123,938	Todd	250	3,370,725
Edmonson	222	3,054,788	Logan	580	7,983,274	Trigg	499	7,914,916
Elliott	171	2,450,620	Lyon	344	6,477,082	Trimble	258	3,862,495
Estill	375	5,176,148	Madison	2,233	36,881,757	Union	346	3,882,159
Fayette	5,293	113,602,031	Magoffin	328	4,619,282	Warren	2,656	46,603,933
Fleming	441	7,521,043	Marion	520	7,096,484	Washington	311	4,868,012
Floyd	844	12,961,273	Marshall	844	12,259,504	Wayne	506	7,201,731
Franklin	6,297	194,114,984	Martin	261	2,802,998	Webster	336	4,337,558
Fulton	166	2,164,135	Mason	393	6,368,023	Whitley	995	14,257,539
Gallatin	108	1,872,994	McCracken	1,506	27,017,840	Wolfe	308	5,039,314
Garrard	433	6,287,475	McCreary	393	3,931,857	Woodford	978	24,141,926

Pension Benefits paid to retirees and beneficiaries of Kentucky Retirement Systems have a wide ranging impact on the state's economic health. In fiscal year 2018, KRS paid over \$2 billion to its recipients. The majority, 93.73%, of these payments are issued to Kentucky residents. Each county in the Commonwealth receives at least \$1 million annually from KRS, providing a stabilizing element for all local economies.

Total Retirement Payments As of June 30, 2018 (In Whole \$)			
	Payees*	%	Payments
Kentucky	104,268	93.73%	\$1,914,670,658
Out of State	7,786	6.27%	128,003,036
Grand Total	112,054	100.00%	\$2,042,673,694
*This table represents all payees receiving a monthly payment during the fiscal year.			

BENEFIT TIERS

KRS currently administers three different pension benefit tiers within our defined benefit plans. The Hybrid Cash Balance plan was established as a part of Senate Bill 2, which was enacted by the Kentucky General Assembly during the 2013 Regular Session.



Members participating before September 1, 2008



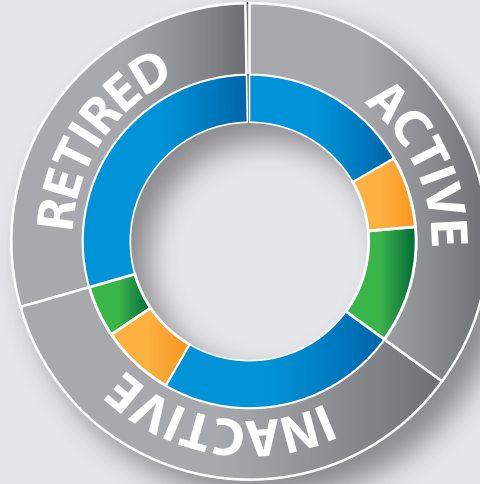
Members participating on or after September 1, 2008 through December 31, 2013



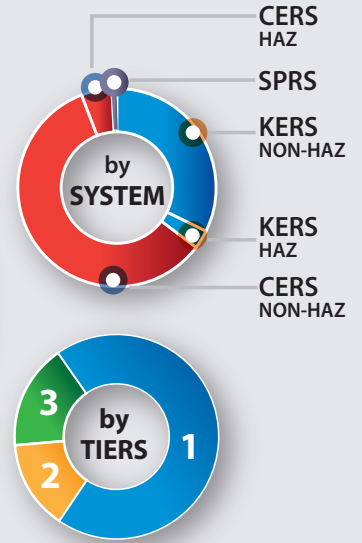
Members participating on or after January 1, 2014



Totals for All Systems



■ Tier 1 ■ Tier 2 ■ Tier 3



	ACTIVE	INACTIVE	RETIRED	TOTAL
Tier 1	63,547	88,274	110,553	262,374
Tier 2	26,589	27,297	352	54,238
Tier 3	43,283	19,392	1	62,676
Total	133,419	134,963	110,906	379,288

See comparative totals and more detailed information in the Statistical Section beginning on page 185.

Fiduciary Net Position (\$ in Thousands)

Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$10,758,706	\$11,153,182	\$12,015,897	\$11,646,481	\$10,877,758	\$11,921,906	\$12,415,856
Insurance	3,089,313	3,521,894	4,154,401	4,246,892	4,231,311	4,783,905	5,165,179
Total	\$13,848,019	\$14,675,076	\$16,170,298	\$15,893,373	\$15,109,069	\$16,705,811	\$17,581,035



134,477 MEMBERS

NON-HAZARDOUS

122,788 MEMBERS

ACTIVE MEMBERSHIP

Tier 1 **18,800** | Tier 2 **6,821** | Tier 3 **9,224**

AVERAGE AGE AVERAGE ANNUAL SALARY

45.2 \$41,876

RETIRED MEMBERSHIP

Tier 1 **42,092** | Tier 2 **83** | Tier 3 **0**

AVERAGE AGE AVERAGE ANNUAL BENEFIT PAYMENT

69.0 \$21,587

HAZARDOUS

11,689 MEMBERS

ACTIVE MEMBERSHIP

Tier 1 **1,463** | Tier 2 **847** | Tier 3 **1,653**

AVERAGE AGE AVERAGE ANNUAL SALARY

39.8 \$40,268

RETIRED MEMBERSHIP

Tier 1 **2,996** | Tier 2 **14** | Tier 3 **0**

AVERAGE AGE AVERAGE ANNUAL BENEFIT PAYMENT

64.5 \$15,467



242,185 MEMBERS

NON-HAZARDOUS

222,672 MEMBERS

ACTIVE MEMBERSHIP

Tier 1 **37,920** | Tier 2 **16,712** | Tier 3 **29,803**

AVERAGE AGE AVERAGE ANNUAL SALARY

47.7 \$30,150

RETIRED MEMBERSHIP

Tier 1 **56,384** | Tier 2 **245** | Tier 3 **0**

AVERAGE AGE AVERAGE ANNUAL BENEFIT PAYMENT

70.3 \$11,739

HAZARDOUS

19,513 MEMBERS

ACTIVE MEMBERSHIP

Tier 1 **4,843** | Tier 2 **2,004** | Tier 3 **2,438**

AVERAGE AGE AVERAGE ANNUAL SALARY

38.5 \$57,607

RETIRED MEMBERSHIP

Tier 1 **7,637** | Tier 2 **9** | Tier 3 **1**

AVERAGE AGE AVERAGE ANNUAL BENEFIT PAYMENT

61.8 \$27,771



2,626 MEMBERS

HAZARDOUS

2,626 MEMBERS

ACTIVE MEMBERSHIP

Tier 1 **521** | Tier 2 **205** | Tier 3 **165**

AVERAGE AGE AVERAGE ANNUAL SALARY

37.3 \$55,088

RETIRED MEMBERSHIP

Tier 1 **1,444** | Tier 2 **1** | Tier 3 **0**

AVERAGE AGE AVERAGE ANNUAL BENEFIT PAYMENT

62.8 \$39,686



ACTIVE MEMBERS

133,419

INACTIVE MEMBERS

134,963

RETIRED MEMBERS

110,906

KERS was established on July 1, 1956 by the State Legislature.

KERS Non-Hazardous - Fiduciary Net Position* (\$ in Thousands)							
Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$2,977,069	\$2,760,753	\$2,578,291	\$2,327,782	\$1,980,292	\$2,092,781	\$2,048,890
Insurance	418,490	496,040	646,904	665,639	668,318	781,406	846,762
Total	\$3,395,559	\$3,256,793	\$3,225,195	\$2,993,421	\$2,648,610	\$2,874,187	\$2,895,652

KERS Hazardous - Fiduciary Net Position* (\$ in Thousands)							
Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$476,589	\$514,592	\$561,484	\$552,468	\$527,880	\$605,921	\$651,173
Insurance	330,730	372,883	433,525	439,113	437,397	484,442	513,384
Total	\$807,319	\$887,475	\$995,009	\$991,581	\$965,277	\$1,090,363	\$1,164,557

CERS was established on July 1, 1958 by the State Legislature.

CERS Non-Hazardous - Fiduciary Net Position* (\$ in Thousands)							
Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$5,381,602	\$5,795,568	\$6,528,146	\$6,440,800	\$6,141,396	\$6,739,142	\$7,086,322
Insurance	1,428,821	1,618,960	1,878,711	1,920,946	1,908,550	2,160,553	2,346,767
Total	\$6,810,423	\$7,414,528	\$8,406,857	\$8,361,746	\$8,049,946	\$8,899,695	\$9,433,089

CERS Hazardous - Fiduciary Net Position* (\$ in Thousands)							
Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$1,672,970	\$1,833,571	\$2,087,002	\$2,078,202	\$2,010,177	\$2,227,679	\$2,361,047
Insurance	785,874	891,320	1,030,303	1,056,480	1,056,097	1,179,313	1,268,272
Total	\$2,458,844	\$2,724,891	\$3,117,305	\$3,134,682	\$3,066,274	\$3,406,992	\$3,629,319

SPRS was established on July 1, 1958 by the State Legislature.

SPRS - Fiduciary Net Position* (\$ in Thousands)							
Fund	2012	2013	2014	2015	2016	2017	2018
Pension	\$250,476	\$248,698	\$260,974	\$247,229	\$218,013	\$256,383	\$268,425
Insurance	125,398	142,691	164,958	164,714	160,949	178,191	189,994
Total	\$375,874	\$391,389	\$425,932	\$411,943	\$378,962	\$434,574	\$458,419

* The Fiduciary Net Positions are the resources accumulated and held in trust to pay benefits.

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MIKE HARMON
AUDITOR OF PUBLIC ACCOUNTS

Board of Trustees
Kentucky Retirement Systems
Frankfort, Kentucky

Independent Auditor's Report

Report on the Combining Financial Statements

We have audited the accompanying combining financial statements of the Pension Funds and Insurance Fund of the Kentucky Retirement Systems (KRS), a component unit of the Commonwealth of Kentucky, as of and for the year ended June 30, 2018, and the related notes to the financial statements, which collectively comprise the KRS' basic combining financial statements as listed in the table of contents.

Management's Responsibility for the Combining Financial Statements

The KRS's management is responsible for the preparation and fair presentation of these combining financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of combining financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these combining financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to the financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the combining financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the combining financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatements of the combining financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the combining financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the combining financial statements.

We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the combining financial statements referred to above present fairly, in all material respects, the combining fiduciary net position of the Pension Funds and Insurance Fund of KRS, a component unit of the Commonwealth of Kentucky, as of June 30, 2018, and the respective combining changes in fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Emphasis-of-Matter

Unusual Subsequent Event - Pension Legislation

With the passage of Senate Bill 151, significant structural changes were made to KRS. This legislation was challenged and the case is currently before the Kentucky Supreme Court. Information regarding this litigation is included in Note N in the combining financial statements. As of the date of this report, no judgment has been rendered. Our opinion is not modified with respect to this matter.

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(Continued)

Reporting Entity

As discussed in Note A, the combining financial statements present only the KRS, and are not intended to present fairly the financial position of the Commonwealth of Kentucky, or the results of its operations in conformity with accounting principles generally accepted in the United States of America. Our opinion is not modified with respect to this matter.

Report on Summarized Comparative Information

The combining financial statements of Kentucky Retirement Systems for the year ended June 30, 2017 were audited by other auditors whose report dated December 7, 2017, stated that the plan net position as of June 30, 2017 and changes in plan net position for the year then ended were in conformity with accounting principles generally accepted in the United States of America. The combining financial statements for the year then ended (not presented herein), were audited by other auditors whose report, dated December 7, 2017, expressed an unmodified opinion on those statements.

Other Matter

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis on pages 20 through 26 and the Schedule of Changes in Employers' Total Pension Liability (TPL) (pages 83-87), Schedule of Employer Net Pension Liability (NPL) (page 82), Schedule of Employer Contributions (pages 89-91), Schedule of Changes in Employers' Net OPEB Liability (pages 94-98), Schedule of Employers' Net OPEB Liability (pages 92-93), Schedule of Employers' OPEB Contributions (pages 100-102), and Schedule of Money Weighted Rate of Return (page 103) be presented to supplement the basic combining financial statements. Such information, although not a part of the basic combining financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of the financial reporting for placing the basic combining financial statements in an appropriate operational, economical, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquires of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquires, the basic combining financial statements, and other knowledge we obtained during our audit of the basic combining financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures did not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the combining financial statements that collectively comprise the Pension Funds and Insurance Fund of the KRS' basic combining financial statements. The additional supporting schedules (pages 104 through 106) are presented for purposes of additional analysis and are not a required part of the basic combining financial statements. Such information is the responsibility of management and was derived from and relate directly to the underlying accounting and other records used to prepare the basic combining financial statements. This information has been subjected to the auditing procedures applied in the audit of the basic combining financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic combining financial statements or to the basic combining financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the information is fairly stated, in all material respects, in relation to the basic combining financial statements as a whole.

Other Information

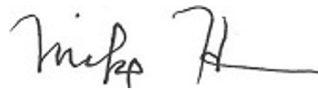
The Introductory, Actuarial, Investment, and Statistical sections are presented for purposes of additional analysis and are not a required part of the combining financial statements. These sections have not been subjected to the auditing procedures applied in the audit of the combining financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

Board of Trustees
Kentucky Retirement Systems
(Continued)

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated, November 29, 2018, on our consideration of the KRS's internal control over financial reporting and on our test of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the KRS's internal control over financial reporting and compliance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mike Harmon", with a long horizontal line extending to the right.

Mike Harmon
Auditor of Public Accounts

November 29, 2018

Management's DISCUSSION & ANALYSIS

Pension Funds

The following highlights are explained in more detail later in this report.

Total Pension Fiduciary Net Position was \$11.9 billion at the beginning of the fiscal year and increased by 4.14% to \$12.4 billion as of June 30, 2018. The \$0.5 billion increase is primarily attributable to positive investment income and higher contributions. The pension funds received \$87.6 million in General Fund in fiscal year 2018 appropriations compared to \$98.2 million in fiscal year 2017.

CONTRIBUTIONS

- Total contributions reported for fiscal year 2018 were \$1,635.9 million compared to \$1,674.0 million in fiscal year 2017. Employer contributions, member contributions, pension spiking contributions, and health insurance contributions increased for the fiscal year. General Fund appropriations of \$87.6 million for the KERS and SPRS plan, and the employer cessation contributions of \$17 thousand were less than fiscal year 2017 resulting in lower total contributions for fiscal year 2018, partially offset by \$1 million from a legal settlement with Northern Trust.
- The member health insurance 401(h) contributions totaled \$19.8 million for fiscal year 2018 compared to \$17.0 million in the prior fiscal year. This increase was mainly due to new active employees in Tier 3.

INVESTMENTS

- The investment portfolio for the Pension Plans reported a net return of 8.57% for fiscal year 2018 compared to the 13.47% return for fiscal year 2017. The investment portfolio experienced realized gains across all of the portfolios.
- The net appreciation in the fair value of investments for fiscal year 2018 was \$806.2 million compared to net appreciation of \$1,164.1 million for the prior fiscal year.
- Interest, dividends, and net securities lending income for fiscal year 2018 was \$274.9 million compared to \$336.6 million in fiscal year 2017. The primary driver of this decrease was due to positive, but less favorable 2018 market conditions which resulted in decreased income and dividends across all portfolios.
- All investment returns are reported net of fees, including carried interest. Investment expenses totaled \$92.6 million for fiscal year 2018 compared to \$85.5 million in the prior fiscal year.

DEDUCTIONS

- Pension benefits paid to retirees and beneficiaries for fiscal year 2018 totaled \$2,062.5 million compared to \$1,981.1 million in fiscal year 2017 (a 4.11% increase). The increase was due to a 4.58% increase in the number of retirees to 124,369. Refund of contributions paid to former members upon termination of employment for fiscal year 2018 totaled \$34.9 million compared to \$30.7 million in fiscal year 2017, a 13.85% increase, as more members elected a refund at employment termination.
- KRS 2018 Pension administrative expense totaled \$33.0 million compared to \$33.1 million in the prior year. The decrease was mainly due to lower technology expenditures and salary expense related to vacant positions.

ACTUARIAL

The actuarial value of the total pension liability was determined as of June 30, 2018. The discount rate and assumed rate of return used to measure the total pension liability was 5.25% for the KERS Non-Hazardous and SPRS Pension plans. The rate of 6.25% was used for the KERS Hazardous and CERS Pension plans. The payroll growth assumptions for the KERS and SPRS Pension plans was 0.00% and 2.00% for the CERS Pension plans. The assumed inflation factor was 2.30% for all plans. The assumed real rate of return was 3.95% for the CERS systems, KERS Hazardous, and all Insurance plans, and 2.95% for KERS Non-Hazardous and State SPRS pension plans.

Management's DISCUSSION & ANALYSIS

Insurance Fund

The following highlights are explained in more detail later in this report.

The combined fiduciary net position of the Insurance Fund increased by \$381.3 million during fiscal year 2018. Total combined net position for the fiscal year was \$5,165.2 million. Total contributions and net investment income of \$759.3 million offset deductions of \$378.0 million which resulted in the net position increase.

CONTRIBUTIONS

- Employer contributions of \$321.9 million were received in fiscal year 2018 compared to \$315.0 million in fiscal year 2017. Total contributions increased 2.19% primarily due to the increased contribution rate for the KERS Non-hazardous plan and increased employer payroll for the CERS plans.
- The reimbursement of retired/re-employed health insurance for fiscal year 2018 totaled \$9.8 million compared to \$8.9 million in the prior fiscal year. The increase is due to an increase in retired/re-employed members for whom employers are paying health insurance reimbursements.

INVESTMENTS

- Interest, dividends, and net securities lending income for fiscal year 2018 was \$106.6 million compared to \$128.1 million in fiscal year 2017. The primary driver of this decrease was due to market conditions resulting in decreased income and dividends across all portfolios.
- The investment portfolio reported a net return of 9.05% for the fiscal year, lower than fiscal year 2017 net of expense returns of 13.72%. The investment returns exceeded the 6.25% assumed rate of return.
- The net appreciation in the fair value of investments for fiscal year 2018 was \$366.2 million compared to net appreciation of \$480.3 million for the prior fiscal year. This \$114.1 million decrease in fiscal year 2018 was due to lower market returns compared to fiscal year 2017 and portfolio rebalancing to reduce equity risk.
- Investment expenses totaled \$45.9 million for fiscal year 2018 compared to \$34.2 million in the prior fiscal year due to asset growth.

DEDUCTIONS

- Total insurance premiums paid plus self-funded reimbursements was \$375.9 million for fiscal year 2018. Although fiscal year 2018 insurance premiums were comparable to fiscal year 2017 rates, the number of covered lives increased by approximately 5% year-over-year.
- KRS' insurance administrative expenses for retirees under age 65, decreased from \$2.2 million in fiscal year 2017 to \$2.1 million in fiscal year 2018.

ACTUARIAL

The actuarial value of the total insurance liability was determined as of June 30, 2018. The discount rate and assumed investment rate of return used to measure the total insurance liability was 6.25% for all plans. Assumed payroll growth and inflation was 0% and 2.30% respectively for KERS Non-Hazardous, KERS Hazardous and SPRS. Assumed payroll growth and inflation for CERS Non-Hazardous and CERS Hazardous was 2.00% and 2.30% respectively. The assumed real rate of return was 3.95% for KERS Non-Hazardous, KERS Hazardous, and SPRS pension plans, 1.95% for the CERS systems.

Management's DISCUSSION & ANALYSIS

Using This Financial Report

Because of the long-term nature of a defined benefit pension plan and post-employment healthcare benefit plan, the combining financial statements alone cannot provide sufficient information to properly reflect the plans' ongoing plan perspective. This financial report consists of two combining financial statements and two required schedules of historical trend information. All plans within KRS are included in the aforementioned combining financial statements. The Combining Statement of Fiduciary Net Position for the Pension Funds on page 27 and the Combining Statement of Fiduciary Net Position for the Insurance Fund on page 29 provide a snapshot of the financial position of each of the three systems as of fiscal year 2018. The Combining Statement of Changes in Fiduciary Net Position for the Pension Funds on page 28, and the Combining Statement of Changes in Fiduciary Net Position for the Insurance Fund on page 28, summarizes the additions and deductions that occurred for each of the three systems during fiscal year 2018.

The economic assumptions for the Pension and Insurance Plans for fiscal year 2018 are on page 61, the Schedules of Changes in Employers' Net Pension Liability on pages 83-87, the Schedules of the Employer Net Pension Liability on pages 82; the Schedule of Changes in Employers' Net OPEB Liability are on pages 94-98; and, the Schedule of the Employers' Net OPEB Liabilities are on page 72-73. These schedules include current and historical trend information about the actuarially funded status of each plan from a long-term, ongoing plan perspective and the progress made in accumulating sufficient assets to pay benefits and insurance premiums when due. The Schedules of the Employers' Contributions – Pensions are on pages 89-91, and the Schedule of the Employers' Contributions – OPEB are on pages 100-102. These schedules present current and historical trend information about the annual required contributions and the contributions made in relation to the requirement. These Schedules provide information that contributes to understanding the changes over time in the funded status of the plans.

Kentucky Retirement Systems Combined

KRS' combined fiduciary net position increased \$875.2 million in fiscal year 2018, compared to the fiduciary net position for the prior fiscal year. The increase in fiduciary net position for the fiscal year 2018 is primarily attributable to an increase in net investment incomes, higher contributions, and General Fund appropriations. The analysis focuses on net position table and changes in fiduciary net position table for KRS' Pension and Insurance Funds.

Management's DISCUSSION & ANALYSIS

FUND ACTIVITIES

The net position of the Pension Funds increased by \$494.0 million to \$12,415.9 million in fiscal year 2018 compared to \$11,921.9 million in fiscal year 2017. All of these assets are restricted in use to provide monthly retirement allowances to members who contributed to the Pension Funds as employees and on behalf of their beneficiaries. The net position of the Insurance Fund increased by \$381.3 million to \$5,165.2 million in fiscal year 2018 compared to \$4,783.9 million in fiscal year 2017. All of these assets are restricted in use to provide hospital and medical insurance benefits to members of the Pension Funds who receive a monthly retirement allowance.

Financial data presented in this report is abbreviated "in thousands" or "in millions."

Fiduciary Net Position as of June 30, 2018 (\$ in Thousands)

	Pension Funds			Insurance Fund			Total		
	2018	2017	2016	2018	2017	2016	2018	2017	2016
Cash & Invest.	\$12,859,431	\$12,168,664	\$11,410,516	\$5,367,071	\$4,936,439	\$4,401,155	\$18,226,502	\$17,105,103	\$15,811,671
Receivables	349,172	347,620	442,464	148,883	103,747	171,033	498,055	451,367	613,497
Equip/Int Assets, net of dep/amort.	4,437	6,311	8,232	-	-	-	4,437	6,311	8,232
Total Assets	13,213,040	12,522,595	11,861,212	5,515,954	5,040,186	4,572,188	18,728,994	17,562,781	16,433,400
Total Liabilities	(797,184)	(600,694)	(983,454)	(350,775)	(256,279)	(340,877)	(1,147,959)	(856,973)	(1,324,331)
Fiduciary Net Position	\$12,415,856	\$11,921,901	\$10,877,758	\$5,165,179	\$4,783,907	\$4,231,311	\$17,581,035	\$16,705,808	\$15,109,069

Pension Fund Activities

Member contributions increased by \$15.6 million. This is primarily due to an increase in covered payroll in CERS Non-Hazardous and CERS Hazardous. Retirement contributions are calculated by applying a percentage factor to salary and are remitted by each employer on behalf of the member. Non-Hazardous members pay pension contributions of 5.00% of creditable compensation and Hazardous members contribute 8.00% of creditable compensation.

Employer contributions increased by \$3.4 million as a result of the increase in the contribution rates for all funds.

Total Pension Funds deductions increased by \$85.4 million. The 4.17% increase was primarily driven by higher retirements across all plans.

Net investment income decreased by \$426.7 million. This is illustrated in the Investment Income Pension table on the next page. The pension funds experienced a decrease in income when compared to fiscal year 2017, due to less favorable market conditions. KRS outperformed the benchmark in fiscal year 2018 and the plans' actuarial assumed rates of return. KRS also has transitioned into new asset allocations with a higher cash allocation at fiscal year-end, resulting in a lower yielding portfolio.

Management's DISCUSSION & ANALYSIS

Investment Income (Loss) - Pension As of June 30, 2018 (\$ in Thousands)

Investment Income (Loss) - Pension	2018	2017	2016
Increase (decrease) in fair value of investments	\$ (142,280)	\$603,703	\$(270,041)
Investment income net of investment expense	182,299	251,064	136,917
Gain on sale of investments	948,444	560,380	57,149
Net investment income (loss)	\$ 988,463	\$1,415,147	\$(75,975)

Changes in Fiduciary Net Position As of June 30, 2018 (\$ in Thousands)

	Pension Funds			Insurance Fund			Total		
	2018	2017	2016	2018	2017	2016	2018	2017	2016
Additions:									
Member Cont.	\$349,844	\$334,232	\$307,422	\$-	\$-	\$-	\$349,844	\$334,232	\$307,422
Employer Cont.	1,169,690	1,166,269	949,802	321,888	314,987	333,118	1,491,578	1,481,256	1,282,920
Health Ins. Cont.	19,849	16,964	14,719	-	-	-	19,849	16,964	14,719
Pension Spiking Cont.	8,078	5,156	2,684	-	-	-	8,078	5,156	2,684
Northern Trust Settlement	827	-	-	173	-	-	1,000	-	-
General Fund Appro.	87,574	98,193	-	-	-	-	87,574	98,193	-
Employer Cessation Cont.	17	53,215	-	-	15,567	-	17	68,782	-
Premiums Rec'd	-	-	-	497	548	721	497	548	721
Retired Re-emp Ins.	-	-	-	9,837	8,893	9,155	9,837	8,893	9,155
Medicare Subsidy	-	-	-	16	2	-	16	2	-
Invest. Inc. (net)	988,463	1,415,147	(75,975)	426,842	574,187	(5,154)	1,415,305	1,989,334	(81,129)
Total Additions	2,624,342	3,089,176	1,198,652	759,253	914,184	337,840	3,383,595	4,003,360	1,536,492
Deductions:									
Benefit payments	2,062,482	1,981,100	1,903,557	-	-	-	2,062,482	1,981,100	1,903,557
Refunds	34,948	30,696	30,985	-	-	-	34,948	30,696	30,985
Administrative Exp.	32,957	33,109	32,300	2,063	2,202	2,038	35,020	35,311	34,338
Healthcare Costs	-	-	-	375,918	359,388	351,383	375,918	359,388	351,383
Capital Projects Exp.	-	123	533	-	-	-	-	123	533
Total Deductions	2,130,387	2,045,028	1,967,375	377,981	361,590	353,421	2,508,368	2,406,618	2,320,796
Inc. (Decrease) in Fiduciary Net Position	\$493,955	\$1,044,148	\$(768,723)	\$381,272	\$552,594	\$(15,581)	\$875,227	\$1,596,742	\$(784,304)

Management's DISCUSSION & ANALYSIS

Insurance Fund Activities

Employer contributions paid into the Insurance Fund increased by \$6.9 million in fiscal year 2018 over the prior fiscal year. This increase was a result of an increase in the employer covered payroll for CERS Non-Hazardous and Hazardous plans.

Net investment income decreased \$147.3 million in fiscal year 2018 compared to fiscal year 2017. Although KRS outperformed the benchmark in fiscal year 2018, market conditions were less favorable, and KRS rebalanced the portfolios resulted in a lower yielding portfolio. This is illustrated in the Investment Income Insurance table as follows:

Investment Income (Loss) - Insurance			
As of June 30, 2018 (\$ in Thousands)			
Investment Income (Loss) - Insurance	2018	2017	2016
Increase (decrease) in fair value of investments	\$25,516	\$256,937	\$(46,852)
Investment income net of investment expense	60,688	93,902	49,380
Gain (loss) on sale of investments	340,638	223,348	(7,682)
Net investment income (loss)	\$426,842	\$574,187	\$(5,154)

Management's DISCUSSION & ANALYSIS

Historical Trends

Accounting standards require that the Combining Statement of Fiduciary Net Position state asset value at fair value and include only benefits and refunds due plan members and beneficiaries; accrued investment income (loss); and, administrative expense as of the reporting date. Information regarding the actuarial funding status of the Pension and Insurance Funds is provided in the schedules of Net Pension Liability on page 82 and Net OPEB Liability on pages 72-73. The asset value stated in the Schedules of Changes in Employers' Total Pension Liability on pages 83-87 and Net OPEB Liability on pages 72-98 is the actuarial value of assets. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets based on the investment return assumption. The amount recognized each year is 20% of the difference between market value and expected market value. The actuarial accrued liability is calculated using the entry age normal cost funding method. This actuarial accrued liability is the measure of the cost of benefits that have been earned to date by KRS' members, but not yet paid. The difference in value between the actuarial accrued liability and the actuarial value of assets is defined as the unfunded actuarial accrued liability.

The unfunded actuarial accrued liability from the June 30, 2018 actuarial valuation in the Pension Plans increased by \$464.5 million for a total unfunded amount of \$23,602.0 million in fiscal year 2018, compared to an unfunded amount of \$23,137.5 million in fiscal year 2017. In recent years, funding levels for the Pension Funds have decreased significantly due to a number of factors including: the change in assumptions for the 2017 valuations; investment returns that were less than the actuarially assumed rates; lower payroll growth; and, higher than anticipated retirement rates. In addition, KERS Non-Hazardous, KERS Hazardous, and SPRS were funded less than the actuarially determined rate until fiscal year 2015.

The Insurance Plan's unfunded actuarial accrued liability from the June 30, 2018, actuarial valuation for fiscal year 2018, was \$2,653.9 million compared to \$3,601.1 million for fiscal year 2017. This is a decrease in the unfunded actuarial accrued liability of \$947.2 million. The deduction is primarily due to reduction in insurance premiums across all plans.

Annual required contributions of the employers, as actuarially determined, and actual contributions made by employers and other contributing entities in relation to the required contributions, are provided in the Schedules of Employer Contributions - Pension on pages 89-91, and in the Schedules of Contributions - OPEB on pages 100-102. The difference in the annual required contributions and actual contributions made by employers and other contributing entities in the KERS and SPRS funds is attributable to the fact that the employer contribution rate set by the Kentucky General Assembly was less than the rate recommended by the KRS Actuary in prior years and adopted by the KRS Board of Trustees.

Combining Statements of Fiduciary Net Position - Pension Funds

As of June 30, 2018 with Comparative Totals as of June 30, 2017 (\$ in Thousands)

ASSETS	KERS	KERS	CERS	CERS	SPRS	KRS Total	KRS Total
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		2018	2017
CASH AND SHORT-TERM INVESTMENT							
Cash Deposits	\$316	\$81	\$228	\$101	\$64	\$790	\$3,366
Short-term Investments	141,771	34,498	371,543	131,077	18,762	697,651	486,931
Total Cash and Short-term Investments	142,087	34,579	371,771	131,178	18,826	698,441	490,297
RECEIVABLES							
Accounts Receivable	42,926	5,438	55,791	16,465	11,803	132,423	150,126
Accounts Receivable - Investments	34,713	11,358	124,294	41,796	4,501	216,662	197,400
Accounts Receivable - Alternate Participation	-	-	-	87	-	87	94
Total Receivables	77,639	16,796	180,085	58,348	16,304	349,172	347,620
INVESTMENTS, AT FAIR VALUE							
Fixed Income	562,011	159,064	1,677,481	558,405	74,090	3,031,051	1,133,170
Public Equities	718,779	280,833	3,060,414	1,016,604	100,025	5,176,655	6,137,268
Private Equities	248,583	64,986	698,607	237,979	21,752	1,271,907	1,574,062
Derivatives	(150)	(41)	(463)	(154)	(18)	(826)	23,453
Absolute Return	126,277	33,774	401,782	127,449	13,302	702,584	921,757
Real Return	160,458	55,093	608,868	207,728	21,949	1,054,096	982,317
Real Estate	67,441	24,040	253,849	81,436	9,833	436,599	509,527
Total Investments, at Fair Value	1,883,399	617,749	6,700,538	2,229,447	240,933	11,672,066	11,281,554
Securities Lending Collateral Invested	74,233	25,766	284,587	94,439	9,899	488,924	396,813
CAPITAL/INTANGIBLE ASSETS							
Capital Assets	929	91	1,701	153	11	2,885	2,885
Intangible Assets	5,920	494	9,961	827	100	17,302	17,302
Accumulated Depreciation	(852)	(84)	(1,561)	(141)	(10)	(2,648)	(2,539)
Accumulated Amortization	(4,474)	(371)	(7,531)	(636)	(90)	(13,102)	(11,337)
Total Capital Assets	1,523	130	2,570	203	11	4,437	6,311
Total Assets	2,178,881	695,020	7,539,551	2,513,615	285,973	13,213,040	12,522,595
LIABILITIES							
Accounts Payable	2,877	2,394	5,921	1,744	419	13,355	12,968
Investment Accounts Payable	52,882	15,687	162,721	56,385	7,230	294,905	190,913
Securities Lending Collateral	74,233	25,766	284,587	94,439	9,899	488,924	396,813
Total Liabilities	129,992	43,847	453,229	152,568	17,548	797,184	600,694
Total Fiduciary Net Position Restricted for Pensions	\$2,048,889	\$651,173	\$7,086,322	\$2,361,047	\$268,425	\$12,415,856	\$11,921,901

See accompanying notes which are an integral part of these combining financial statements.

The displayed fair values include investable assets held by each System and its associated contributions, payables, and equipment and intangible assets; unlike those found in the Investment Section (pages 116-119), which include only those investable assets held by each System.

Combining Statements of Changes In Fiduciary Net Position - Pension Funds

for the fiscal year ending June 30, 2018 with Comparative Totals for the fiscal year ending June 30, 2017 (\$ in Thousands)

	KERS	KERS	CERS	CERS	SPRS	KRS Total	KRS Total
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		2018	2017
ADDITIONS							
Member Contributions	\$104,972	\$17,891	\$160,370	\$61,089	\$5,522	\$349,844	\$334,232
Employer Contributions	619,988	32,790	355,473	124,953	36,486	1,169,690	1,166,269
General Fund Appropriations	67,574	10,000	-	-	10,000	87,574	98,193
Pension Spiking Contributions	1,564	871	2,544	2,707	392	8,078	5,156
Northern Trust Settlement	301	33	361	111	21	827	
Health Insurance Contributions (HB1)	5,786	909	10,826	2,173	155	19,849	16,964
Employer Cessation Contributions	17	-	-	-	-	17	53,215
Total Contributions	800,202	62,494	529,574	191,033	52,576	1,635,879	1,674,029
INVESTMENT INCOME							
From Investing Activities							
Net Appreciation in FV of Investments	112,993	42,668	477,218	158,788	14,497	806,164	1,164,083
Interest/Dividends	46,969	13,800	154,008	50,956	5,605	271,338	334,599
Total Investing Activities Income	159,962	56,468	631,226	209,744	20,102	1,077,502	1,498,682
Investment Expense	6,487	2,852	32,464	10,624	1,070	53,497	85,520
Performance Fees	6,670	1,981	22,254	7,572	623	39,100	-
Net Income from Investing Activities	146,805	51,635	576,508	191,548	18,409	984,905	1,413,162
From Securities Lending Activities							
Securities Lending Income	1,624	478	4,823	1,607	183	8,715	3,070
Securities Lending Expense							
Securities Lending Borrower Rebates	779	242	2,699	896	96	4,712	734
Securities Lending Agent Fees	73	23	255	85	9	445	351
Net Income from Securities Lending	772	213	1,869	626	78	3,558	1,985
Total Investment Income	147,577	51,848	578,377	192,174	18,487	988,463	1,415,147
Total Additions	947,779	114,342	1,107,951	383,207	71,063	2,624,342	3,089,176
DEDUCTIONS							
Benefit Payments	967,374	65,616	726,568	244,119	58,805	2,062,482	1,981,100
Refunds	13,603	2,501	14,608	4,214	22	34,948	30,696
Administrative Expenses	10,692	975	19,592	1,504	194	32,957	33,109
Capital Project Expenses	-	-	-	-	-	-	123
Total Deductions	991,669	69,092	760,768	249,837	59,021	2,130,387	2,045,028
Net Increase(Decrease) in Fiduciary Net Position	(43,890)	45,250	347,183	133,370	12,042	493,955	1,044,148
FIDUCIARY NET POSITION HELD IN TRUST FOR PENSION BENEFITS							
Beginning of Period	2,092,779	605,923	6,739,139	2,227,677	256,383	11,921,901	10,877,753
End of Period	\$2,048,889	\$651,173	\$7,086,322	\$2,361,047	\$268,425	\$12,415,856	\$11,921,901

See accompanying notes which are an integral part of these combining financial statements.

Combining Statements of Fiduciary Net Position - Insurance Fund

As of June 30, 2018 with Comparative Totals as of June 30, 2017 (\$ In Thousands)

ASSETS	KERS	KERS	CERS	CERS	SPRS	KRS Total	KRS Total
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		2018	2017
CASH AND SHORT-TERM INVESTMENT							
Cash Deposits	\$78	\$33	\$51	\$45	\$33	\$240	\$243
Short-term Investments	45,856	26,665	118,284	63,000	7,607	261,412	184,860
Total Cash and Short-term Investments	45,934	26,698	118,335	63,045	7,640	261,652	185,103
RECEIVABLES							
Accounts Receivable	12,396	657	14,016	4,236	885	32,190	28,249
Investment Accounts Receivable	20,229	11,178	52,013	28,790	4,483	116,693	75,498
Total Receivables	32,625	11,835	66,029	33,026	5,368	148,883	103,747
INVESTMENTS, AT FAIR VALUE							
Fixed Income	199,166	118,026	513,963	276,976	42,541	1,150,672	371,212
Public Equities	399,932	225,391	1,014,654	548,164	82,690	2,270,831	2,614,142
Private Equities	49,763	52,224	276,522	155,455	23,585	557,549	582,345
Derivatives	(57)	(34)	(153)	(83)	(12)	(339)	9,575
Absolute Return	45,185	29,938	128,204	71,761	11,221	286,309	388,353
Real Return	72,701	42,936	206,376	107,249	14,839	444,101	395,367
Real Estate	25,727	18,847	81,828	44,780	7,189	178,371	211,795
Total Investments, at Fair Value	792,417	487,328	2,221,394	1,204,302	182,053	4,887,494	4,572,789
Securities Lending Collateral Invested	36,100	22,759	97,332	53,693	8,041	217,925	178,547
Total Assets	907,076	548,620	2,503,090	1,354,066	203,102	5,515,954	5,040,186
LIABILITIES							
Accounts Payable	98	3	674	36	0	811	1,013
Investment Accounts Payable	24,116	12,474	58,317	32,065	5,067	132,039	76,719
Securities Lending Collateral	36,100	22,759	97,332	53,693	8,041	217,925	178,547
Total Liabilities	60,314	35,236	156,323	85,794	13,108	350,775	256,279
Total Fiduciary Net Position Restricted for Insurance	\$846,762	\$513,384	\$2,346,767	\$1,268,272	\$189,994	\$5,165,179	\$4,783,907

See accompanying notes which are an integral part of these combining financial statements.

Combining Statements of Changes In Fiduciary Net Position - Insurance Fund
for the fiscal year ending June 30, 2018 with Comparative Totals for the fiscal year ended June 30, 2017 (\$ in Thousands)

	KERS	KERS	CERS	CERS	SPRS	KRS Total	KRS Total
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		2018	2017
ADDITIONS							
Employer Contributions	\$132,364	\$4,302	\$120,798	\$55,027	\$9,397	\$321,888	\$314,987
Medicare Drug Reimbursement	5	-	11	-	-	16	2
Insurance Premiums	216	(50)	637	(265)	(41)	497	548
Retired Re-employed Healthcare	4,055	986	3,821	975	-	9,837	8,893
Northern Trust Settlement	32	18	75	40	8	173	
Employer Cessation Contributions	-	-	-	-	-	-	15,567
Total Contributions	136,672	5,256	125,342	55,777	9,364	332,411	339,997
INVESTMENT INCOME							
From Investing Activities							
Net Appreciation in FV of Investments	49,902	36,484	170,708	94,771	14,289	366,154	480,285
Interest/Dividends	16,700	10,420	48,144	26,083	3,922	105,269	127,379
Total Investing Activities Income	66,602	46,904	218,852	120,854	18,211	471,423	607,664
Investment Expense	3,959	2,784	12,923	7,087	1,086	27,839	34,228
Performance Fees	1,542	1,695	9,001	5,085	755	18,078	-
Net Income from Investing Activities	61,101	42,425	196,928	108,682	16,370	425,506	573,436
From Securities Lending Activities							
Securities Lending Income	574	344	1,493	814	125	3,350	1,071
Securities Lending Expense							
Securities Lending Borrower Rebates	310	182	810	443	68	1,813	187
Securities Lending Agent Fees	34	20	91	49	7	201	133
Net Income from Securities Lending	230	142	592	322	50	1,336	751
Total Investment Income	61,331	42,567	197,520	109,004	16,420	426,842	574,187
Total Additions	198,003	47,823	322,862	164,781	25,784	759,253	914,184
DEDUCTIONS							
Healthcare Premiums Subsidies	130,069	18,697	131,631	74,844	13,881	369,122	353,595
Administrative Expenses	760	104	761	376	62	2,063	2,202
Self-Funded Healthcare Costs	1,819	79	4,248	603	38	6,787	5,784
Excise Tax Insurance	3	-	6	-	-	9	9
Total Deductions	132,651	18,880	136,646	75,823	13,981	377,981	361,590
Net Increase(Decrease) in Fiduciary Net Position	65,352	28,943	186,216	88,958	11,803	381,272	552,594
FIDUCIARY NET POSITION HELD IN TRUST FOR INSURANCE BENEFITS							
Beginning of Period	781,410	484,441	2,160,551	1,179,314	178,191	4,783,907	4,231,313
End of Period	\$846,762	\$513,384	\$2,346,767	\$1,268,272	\$189,994	\$5,165,179	\$4,783,907

See accompanying notes which are an integral part of these combining financial statements.

NOTE A. Summary of Significant Accounting Policies

This summary of KRS' significant accounting policies is presented to assist in understanding KRS' combining financial statements. The combining financial statements and notes are representations of KRS' management, which is responsible for their integrity and objectivity. These accounting policies conform to GAAP and have been consistently applied in the preparation of the combining financial statements.

Organization

Under the provisions of Kentucky Revised Statute Section 61.645, the KRS Board administers the KERS, CERS, and SPRS in accordance with the provisions of Kentucky Revised Statute Sections 16.555, 61.570, and 78.630. The KRS' assets are segregated by plan, where each system's assets are used only for the payment of benefits to the members of that plan and a pro rata share of administrative costs.

Under the provisions of Kentucky Revised Statute Section 61.701, the KRS Board administers the KRS Insurance Fund. The statutes provide for a single insurance fund to provide group hospital and medical benefits to retirees drawing a benefit from the three pension funds administered by KRS: (1) KERS; (2) CERS; and (3) SPRS. The assets of the Insurance Fund are also segregated by plan. The following notes apply to the various funds administered by KRS.

Basis of Accounting

KRS' combining financial statements are prepared using the accrual basis of accounting. Plan member contributions are recognized in the period in which contributions are due. Employer contributions to the plan are recognized when due and the employer has made a formal commitment to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with terms of the plan. Premium payments are recognized when due and payable in accordance with terms of the plan. Administrative and investment expenses are recognized when incurred. The net position represents the funds KRS has accumulated thus far to pay pension benefits for retirees, active and inactive members, and health care premiums for current and future employees.

Method Used to Value Investments

Investments are reported at fair value. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Short-term investments are reported at cost, which approximates fair value. See Investments Note D for further discussion of fair value measurements. Purchases and sales of securities are recorded on a trade-date basis. Interest income is recorded on the accrual basis. Dividends are recorded on the dividend date. Gain (loss) on investments includes KRS' gains and losses on investments bought and sold as well as held during the fiscal year. Investment returns are recorded in all plans net of investment fees.

Estimates

The preparation of financial statements in accordance with Generally Accepted Accounting Principles (GAAP) requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

Equipment

Equipment is valued at historical cost and depreciation is computed utilizing the straight-line method over the estimated useful lives of the assets ranging from three to ten years. Improvements, which increase the useful life of the equipment, are capitalized. Maintenance and repairs are charged as an expense when incurred. The capitalization threshold used in fiscal years 2018 and 2017 was \$3,000 (see Equipment Note J for further information).

Intangible Assets

Intangible assets, currently computer software, are valued at historical cost and amortization is computed utilizing the straight-line method over the estimated useful lives of the assets which is 10 years. The capitalization threshold used in fiscal years 2018 and 2017 was \$3,000 (see Intangible Assets Note K for further information).

Contributions Receivable

Contributions receivable consist of amounts due from employers. KRS management considers contributions receivable to be fully collectible; accordingly, no allowance for doubtful accounts is considered necessary. If amounts become uncollectible, they will be charged to operations when that determination is made. If amounts previously written off are collected, they will be credited to income when received.

The Investment Accounts Receivable and Investment Accounts Payable consist of all buys and sells of securities which have not closed, as well as all investment related accruals.

Payment of Benefits

Benefits are recorded when paid.

Expense Allocation

KRS administrative expenses are allocated in proportion to the number of total members participating in each plan and direct investment manager expenses are allocated in proportion to the percentage of investment assets held by each plan.

Component Unit

KRS is a component unit of the Commonwealth of Kentucky (Commonwealth) for financial reporting purposes.

KERS was created by the Kentucky General Assembly pursuant to the provisions of Kentucky Revised Statute 61.515. CERS was created by the Kentucky General Assembly pursuant to the provisions of Kentucky Revised Statute 78.520. SPRS was created by the Kentucky General Assembly pursuant to the provisions of Kentucky Revised Statute 16.510. The Kentucky Retirement Systems Insurance Fund was created by the Kentucky General Assembly pursuant to the provisions of Kentucky Revised Statute 61.701. KRS' administrative budget is subject to approval by the Kentucky General Assembly. Employer contribution rates for KERS and SPRS are also subject to legislative approval. Employer contribution rates for CERS are determined by the Board of KRS without further legislative review. The methods used to determine the employer rates for KRS are specified in Kentucky Revised Statute 61.565. Employee contribution rates are set by statute and may be changed only by the Kentucky General Assembly.

Recent Accounting Pronouncements

In June 2015, the Governmental Accounting Standards Board (GASB) issued Statement No. 75, Accounting and Financial Reporting for Post-employment Benefits Other Than Pensions. The objective of this Statement is to address accounting and financial reporting for Other Post-employment Benefits (OPEB) that are provided to the employees of state and local governmental employers. This Statement establishes standards for recognizing and measuring liabilities; deferred outflows of resources; deferred inflows of resources; and, expense/expenditures. For defined benefit OPEB, this Statement identifies the methods and assumptions that are required to be used to project benefit payments, discount projected benefit payments to their actuarial present value, and attribute that present value to periods of employee service. Note disclosure and required supplementary information requirements about defined benefit OPEB are also addressed. This Statement became effective for the fiscal year beginning July 1, 2017. KRS provided the agencies their proportionate share in the OPEB unfunded liability, calculated by Gabriel, Roeder, Smith & Co. (GRS), to be used in their financial reports for fiscal year ending June 30, 2018.

In June 2017, the GASB issued Statement No. 87, Leases. The objective of this Statement is to address government lessee's recognition of lease liabilities, intangible assets, and report amortization expense for using the lease, interest expense on the lease liability, and note disclosures about the lease. Another objective of this Statement is to address government lessor's recognition of a lease receivable, deferred inflow, and report lease revenue, interest income, and note disclosures about the lease. This Statement becomes effective for the fiscal year beginning July 1, 2020. KRS is evaluating the impact of this Statement to the financial report.

GASB Statement 84, Fiduciary Activities, establishes criteria for identifying fiduciary activities of all state and local governments and clarifies whether and how business type activities should report their fiduciary activities. This Statement becomes effective for the fiscal year beginning July 1, 2019. KRS meets the criteria as a fiduciary activity. KRS reports the plan's assets, deferred outflows of resources, liabilities, deferred inflows of resources, and fiduciary net position in accordance with Statement 67 and Statement 74, as applicable.

GASB Statement 82, Pension Issues, was designed to improve consistency in the application of the pension standards by clarifying or amending related areas of existing guidance. Specifically, the practice issues raised by stakeholders during implementation related to GASB 67, 68, and 73. This Statement became effective for the fiscal year beginning July 1, 2017. KRS has implemented GASB Statement 82. GASB 67 & 68 require the presentation of covered payroll as defined as the payroll on which contributions to a pension plan are based. There is no deviation from the guidance in an Actuarial Standard of Practice for financial reporting purposes with the requirements of Statement 67, 68, or 73. The member and contributions disclosed in GASB 67 & 68 reports are in conformity with plan member contributions classified as plan member contributions for purposes of Statement 67, and as employee contributions for purposes of Statement 68.

Note B. Plan Descriptions & Contribution Information

KERS Membership Combined

As of June 30, 2018

Members	2018			2017		
	Non-Haz	Hazardous	Total	Non-Haz	Hazardous	Total
Retirees and Beneficiaries Receiving Benefits	42,175	3,010	45,185	40,813	2,823	43,636
Inactive Memberships	45,768	4,716	50,484	44,848	4,363	49,211
Active Plan Members	34,845	3,963	38,808	36,725	4,061	40,786
Total	122,788	11,689	134,477	122,386	11,247	133,633
Number of Participating Employers			348			354

CERS Membership Combined

As of June 30, 2018

Members	2018			2017		
	Non-Haz	Hazardous	Total	Non-Haz	Hazardous	Total
Retirees and Beneficiaries Receiving Benefits	56,629	7,647	64,276	54,018	7,186	61,204
Inactive Memberships	81,608	2,581	84,189	78,940	2,442	81,382
Active Plan Members	84,435	9,285	93,720	84,401	9,321	93,722
Total	222,672	19,513	242,185	217,359	18,949	236,308
Number of Participating Employers			1,139			1,138

SPRS

As of June 30, 2018

Members	2018	2017
Retirees and Beneficiaries Receiving Benefits	1,445	1,393
Inactive Memberships	290	278
Active Plan Members	891	910
Total	2,626	2,581
Number of Participating Employers	1	1

Note: Each person is only counted once in the Membership by System report. A member who has both a membership account and a retired account is included in retired count. Members who have multiple membership accounts are included under the system where they most recently contributed. Members who have more than one retirement account are included in the system with the greatest service credit. If the retired accounts have equal service credit, they are counted first in SPRS, CERS Hazardous, KERS Hazardous, CERS Non-Hazardous, then KERS Non-Hazardous.

Number of Hospital & Medical Contracts As of June 30, 2018

System	Single	Couple/ Family	Parent	Medicare Without Prescription	Medicare With Prescription
KERS Non-Hazardous	8,638	696	460	1,179	21,117
KERS Hazardous	686	478	96	73	1,495
CERS Non-Hazardous	8,802	510	231	2,389	25,476
CERS Hazardous	1,712	2,571	422	119	3,388
SPRS	253	426	74	21	941
Totals	20,091	4,681	1,283	3,781	52,417

Number of Hospital & Medical Contracts As of June 30, 2017

System	Single	Couple/ Family	Parent	Medicare Without Prescription	Medicare With Prescription
KERS Non-Hazardous	8,627	663	411	1,229	20,215
KERS Hazardous	667	432	88	72	1,401
CERS Non-Hazardous	8,313	462	222	2,462	24,247
CERS Hazardous	1,645	2,387	395	125	3,205
SPRS	251	420	79	17	897
Totals	19,503	4,364	1,195	3,905	49,965

Medical Insurance coverage is provided based on the member's initial participation date and length of service. Members receive either a percentage or dollar amount for insurance coverage.

Pension Plan Descriptions

These systems provide for retirement, disability, and death benefits to system members. Retirement benefits may be extended to beneficiaries of members under certain circumstances.

KERS - Kentucky Employees Retirement System

This system consists of two plans - Non-Hazardous and Hazardous. Each plan is a cost-sharing, multiple-employer defined benefit pension plan that covers all regular full-time members employed in positions of any state department, board, or agency directed by Executive Order to participate in KERS.

CERS - County Employees Retirement System

This system consists of two plans - Non-Hazardous and Hazardous. Each plan is a cost-sharing, multiple-employer defined benefit pension plan that covers all regular full-time members employed in positions of each participating county, city, and school board, and any additional eligible local agencies electing to participate in CERS.

SPRS - State Police Retirement System

This system is a single-employer defined benefit pension plan that covers all full-time state troopers employed in positions by the Kentucky State Police.

Cost of Living Adjustment (COLA)

Prior to July 1, 2009, COLAs were provided annually equal to the percentage increase in the annual average of the consumer price index for all urban consumers for the most recent calendar year, not to exceed 5% in any plan year. After July 1, 2009, the COLAs were limited to 1.50%. No COLA has been granted since July 1, 2011.

Contributions

The Commonwealth is required to contribute at an actuarially determined rate for KERS and SPRS pensions. Participating employers are required to contribute at an actuarially determined rate for CERS pensions. Per Kentucky Revised Statute Sections {KERS 61.565(3); CERS 78.545(33); SPRS 16.645(18)}, normal contribution and past service contribution rates shall be determined by the Board on the basis of an annual valuation last preceding July 1 of a new biennium. The Board may amend contribution rates as of the first day of July of the second year of a biennium, if it is determined on the basis of a subsequent actuarial valuation that amended contribution rates are necessary to satisfy requirements determined in accordance with actuarial bases adopted by the Board. However, formal commitment to provide the contributions by the employer is made through the biennial budget for KERS and SPRS.

For the fiscal year ended June 30, 2018, participating employers contributed a percentage of each employee's creditable compensation. The actuarially determined rates set by the Board for the fiscal year is a percentage of each employee's creditable compensation. Administrative costs of KRS are financed through employer contributions and investment earnings. See the chart on the following page for the 2018 and 2017 fiscal year employer contribution rates, including the actuarially recommended rates.

TIER 1:

Tier 1 plan members who began participating prior to September 1, 2008, are required to contribute 5% (Non-Hazardous) or 8% (Hazardous) of their annual creditable compensation. These members are classified in the Tier 1 structure of benefits. Interest is paid each June 30 on members' accounts at a rate of 2.5%. If a member terminates employment and applies to take a refund, the member is entitled to a full refund of contributions and interest.

TIER 2:

Tier 2 plan members, who began participating on, or after, September 1, 2008, and before January 1, 2014, are required to contribute 6% (Non-Hazardous) or 9% (Hazardous) of their annual creditable compensation, while 1% of these contributions are deposited to an account created for the payment of health insurance benefits under 26 USC Section 401(h) in the Pension Fund (see Kentucky Administrative Regulation 105 KAR 1:420 Employer's administrative duties). These members are classified in the Tier 2 structure of benefits. Interest is paid each June 30th on members' accounts at a rate of 2.5%. If a member terminates employment and applies to take a refund, the member is entitled to a full refund of contributions and interest; however, the 1% contribution to the 401(h) account is non-refundable and is forfeited.

TIER 3:

Tier 3 plan members, who began participating on, or after, January 1, 2014, are required to contribute to the Cash Balance Plan. The Cash Balance Plan is known as a hybrid plan because it has characteristics of both a defined benefit plan and a defined contribution plan. Members in the plan contribute a set percentage of their salary each month to their own account. Members contribute 5% (Non-Hazardous) or 8% (Hazardous) of their annual creditable compensation, and an additional 1% to the health insurance fund (401(h) account), which is not credited to the member's account and is not refundable. The employer contribution rate is set annually by the Board based on an actuarial valuation. The employer contributes a set percentage of the member's salary. Each month, when employer contributions are received, an employer pay credit is deposited to the member's account. A member's account is credited with a 4% (Non-Hazardous) or 7.5% (Hazardous) employer pay credit. The employer pay credit represents a portion of the employer contribution.

Contribution Rate Breakdown by System As of June 30, 2018												
System	Pension				Insurance				Combined Total			
	Employer Contribution Rates		Actuarially Recommended Rates		Employer Contribution Rates		Actuarially Recommended Rates		Employer Contribution Rates		Actuarially Recommended Rates	
	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017
KERS Non-Hazardous	41.06%	40.24%	41.06%	38.93%	8.41%	8.35%	8.41%	8.35%	49.47%	48.59%	49.47%	47.28%
KERS Hazardous	21.44%	21.08%	21.44%	21.08%	2.26%	2.74%	2.26%	2.74%	23.70%	23.82%	23.70%	23.82%
CERS Non-Hazardous	14.48%	13.95%	14.48%	13.95%	4.70%	4.73%	4.70%	4.93%	19.18%	18.68%	19.18%	18.88%
CERS Hazardous	22.20%	21.71%	22.20%	21.71%	9.35%	9.35%	9.35%	9.79%	31.55%	31.06%	31.55%	31.50%
SPRS	72.47%	70.34%	72.47%	66.47%	18.77%	18.87%	18.77%	18.87%	91.24%	89.21%	91.24%	85.34%

Tier 3 Plan

Interest is paid into the Tier 3 member's account. The account currently earns 4% interest credit on the member's account balance as of June 30th of the previous year. The member's account may be credited with additional interest if the system's five-year Geometric Average Net Investment Return (GANIR) exceeded 4%. If the member was actively employed and participating in the fiscal year, and if the systems' GANIR for the previous five years exceeds 4%, then the member's account will be credited with 75% of the amount of the returns over 4% on the account balance as of June 30th of the previous year (Upside Sharing Interest). It is possible that one system in KRS may get an Upside Sharing Interest, while one may not.

Upside Sharing Interest

Upside Sharing Interest is credited to both the member contribution balance and Employer Pay Credit balance. Upside Sharing Interest is an additional interest credit. Member accounts automatically earn 4% interest annually. The GANIR is calculated on an individual system basis.

The chart below shows the interest calculated on the members' balances as of June 30, 2017, and credited to each member account on June 30, 2018.

(A-B) = C x 75% = D then B + D = Interest (\$ in Thousands)						
	A	B	C	D		
System	5 Year Geometric Average Return	Less Guarantee Rate of 4%	Upside Sharing Interest	Upside Sharing Interest X 75% = Upside Gain	Interest Rate Earned (4% + Upside)	Total Interest Credited to Member Accounts
KERS Non-Hazardous	6.66%	4.00%	2.66%	2.00%	6.00%	\$2,379
KERS Hazardous	7.53%	4.00%	3.53%	2.65%	6.65%	771
CERS Non-Hazardous	7.39%	4.00%	3.39%	2.54%	6.54%	4,786
CERS Hazardous	7.66%	4.00%	3.66%	2.75%	6.75%	1,284
SPRS	6.95%	4.00%	2.95%	2.21%	6.21%	\$92

Insurance Plan Description

The Kentucky Retirement Systems' Insurance Fund was established to provide hospital and medical insurance for eligible members receiving benefits from KERS, CERS, and SPRS. The eligible non-Medicare retirees are covered by the Department of Employee Insurance (DEI) plans. KRS submits the premium payments to DEI. The Board contracts with Humana to provide health care benefits to the eligible Medicare retirees through a Medicare Advantage Plan. The Insurance Fund pays a prescribed contribution for whole or partial payment of required premiums to purchase hospital and medical insurance. For the fiscal year ended June 30, 2018, insurance premiums withheld from benefit payments for members of the Systems were \$20.8 million and \$1.3 million for KERS Non-Hazardous and Hazardous, respectively; \$23.8 million and \$2.8 million for CERS Non-Hazardous and Hazardous, respectively; and, \$329,330 for SPRS. For fiscal year 2017, insurance premiums withheld from benefit payments for members of the Systems were \$20.3 million and \$1.3 million for KERS Non-Hazardous and KERS Hazardous, respectively; \$22.9 million and \$2.7 million for CERS Non-Hazardous and CERS Hazardous, respectively, and \$290,387 for SPRS. The Insurance Fund pays the same proportion of hospital and medical insurance premiums for the spouse and dependents of retired hazardous members killed in the line of duty.

As a result of House Bill 290 (2004 Kentucky General Assembly), medical insurance benefits are calculated differently for members who began participating on, or after, July 1, 2003. Once members reach a minimum vesting period of 10 years, non-hazardous employees whose participation began on, or after, July 1, 2003, earn \$10 per month for insurance benefits at retirement for every year of earned service without regard to a maximum dollar amount. Hazardous employees whose participation began on, or after, July 1, 2003 earn \$15 per month for insurance benefits at retirement for every year of earned service without regard to a maximum dollar amount. Upon death of a hazardous employee, the employee's spouse receives \$10 per month for insurance benefits for each year of the deceased employee's earned hazardous service. This dollar amount is subject to adjustment annually, which is currently 1.5%, based upon Kentucky Revised Statutes. See chart for current values for Dollar Contribution. This benefit is not protected under the inviolable contract provisions of Kentucky Revised Statute 16.652, 61.692 and 78.852. The Kentucky General Assembly reserves the right to suspend or reduce this benefit if, in its judgment, the welfare of the Commonwealth so demands.

The amount of contribution paid by the Insurance Fund is based on years of service. For members participating prior to July 1, 2003, years of service and respective percentages of the maximum contribution are as follows:

Portion Paid by Insurance Fund As of June 30, 2018	
Years of Service	Paid by Insurance Fund (%)
20+ years	100.00%
15-19 years	75.00%
10-14 years	50.00%
4-9 years	25.00%
Less than 4 years	0.00%

The amount of contribution paid by the Insurance Fund is based on years of service. For members participating prior to July 1, 2003, years of service and respective percentages of the maximum contribution are as follows:

Dollar Contribution for Fiscal Year 2018 For Member participation date on or after July 1, 2003	
System	(in Whole \$)
KERS Non-Hazardous	\$13.38
KERS Hazardous	\$20.07
CERS Non-Hazardous	\$13.38
CERS Hazardous	\$20.07
SPRS	\$20.07

Note C. Cash, Short-Term Investments & Securities Lending Collateral

The provisions of GASB Statement No. 28, Accounting and Financial Reporting for Securities Lending Transactions, require that cash received as collateral on securities lending transactions, and investments made with that cash, be reported as assets on the financial statements. In accordance with GASB No. 28, KRS classifies certain other investments, not related to the securities lending program, as short-term. Cash and short-term investments consist of the following as of June 30, 2018.

Cash, Short-Term Investments, & Securities Lending Collateral		
As of June 30, 2018 (\$ in Thousands)		
KERS - Pension		
	2018	2017
Cash	\$397	\$1,497
Short-Term Investments	176,269	138,632
Securities Lending Collateral Invested	99,999	82,349
Total	\$276,665	\$222,478
CERS - Pension		
	2018	2017
Cash	\$329	\$1,775
Short-Term Investments	502,620	336,326
Securities Lending Collateral Invested	379,026	306,661
Total	\$881,975	\$644,762
SPRS - Pension		
	2018	2017
Cash	\$64	\$94
Short-Term Investments	18,762	11,973
Securities Lending Collateral Invested	9,899	7,803
Total	\$28,725	\$19,870
KRS - Insurance Fund		
	2018	2017
Cash	\$240	\$243
Short-Term Investments	261,412	184,858
Securities Lending Collateral Invested	217,925	178,547
Total	\$479,577	\$363,648

Note D. Investments

Kentucky Revised Statute 61.650 grants the responsibility for the investment of plan assets to the KRS Board. The Board has established an Investment Committee which is specifically charged with the oversight and investment of plan assets. The Investment Committee recognizes their duty to invest the funds in accordance with the “Prudent Person Rule” (set forth in Kentucky Revised Statute 61.650) and manage those funds consistent with the long-term nature of the systems. The Investment Committee has adopted a Statement of Investment Policy that contains guidelines and restrictions for deposits and investments. By statute, all investments are to be registered and held in the name of KRS. The Statement of Investment Policy contains the specific guidelines for the investment of Pension and Insurance assets. Additionally, the Investment Committee establishes specific investment guidelines that are summarized below and are included in the Investment Management Agreement for each investment management firm.

Equity Investments

Investments may be made in common stock; securities convertible into common stock; preferred stock of publicly traded companies on stock markets; asset class relevant Exchange Traded Funds (ETF); or any other type of security contained in a manager’s benchmark. Each individual equity account has a comprehensive set of investment guidelines prepared, which contains a listing of permissible investments, portfolio restrictions and standards of performance.

Fixed Income Investments

The fixed income accounts may include, but are not limited to, the following fixed income securities: U.S. Government and Agency bonds; investment grade U.S. corporate credit; investment grade non-U.S. corporate credit; non-investment grade U.S. corporate credit including both bonds and bank loans; non-investment grade non-U.S. corporate credit including bonds and bank loans; municipal bonds; non-U.S. sovereign debt; mortgages, including residential mortgage backed securities; commercial mortgage backed securities and whole loans; asset-backed securities and emerging market debt (EMD), including both sovereign EMD and corporate EMD; and, asset class relevant ETFs.

Private Equity/Equity Real Estate/Real Return/Absolute Return Investments

Subject to the specific approval of the Investment Committee, investments may be made for the purpose of creating a diversified portfolio of alternative investments. The Board may invest in real estate or alternative investments including, but not limited to and without limitation: venture capital, private equity, real assets, and absolute return investments. The Investment Committee believes absolute returns have the potential to generate substantial income, but may have a higher degree of risk. It is important to note that KERS (Non-Hazardous) and SPRS have not made any new investments in Private Equity since 2010 and 2016, respectively, due to the inability to invest in long-term investments as a result of cash flow constraints. Investments may be made in real estate mortgages on a direct basis or in the form of mortgage pool instruments.

Cash Equivalent Securities

The following short-term investment vehicles are considered acceptable: publicly traded investment grade corporate bonds; variable rate demand notes; government and agency bonds; mortgages; municipal bonds; Short Term Investment Funds (STIFs); money market funds or instruments (including, but not limited to, certificates of deposit, bank notes, deposit notes, bankers’ acceptances and commercial paper); and repurchase agreements relating to the above instruments. Instruments may be selected from among those having an investment grade rating at the time of purchase by at least one recognized bond rating service. In cases where the instrument has a split rating, the lower of the two ratings is used.

All instruments shall have a maturity at the time of purchase that does not exceed two years. Repurchase agreements shall be deemed to have a maturity equal to the period remaining until the date on which the repurchase of the underlying securities is scheduled to occur. Variable rate securities shall be deemed to have a maturity equal to the time left until the next interest rate reset occurs, but in no case will any security have a stated final maturity of more than three years.

KRS' fixed income managers, who utilize cash equivalent securities as an integral part of their investment strategy, are exempt from the permissible investments contained in the preceding paragraph. Permissible short-term investments for fixed income managers shall be included in the investment manager's investment guidelines.

Investment Expenses

In accordance with GASB Statement Nos. 67 and 74, Financial Reporting for Pension Plans and Postemployment Benefit Plans Other Than Pension Plans, KRS has exercised professional judgment to report investment expenses. It is not cost-beneficial to separate certain investment expenses from either the related investment income or the general administrative expenses. In fiscal year 2015, KRS changed private equity investment fees from a gross basis to a net basis. KRS made this decision to enhance transparency reporting. Prior to 2015, the majority of KRS' private equity investment fees were netted against investment activity which is the standard used within the private equity sector. KRS' net investment income has always included these fees regardless of the reporting method used. During the 2017 Regular Session of the Kentucky General Assembly, legislators passed SB2 which requires the reporting of all investment fees and expenses. KRS staff continues to work with managers to enhance fees and expenses reporting.

Derivatives

Derivative instruments are financial contracts that have various effective dates and maturity dates and whose values depend on the values of one or more underlying assets, reference rates, or financial indices. Investments may be made in derivative securities, or strategies which make use of derivative instruments, only if such investments do not cause the portfolio to be in any way leveraged beyond a 100% invested position. Investments in derivative securities are subject to large or unanticipated changes in duration or cash flows, and can be interest only, principal only, inverse floater, or structured note securities. These are permitted only to the extent that they are authorized in a contract or an alternative investment offering memorandum of agreement.

Investments in securities such as collateralized mortgage obligations and planned amortization class issues are allowed if, in the judgment of the investment manager, they are not expected to be subject to large or unanticipated changes in duration or cash flows. Investment managers may make use of derivative securities for defensive or hedging purposes. Any derivative security shall be sufficiently liquid so that it can be expected to be sold at, or near, its most recently quoted market price.

It is the KRS policy that investment managers may invest in derivative securities, or strategies which make use of derivative investments, only if such investments do not cause the portfolio to be in any way leveraged beyond a 100% invested position. Examples of such derivatives include, but are not limited to, foreign currency forward contracts, collateralized mortgage obligations, treasury inflation protected securities, futures, options, and swaps.

For accounting and financial reporting purposes, all derivative instruments are considered investment derivative instruments. The derivatives have been segregated on the Combining Statement of Fiduciary Net Position for both the Pension and Insurance Funds.

In accordance with GASB Statement No. 53, Accounting and Financial Reporting for Derivative Instruments, KRS provides additional disclosure regarding its derivatives. The following chart represents the derivatives by types as of June 30, 2018. The chart shows the change in fair value of each of the derivatives types as well as the current fair value and notional value. The notional value is the reference amount of the underlying asset times its current spot price. KRS holds investments in options, commitments, futures, and forward foreign exchange contracts. KRS is exposed to counterparty risk with the foreign exchange contracts that are held. As of June 30, 2018, the aggregate fair value of investment derivatives subject to counterparty credit risk was \$1.8 million for the Pension Fund and \$0.6 million for the Insurance Fund.

Derivative Instruments As of June 30, 2018 (\$ in Thousands)

Pension

Derivatives (by Type)	Net Appreciation (Depreciation) in Fair Value for the Fiscal year Ended June 30, 2018		Fair Value	Notional Value
Futures	\$(826)	Investment	\$(826)	\$(112,271)
FX Spots and Forwards	966	Investment	1,791	(825)
Commits and Options	-	Investment	74	(84,469)

Insurance

Derivatives (by Type)	Net Appreciation (Depreciation) in Fair Value for the Fiscal year Ended June 30, 2018		Fair Value	Notional Value
Futures	(339)	Investment	(339)	(36,639)
FX Spots and Forwards	378	Investment	550	(172)
Commits and Options	\$-	Investment	\$13	\$(11,106)

Note: Commits and Options are recorded on the Financial Statements within the Fixed Income asset class as they are Government Loan Commitments.

Derivatives foreign currency risk is comprised of the above FX Spots and Forwards. The risk associated is due to the potential decline in exchange rates.

FX Spots and Forwards are recorded on the Financial Statements as Payable/Receivables because they represent the foreign exchange for the purchase/sales of securities.

Derivative Instruments Subject to Counterparty Credit Risk

Pension

Counterparty	Percentage of Net Exposure	S & P Ratings
Derivative Instruments - Pension Fund		
Australia & New Zealand Banking Group Ltd	63.65%	AA-
Bank of America NA	-0.02%	A+
Bank of New York Mellon Corp/London	1.20%	AA-
Citibank NA	-4.47%	A+
Credit Suisse AG	0.00%	A
HSBC Bank USA NA/New York NY	2.72%	AA-
JPMorgan Chase Bank NA	0.38%	A+
Morgan Stanley Capital Services LLC	46.10%	A+
Royal Bank of Canada	-0.07%	AA-
State Street Corp	-9.87%	A
UBS AG/Stamford CT	0.05%	A+
Westpac Banking Corp	0.33%	AA-
TOTAL	100.00%	

Derivative Instruments Subject to Counterparty Credit Risk

Insurance

Counterparty	Percentage of Net Exposure	S & P Ratings
Derivative Instruments Subject to Counterparty Credit Risk		
Australia & New Zealand Banking Group Ltd	79.92%	AA-
Bank of America NA	-0.02%	A+
Bank of New York Mellon Corp/London	1.73%	AA-
Citibank NA	-5.70%	A+
Credit Suisse AG	0.00%	A
HSBC Bank USA NA/New York NY	3.35%	AA-
JPMorgan Chase Bank NA	0.49%	A+
Morgan Stanley Capital Services LLC	31.39%	A+
Royal Bank of Canada	-0.10%	AA-
State Street Corp	-11.15%	A
UBS AG/Stamford CT	0.05%	A+
Westpac Banking Corp	0.04%	AA-
TOTAL	100.00%	

RISKS

Custodial Credit Risk for Deposits

Custodial credit risk for deposits is the risk that may occur as a result of a financial institution's failure, whereby KRS' deposits may not be returned. All non-investment related bank balances are held by JP Morgan Chase and each individual account is insured by the Federal Deposit Insurance Corporation (FDIC). These cash balances are invested daily by the local institution in overnight repurchase agreements which are required by Kentucky Administrative Regulations (200 KAR 14:081) to be collateralized at 102% of the principal amount.

As of June 30, 2018, and 2017, deposits for KRS Pension Funds were \$2.7 million and \$4.7 million, respectively. None of these balances were exposed to custodial credit risk as they were either insured or collateralized at required levels.

As of June 30, 2018, and 2017, deposits for KRS Insurance Fund were \$247,384 and \$251,825, respectively. None of these balances were exposed to custodial credit risk as they were either insured or collateralized at required levels.

As of June 30, 2018 and 2017, deposits for the Clearing account, were (\$1,277,139) and \$523,643, respectively. None of these balances were exposed to custodial credit risk as they were either insured or collateralized at required levels.

As of June 30, 2018, and 2017, deposits for the Excess Benefit account, were \$4,789 and \$4,789, respectively. None of these balances were exposed to custodial credit risk as they were either insured or collateralized at required levels.

Custodial Credit Risk for Investments

Custodial credit risk for investments is the risk that, in the event of the failure of the counterparty to a transaction, a government will not be able to recover the value of an investment or collateral securities that are in the possession of an outside party. As of June 30, 2018, the currencies in the chart below were uninsured and unregistered, with securities held by the counterparty or by its trust department or agent but not in KRS' name. These funds are cash held by KRS' Global Managers and consist of various currencies.

Custodial Credit Risk		
As of June 30, 2018 (\$ in Thousands)		
	2018	2017
Pension Fund Foreign Currency	\$1,518,359	\$1,408,163
Insurance Fund Foreign Currency	\$654,401	\$557,016

Pension Fund Securities

Pension Funds Investment Summary		
As of June 30, 2018 (\$ in Thousands)		
Type	2018	2017
Fixed Income	\$3,031,051	\$1,133,170
Public Equities	5,176,655	6,137,268
Private Equities	1,271,907	1,574,062
Derivatives	(826)	23,453
Absolute Return	702,584	921,757
Real Return	1,054,096	982,317
Real Estate	436,599	509,527
Short-Term Investments	697,651	486,931
Accounts Receivable (Payable), Net	(78,243)	6,487
Total	\$12,291,474	\$11,774,972

Note: Differences due to rounding.

Insurance Fund Securities

Insurance Fund Investment Summary		
As of June 30, 2018 (\$ in Thousands)		
Type	2018	2017
Fixed Income	\$1,150,672	\$371,213
Public Equities	2,270,831	2,614,142
Private Equities	557,549	582,345
Derivatives	(339)	9,574
Absolute Return	286,309	388,353
Real Return	444,101	395,369
Real Estate	178,371	211,796
Short-Term Investments	261,412	184,860
Accounts Receivable (Payable), Net	(15,346)	(1,220)
Total	\$5,133,560	\$4,756,432

Note: Differences due to rounding.

Credit Risk Debt Securities

Credit risk is when the risk that an issuer or other counterparty to an investment will not fulfill its obligations. The debt security portfolios are managed by the Investment Division staff and by external investment management firms. All portfolio managers are required by the Statement of Investment Policy to maintain diversified portfolios. Each portfolio is also required to be in compliance with risk management guidelines that are assigned to them based upon the portfolio's specific mandate. In total, the Pension and Insurance Funds' debt securities portfolios are managed using the following guidelines adopted by the Board:

- Bonds, notes, or other obligations issued or guaranteed by the U.S. Government, its agencies or instrumentalities are permissible investments and may be held without restrictions.
- Fixed income investments will be similar in type to those securities found in the KRS fixed income benchmarks and the characteristics of the KRS Fixed Income portfolio will be similar to the KRS fixed income benchmarks. The duration of the total fixed income portfolio shall not deviate from the KRS Fixed Income by more than 25%.
- The duration of the TIPS portfolio shall not deviate from the KRS Fixed Income Index by more than 10%.
- The amount invested in the debt of a single corporation shall not exceed 5% of the total market value of KRS' assets.
- No public fixed income manager shall invest more than 5% of the market value of assets held in any single issue short-term instrument, with the exception of U.S. Government issued, guaranteed or agency obligations.

As of June 30, 2018, the KRS Pension portfolio had \$2,161.9 million and \$539.2 million respectively, in debt securities rated below BBB-. The government agencies in which KRS invested have credit ratings of AA+ or above.

Pension Funds Debt Securities		
As of June 30, 2018 (\$ in Thousands)		
Rating	2018	2017
AAA	\$67,216	\$88,072
AA+	8,477	40,496
AA	6,237	6,378
AA-	5,719	13,342
A+	29,667	15,739
A	14,087	35,514
A-	43,933	27,005
BBB+	46,075	56,193
BBB	93,300	63,483
BBB-	74,459	73,754
BB+	88,775	73,429
BB	79,681	68,279
BB-	123,451	78,218
B+	86,570	75,043
B	109,938	70,787
B-	53,235	40,369
CCC+	13,104	14,997
CCC	6,430	13,999
CCC-	1,760	5,432
CC	4,349	9,009
C	2,389	
D	5,073	18,596
NR	1,587,144	71,095
Total Credit Risk Debt Securities	2,551,069	959,229
Government Agencies	24,109	901
Government Mortgage-Backed Securities	163,641	82,149
Government Issued Commercial Mortgage Backed	23,560	19,808
Government Bonds	268,672	71,083
Total	\$3,031,051	\$1,133,170

Note: These ratings are based on Standard & Poor's (S&P) Global Ratings. Where S&P ratings are unavailable, equivalent Fitch and Moody's Ratings are used as proxies.

Note: Differences due to rounding.

Note: Government Agencies, Government Mortgage-Backed Securities, Government Issued Commercial Mortgage Backed Securities, and Government Bonds are aggregates, therefore, credit ratings are not listed.

Note: The increase in NR Debt Securities is because of the updated investment buckets created during FY2018 which reclassified several of our managers to different asset classes due to the underlying securities held by the managers. Our bond portfolio includes high yield bonds which are not rated. For example, in FY17 Cerberus was classified as Private Equity, but in FY18 they are classified as Specialty Credit which is part of Fixed Income.

As of June 30, 2018, the KRS Insurance portfolio had \$824.0 million and \$165.9 million respectively, in debt securities rated below BBB-. The government agencies in which KRS invested have credit ratings of AA+ or above.

Insurance Fund Debt Securities		
As of June 30, 2018 (\$ in Thousands)		
Rating	2018	2017
AAA	\$33,225	\$26,700
AA+	7,997	15,518
AA	2,339	2,275
AA-	1,966	4,337
A+	11,564	5,813
A	4,859	12,369
A-	17,084	9,554
BBB+	18,302	20,081
BBB	36,025	22,688
BBB-	27,886	26,914
BB+	29,025	22,620
BB	24,614	19,733
BB-	41,302	21,762
B+	27,240	20,999
B	47,382	19,232
B-	17,479	12,468
CCC+	3,395	3,545
CCC	2,227	3,394
CCC-	229	1,161
CC	1,209	2,282
C	367	0
D	2,198	4,479
NR	627,488	34,178
Total Credit Risk Debt	985,402	312,102
Government Agencies	9,385	322
Government Mortgage-Backed Securities	37,949	27,723
Government Issued Commercial Mortgage Backed	8,403	6,978
Government Bonds	109,533	24,088
Total	\$1,150,672	\$371,213

Note: These ratings are based on Standard & Poor's (S&P) Global Ratings. Where S&P ratings are unavailable, equivalent Fitch and Moody's Ratings are used as proxies.

Note: Differences due to rounding.

Note: Note: Government Agencies, Government Mortgage-Backed Securities, Government Issued Commercial Mortgage Backed Securities, and Government Bonds are aggregates, therefore, credit ratings are not listed.

Note: The increase in NR Debt Securities is because of the updated investment buckets created during FY2018 which reclassified several of our managers to different asset classes due to the underlying securities held by the managers. For example, in FY17 Cerberus was classified as Private Equity, but in FY18 they are classified as Specialty Credit which is part of Fixed Income.

Concentration of Credit Risk Debt Securities

Concentration of credit risk is the risk of loss attributed to the magnitude of an entity's exposure in a single issuer.

The total debt securities portfolio is managed using the following general guidelines adopted by the KRS Board: bonds, notes, or other obligations issued or guaranteed by the U.S. Government, its agencies, or instrumentalities are permissible investments and may be held without restrictions. Debt obligations of any single U.S. corporation is limited to a maximum of 5% of the total portfolio at market value.

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. Duration measures the sensitivity of the market prices of fixed income securities to changes in the yield curve and can be measured using two methodologies: effective or modified duration. Effective duration uses the present value of cash flows, weighted for those cash flows as a percentage of the investment's full price, and makes adjustments for any bond features that would retire the bonds prior to maturity. The modified duration, similar to effective duration, measures the sensitivity of the market prices to changes in the yield curve, but does not assume the securities will be called prior to maturity.

The KRS Pension Funds benchmarks its fixed income securities portfolio to a 50/50 blend of the Barclays U.S. Universal Index and the Barclays U.S. High Yield Index. As of June 30, 2018, and 2017, the modified duration of the KRS Pension Funds' fixed income benchmark was 4.81 and 4.71, respectively. At the same points in time, the modified duration of the KRS Pension Funds' fixed income securities portfolio was 4.04 and 5.06, respectively.

GASB 40 - Interest Rate Risk - Modified Duration for the Pension Funds
As of June 30, 2018 (\$ in Thousands)

TYPE	2018	Weighted Avg Modified Duration	TYPE	2017	Weighted Avg Modified Duration
Asset Backed Securities	\$78,908	4.75	Asset Backed Securities	\$74,249	5.97
Financial Institutions	286,701	1.89	Financial Institutions	195,269	4.48
Collateralized Mortgage Obligations	18,420	3.37	Collateralized Mortgage Obligations	14,937	2.93
Commercial Mortgage Backed Securities	89,317	4.77	Commercial Mortgage Backed Securities	90,171	2.97
Corporate Bonds - Industrial	432,634	5.24	Corporate Bonds - Industrial	434,421	5.54
Corporate Bonds - Utilities	34,929	5.47	Corporate Bonds - Utilities	31,381	5.99
Agencies	24,109	4.57	Agencies	15,968	3.93
Government Bonds - Sovereign Debt	14,549	4.57	Government Bonds - Sovereign Debt	4,533	8.42
Mortgage Back Securities Pass-through - Not CMO's	165,805	6.49	Mortgage Back Securities Pass-through - Not CMO's	82,975	5.05
Local Authorities - Municipal Bonds	17,693	3.59	Local Authorities - Municipal Bonds	22,644	3.11
Supranational - Multi-National Bonds	25,395	2.78	Supranational - Multi-National Bonds	18,672	2.78
Treasuries	362,778	6.29	Treasuries	131,953	6.16
Other	1,479,813	3.19	Other	15,996	3.59
Total	\$3,031,051	4.04	Total	\$1,131,169	5.06

The KRS Insurance Fund benchmarks its fixed income securities portfolio to a 50/50 blend of the Barclays U.S. Universal Index and the Barclays U.S. High Yield Index. As of June 30, 2018, the modified duration of the KRS Insurance Fund fixed income benchmark was 4.81 and 4.85, respectively. At the same points in time, the modified duration of the KRS Insurance Fund fixed income securities portfolio was 3.84 and 4.85, respectively.

KRS Insurance Fund Interest Rate Risk as of June 30, 2018:

GASB 40 - Interest Rate Risk - Modified Duration for the Insurance Fund
As of June 30, 2018 (\$ in Thousands)

TYPE	2018	Weighted Avg Modified Duration	TYPE	2017	Weighted Avg Modified Duration
Asset Backed Securities	\$26,124	5.15	Asset Backed Securities	\$20,244	5.35
Financial Institutions	117,895	1.61	Financial Institutions	73,800	4.18
Collateralized Mortgage Obligations	6,665	2.90	Collateralized Mortgage Obligations	5,462	3.25
Commercial Mortgage Backed Securities	32,780	4.61	Commercial Mortgage Backed Securities	33,521	3.13
Corporate Bonds - Industrial	132,033	5.08	Corporate Bonds - Industrial	123,030	5.47
Corporate Bonds - Utilities	11,249	5.25	Corporate Bonds - Utilities	10,482	5.92
Agencies	9,385	4.48	Agencies	6,025	3.80
Government Bonds - Sovereign Debt	5,620	4.62	Government Bonds - Sovereign Debt	1,738	8.19
Mortgage Back Securities Pass-through - Not CMO's	38,757	6.35	Mortgage Back Securities Pass-through - Not CMO's	27,568	5.09
Local Authorities - Municipal Bonds	7,032	3.64	Local Authorities - Municipal Bonds	8,750	3.06
Supranational - Multi-National Bonds	9,637	2.77	Supranational - Multi-National Bonds	7,211	2.72
Treasuries	147,277	6.29	Treasuries	46,853	6.00
Other	606,218	3.13	Other	6,529	3.38
Total	\$1,150,672	3.84	Total	\$371,213	4.85

Foreign Currency Risk

Foreign currency risk is the risk that occurs if exchange rates adversely affect the value of a non-U.S. dollar based investment or deposit within the KRS portfolio. KRS' currency risk exposure, or exchange rate risk, primarily resides with KRS' international equity holdings, but also affects other asset classes. KRS does not have a formal policy to limit foreign currency risk; however, some individual managers are given the latitude to hedge some currency exposures. All foreign currency transactions are classified as Short-Term Investments. All gains and losses associated with these transactions are recorded in the Net Appreciation (Depreciation) in the Fair Value of Investments on the combining financial statements.

GASB 40: Foreign Currency Risk for the Pension Funds As of June 30, 2018 (\$ in Thousands)

	2018	2017
Australian Dollar	\$63,425	\$38,506
Brazilian Real	28,320	18,032
Canadian Dollar	101,784	75,198
Chilean Peso	663	777
Columbian Peso	2,406	1,001
Czech Koruna	1	375
Danish Krone	28,129	36,732
Egyptian Pound	1,000	949
Euro	476,752	445,443
Hong Kong Dollar	71,857	61,886
Indian Rupee	13,994	17,037
Indonesian Rupiah	30,087	28,606
Israeli Shekel	12,757	16,932
Japanese Yen	203,521	228,164
Malaysian Ringgit	14,463	6,284
Mexican Peso	13,717	13,729
New Zealand Dollar	13,067	17,149
Norwegian Krone	19,887	21,189
Philippine Peso	7,619	6,488
Polish Zloty	1	1
Pound Sterling	237,829	270,742
Singapore Dollar	29,116	10,519
South African Rand	8,535	7,574
South Korean Won	32,527	34,465
Swedish Krona	30,716	26,267
Swiss Franc	41,116	55,668
Taiwan Dollar	18,946	27,215
Thai Bhat	9,444	9,779
Turkish Lira	6,680	10,719
Total Foreign Investment Securities	1,518,359	1,487,426
U.S. Dollar	10,773,115	10,287,547
Total Investment Securities	\$12,291,474	\$11,774,973
<i>Note: Differences due to rounding.</i>		

GASB 40: Foreign Currency Risk for the Insurance Fund
As of June 30, 2018 (\$ in Thousands)

	2018	2017
Australian Dollar	\$26,537	\$15,723
Brazilian Real	12,392	7,660
Canadian Dollar	44,232	30,632
Chilean Peso	263	312
Columbian Peso	1,055	378
Czech Koruna	0	153
Danish Krone	12,202	15,048
Egyptian Pound	347	329
Euro	205,646	186,582
Hong Kong Dollar	30,268	25,891
Indian Rupee	5,911	7,206
Indonesian Rupiah	12,578	11,865
Israeli Shekel	5,461	6,949
Japanese Yen	90,076	94,145
Malaysian Ringgit	6,012	2,238
Mexican Peso	5,803	5,157
New Zealand Dollar	5,475	6,546
Norwegian Krone	8,188	8,460
Philippine Peso	2,962	2,429
Pound Sterling	102,368	109,861
Singapore Dollar	12,212	4,985
South African Rand	4,193	3,590
South Korean Won	14,173	15,685
Swedish Krona	13,716	9,968
Swiss Franc	17,715	23,446
Taiwan Dollar	8,115	11,427
Thai Bhat	3,795	4,164
Turkish Lira	2,707	4,660
Total Foreign Investment Securities	654,402	615,489
U.S. Dollar	4,479,158	4,140,943
Total Investment Securities	\$5,133,560	\$4,756,432

Note: Differences due to rounding

GASB 72

In accordance with GASB Statement No. 72, Fair Value Measurement and Application, KRS provides this additional disclosure regarding the fair value of its Pension and Insurance investments. KRS categorizes its fair value measurements within the fair value hierarchy established by GAAP.

KRS defined the Fair Value Hierarchy and Levels as follows:

Level 1

Quoted prices (unadjusted) in an active market for identical assets or liabilities that KRS has the ability to access at the measurement date (e.g., prices derived from NYSE, NASDAQ, Chicago Board of Trade, and Pink Sheets). Debt and equity securities classified in Level 1 of the fair value hierarchy are valued using quoted prices (unadjusted) in an active market for identical assets or liabilities that KRS has the ability to access at the measurement date.

Level 2

Inputs (other than quoted prices included within Level 1) that are observable for an asset or liability, either directly or indirectly. These inputs can include quoted prices for similar assets or liabilities in active or inactive markets, or market-corroborated inputs.

Level 3

Unobservable inputs for an asset or liability, which generally results in a government using the best information available and may include the government's own data.

Net Asset Value (NAV)

The remaining investments not categorized under the fair value hierarchy are shown as net asset value (NAV). These are investments in non-governmental entities for which a readily determinable fair value is not available, such as member units or an ownership interest in partners' capital to which a proportionate share of net assets is attributed.

GASB 72 Pension Funds
As of June 30, 2018 (\$ in Thousands)

Asset Type	Fair Value	Level		
		1	2	3
Public Equity				
US Equity	\$2,106,013	\$2,106,012	\$0	\$1
Non-US Equity	2,544,124	1,433,527	1,663	1,108,935
Total Public Equity	4,650,138	3,539,539	1,663	1,108,936
Fixed Income				
Agencies	845		845	
Asset-Backed	82,212		82,207	5
Bank & Finance	70,613		53,235	17,378
Cash & Cash Equivalent	693,566	21,074	448,945	223,547
Collateralized Mortgage	6,879		6,879	
Commercial Mortgage	10,182		10,182	
Healthcare	34,884		34,884	
Insurance	8,392		8,392	
Mortgage-Backed	68,585		68,585	
Municipals	40,518		40,518	
Sovereign Debt	164,307	5,942	158,365	
US Corporate	686,042	19,308	422,054	244,680
US Government	658,186	486,319	171,867	
Total Fixed Income	2,525,212	532,643	1,506,958	485,610
Derivatives				
Futures	\$ (826)	\$ (826)		
Total Derivatives	(826)	(826)		
Other				
Investment Grade Credit	1,375,364			1,375,364
Private Equity	1,631	1,631		
Real Assets	702,533	595,392	103,854	3,287
Real Estate	12,987		12,987	
Total Other	2,092,515	597,023	116,841	1,378,651
Investments Measured at NAV				
Fixed Income	457,996			
Absolute Return	702,584			
Real Assets	123,173			
Real Estate	591,715			
Private Equity	1,212,833			
Total Investments Measured at NAV	\$3,088,301			

Note: The fair value hierarchies do not reflect cash and accruals thus totals differ from the Investment Summaries.

Note: Cash Equivalents include publicly traded investment grade corporate bonds; variable rate demand notes; government and agency bonds; mortgages; municipal bonds; Short Term Investment Funds (STIF); money market funds or instruments (including, but not limited to, certificates of deposit, bank notes, deposit notes, bankers' acceptances and commercial paper); and repurchase agreements.

GASB 72 Insurance
As of June 30, 2018 (\$ in Thousands)

Asset Type	Fair Value	Level		
		1	2	3
Public Equity				
US Equity	\$934,946	\$929,999	\$0	\$4,947
Non-US Equity	1,112,002	627,771	585	483,646
Total Public Equity	2,046,948	1,557,770	585	488,593
Fixed Income				
Agencies	302		302	
Asset-Backed	26,946		26,943	3
Bank & Finance	22,854		16,962	5,892
Cash & Cash Equivalent	249,912	9,862	139,041	101,009
Collateralized Mortgage	2,518		2,518	
Commercial Mortgage	4,052		4,052	
Healthcare	11,604		11,604	
Insurance	3,011		3,011	
Mortgage-Backed	24,763		24,763	
Municipals	11,704		11,704	
Sovereign Debt	64,717	2,099	62,618	
US Corporate	246,821	6,041	130,020	110,760
US Government	264,354	223,311	41,043	
Total Fixed Income	933,558	241,313	474,581	217,664
Derivatives				
Futures	\$ (339)	\$ (339)		
Total Derivatives	(339)	(339)		
Other				
Investment Grade Credit	573,472			573,472
Private Equity	181	181		
Real Estate	3,237		3,237	
Real Assets	274,892	229,448	43,221	2,223
Total Other	851,782	229,629	46,458	575,695
Investments Measured at NAV				
Fixed Income	224,333			
Absolute Return	286,309			
Real Assets	55,558			
Real Estate	215,924			
Private Equity	528,012			
Total Investments Measured at NAV	\$1,310,136			

Note: The fair value hierarchies do not reflect cash and accruals thus totals differ from the Investment Summaries.

Note: Cash Equivalents include publicly traded investment grade corporate bonds; variable rate demand notes; government and agency bonds; mortgages; municipal bonds; Short Term Investment Funds (STIF); money market funds or instruments (including, but not limited to, certificates of deposit, bank notes, deposit notes, bankers' acceptances and commercial paper); and repurchase agreements.

Money-Weighted Rates of Return

In accordance with GASB Statement No. 67, Financial Reporting for Pension Plans, and GASB Statement No. 74, *Financial Reporting for Post-Employment Benefit Plans Other than Pension Plan*, KRS provides this additional disclosure regarding its money-weighted rate of return for the Pension Funds and Insurance Fund for the periods, June 30, 2018, and June 30, 2017. The money-weighted rate of return is a method of calculating period-by-period returns on Pension Funds and Insurance Fund investments that adjusts for the changing amounts actually invested. For purposes of this Statement, money weighted-rate of return is calculated as the internal rate of return on Pension Funds and Insurance Fund investments, net of Pension Funds and Insurance Fund investment expense, adjusted for the changing amounts actually invested.

Money - Weighted Rates of Return As of June 30,					
	KERS	KERS	CERS	CERS	SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
Pension Funds					
2018	7.63%	8.69%	8.82%	8.82%	7.68%
2017	12.08%	13.45%	13.80%	13.72%	12.50%
	KERS	KERS	CERS	CERS	SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
Insurance Fund					
2018	7.95%	8.93%	9.22%	9.35%	9.39%
2017	13.77%	13.75%	13.67%	13.69%	13.69%

Note: The money-weighted rates of return decreased due to unfavorable conditions in the capital markets. This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Note E. Securities Lending Transactions

Kentucky Revised Statutes Sections 61.650 and 386.020(2) permit the Pension and Insurance Funds to lend their securities to broker-dealers and other entities. The borrowers of the securities agree to transfer to the Funds' custodial banks either cash collateral or other securities with an initial fair value of 102% or 105% of the value of the borrowed securities. The borrowers of the securities simultaneously agree to return the borrowed securities in exchange for the collateral at a later date. The types of securities lent include U.S. Treasuries, U.S. Agencies, U.S. Corporate Bonds, U.S. Equities, Global Fixed Income Securities, and Global Equities Securities.

The Statement of Investment Policy does not address any restrictions on the amount of loans that can be made. As of June 30, 2018, KRS had no credit risk exposure to borrowers because the collateral amounts received exceeded the amounts out on loan. The contracts with the custodial banks require them to indemnify KRS if the borrowers fail to return the securities and one or both of the custodial banks have failed to live up to their contractual responsibilities relating to the lending of securities.

All securities loans can be terminated on demand by either party to the transaction. BNY Mellon invests cash collateral as permitted by state statute and Board policy. The agent of the Funds cannot pledge or sell collateral securities received unless the borrower defaults. KRS maintains a conservative approach to investing the cash collateral with BNY Mellon, emphasizing capital preservation, liquidity, and credit quality.

As of June 30, 2018, the cash collateral received for the securities on loan for the Pension and Insurance Funds was \$488.9 million and \$217.9 million, respectively compared to the Fair Value of the underlying securities of \$396.8 million and \$178.5million, respectively.

Note F. Risk of Loss

KRS is exposed to various risks of loss related to torts; thefts of, damage to, and destruction of assets; errors and omissions; injuries to employees; and, natural disasters. Under the provisions of the Kentucky Revised Statutes, the Kentucky Claims Commission is vested with full power and authority to investigate, hear proof, and compensate persons for damages sustained to either person or property as a result of negligence of the agency or any of its employees. Awards are limited to \$250,000 for a single claim and \$400,000 in aggregate per occurrence. Awards and a pro rata share of the operating cost of the Kentucky Claims Commission are paid from the fund of the agency having a claim or claims before the Kentucky Claims Commission.

Claims against the KRS Board, or any of its staff as a result of an actual or alleged breach of fiduciary duty, are insured with two commercial insurance policies. Hallmark Specialty provides coverage of up to \$2.5 million and ANV Global Services provides coverage up to \$2.5 million for a total coverage of \$5 million, with a deductible/retention of \$250,000 for each claim (the retention increases to \$500,000 from \$250,000 for any claims arising out of the (1) KERS plans and (2) any investment in any alternative investment - including any private equity funds or hedge funds for all plans). Defense costs incurred in defending such claims will be paid by the insurance company. However, the total defense cost and claims paid shall not exceed the total aggregate coverage of the policies. The aggregate limit for all loss is \$5 million. The Voluntary Compliance Program (cyber privacy violations) sub-limit is \$200,000, and the Health Insurance Portability and Accountability Act (HIPAA) and Patient Protection and Affordable Care Act (PPACA) fines and penalties sub-limit is \$1.5 million.

Claims for job-related illnesses or injuries to employees are insured by the state's self-insured workers' compensation program. Payments approved by the program are not subject to maximum limitations. A claimant may receive reimbursement for all medical expenses related to the illness or injury and up to 66.67% of wages for temporary disability. Each agency pays premiums based on fund reserves and payroll. Settlements did not exceed insurance coverage in any of the past three fiscal years. Thus, no secondary insurance had to be utilized. There were no claims which were appealed to the Kentucky Workers' Compensation Board.

Note G. Contingencies

In the normal course of business, KRS is involved in litigation concerning the right of participants, or their beneficiaries, to receive benefits. KRS does not anticipate any material losses as a result of the contingent liabilities.

Note H. Defined Benefit Pension Plan

All eligible employees of KRS participate in KERS Non-Hazardous, a cost-sharing, multiple-employer defined pension plan that covers all regular full-time employees in non-hazardous positions of any Kentucky State Department, Board or Agency directed by Executive Order (EO) to participate in the system. The plan provides for retirement, disability, and death benefits to plan members. Plan benefits are extended to beneficiaries of plan members under certain circumstances. Tier 1 Plan members contributed 5% of creditable compensation for the fiscal years ended June 30, 2018, 2017, and 2016. Tier 2 and Tier 3 Plan members contributed 6% of creditable compensation for the fiscal years ended June 30, 2018, 2017, and 2016.

The chart below includes the covered payroll and contribution amounts for KRS for the three periods ended June 30 included in this discussion.

Payroll and Contributions as of June 30, 2018 (\$ in Thousands)			
	2018	2017	2016
Covered Payroll	\$13,287	\$13,945	\$14,579
Required Employer Contributions	6,570	6,776	5,652
Employer Percentage Contributed	100%	100%	100%

Note I. Income Tax Status

The Internal Revenue Service has ruled that KRS qualifies under Section 401(a) of the Internal Revenue Code and is, generally, not subject to tax. KRS is subject to income tax on any unrelated business income; however, KRS had no unrelated business income in fiscal years 2018 and 2017.

Note J. Equipment Expenses

Equipment Expenses as of June 30, 2018 (\$ in Thousands)		
	2018	2017
Equipment, cost	\$2,885	\$2,885
Less Accumulated Depreciation	(2,648)	(2,540)
Equipment, net	\$237	\$345

Depreciation expenses rose to \$2.6 million in fiscal year 2018, an increase of \$108 thousand over fiscal year 2017.

Note K. Intangible Assets

The provisions of GASB Statement No. 51, Accounting and Financial Reporting for Intangible Assets, requires that intangible assets be recognized in the Combining Statement of Plan Net Position only if they are considered identifiable. In accordance with GASB No. 51, KRS has capitalized software costs as indicated below for the Strategic Technology Advancements for the Retirement of Tomorrow (START) project.

Software Expenses as of June 30, 2018 (\$ in Thousands)		
	2018	2017
Software, Cost	\$17,302	\$17,301
Less Accumulated Amortization	(13,102)	(11,336)
Intangible Assets, Net	\$4,200	\$5,965

Amortization expense rose to \$13.1 million in fiscal year 2018, an increase of \$1.8 million over fiscal year 2017.

Note L. Actuarial Valuation

The actuary, GRS, completed an actuarial valuation of the Pension and Insurance plans for the period ending June 30, 2018. There have been no changes in actuarial assumptions since June 30, 2017. However, during the 2018 legislative session, HB 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. Benefits paid to the spouse of deceased members have increased and benefits paid to surviving dependent children, if the member doesn't have a surviving spouse, also increased. The total Pension liability as of June 30, 2018, is determined using the updated benefit provisions. The following two charts show the economic assumptions and target asset allocations for the Pension Funds and Insurance Fund.

Economic Assumptions-Pension as of June 30, 2018										
	KERS		KERS		CERS		CERS		SPRS	
	Non-Hazardous		Hazardous		Non-Hazardous		Hazardous			
	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017
Assumed Investment Return	5.25%	5.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	5.25%	5.25%
Inflation Factor	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
Payroll Growth	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%

Economic Assumptions-Insurance as of June 30, 2018										
	KERS		KERS		CERS		CERS		SPRS	
	Non-Hazardous		Hazardous		Non-Hazardous		Hazardous			
	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017
Assumed Investment Return	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
Inflation Factor	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
Payroll Growth	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%

Target Asset Allocation

The long-term expected rate of return was determined by using a building-block method in which best-estimate ranges of expected future real rate of returns are developed for each asset class. The ranges are combined by weighting the expected future real rate of return by the target asset allocation percentage. The target allocation and best estimates of arithmetic real rate of return for each major asset class are summarized in the tables below.

Target Asset Allocation - Pension

As of June 30, 2018

Allocations Apply Only to KERS and SPRS in Pension Funds

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
US Equity	17.50%	
US Large Cap	8.50%	4.50%
US Mid Cap	5.00%	4.50%
US Small Cap	4.00%	5.50%
Non US Equity	17.50%	
International Developed	12.50%	6.50%
Emerging Markets	5.00%	7.25%
Global Bonds	10.00%	3.00%
Credit Fixed	17.00%	
Global IG Credit	10.00%	3.75%
High Yield	3.00%	5.50%
EMD	4.00%	6.00%
Private Equity	10.00%	6.50%
Real Estate	5.00%	7.00%
Absolute Return	10.00%	5.00%
Real Return	10.00%	5.00%
Cash	3.00%	1.50%
Total	100.00%	5.13%

Target Asset Allocation - Pension and Insurance

As of June 30, 2018

Allocations Apply to CERS, CERS-Haz, and KERS-Haz in Pension Funds and All Plans are included in the Insurance Fund

US Equity	17.50%	
US Large Cap	5.00%	4.50%
US Mid Cap	6.00%	4.50%
US Small Cap	6.50%	5.50%
Non US Equity	17.50%	
International Developed	12.50%	6.50%
Emerging Markets	5.00%	7.25%
Global Bonds	4.00%	3.00%
Credit Fixed	24.00%	
Global IG Credit	2.00%	3.75%
High Yield	7.00%	5.50%
EMD	5.00%	6.00%
Illiquid Private	10.00%	8.50%
Private Equity	10.00%	6.50%
Real Estate	5.00%	9.00%
Absolute Return	10.00%	5.00%
Real Return	10.00%	7.00%
Cash	2.00%	1.50%
Total	100.00%	6.09%

Note M. GASB 67 and GASB 74 Valuations

GASB 67

GRS completed reports by Plan in compliance with the GASB Statement No. 67 “Financial Reporting for Pension Plans.” The total pension liability, net pension liability, and sensitivity information shown in these reports are based on an actuarial valuation date of June 30, 2017. The total pension liability was rolled-forward from the valuation date to the plan’s fiscal year ending June 30, 2018, using generally accepted actuarial principles. Information disclosed for years prior to June 30, 2017, were prepared by KRS’ prior actuary. A single discount rate of 5.25% was used for the Non-Hazardous KERS system and the SPRS system and a single discount rate of 6.25% was used for the Hazardous KERS system, the non-Hazardous CERS system and the Hazardous CERS system to measure the total pension liability for the fiscal year ending June 30, 2018. These single discount rates are based on the expected rate of return on pension plan investments for each system. Certain benefit assumptions (see Actuarial Section) including the mortality assumptions (also see page 88 Required Supplementary Information) are from the 2013 experience study. A new experience study will be completed based on the 2018 actuarial valuation in 2019. GASB 67 pension liabilities are used to prepare GASB 68 – Accounting and Financial Reporting for Pension Liabilities for KRS employers.

GASB 74

GRS completed reports by plan in compliance with the GASB Statement No. 74, “Financial Reporting for Postemployment Benefit Plans Other than Pension Plans” (OPEB) for the fiscal year ending June 30, 2018. The total OPEB liability, net OPEB liability, and sensitivity information shown in these reports were based on an actuarial valuation date of June 30, 2017. The total OPEB liability was rolled-forward from the valuation date to the plan’s fiscal year ending June 30, 2018, using generally accepted actuarial principles. The single discount rates used in the reports are based on the expected rate of return on OPEB plan investments of 6.25% and a municipal bond rate of 3.62%, as reported in Fidelity Index’s “20-Year Municipal GO AA Index” as of June 30, 2018. Certain benefit assumptions (see Actuarial Section) including the mortality assumptions (also see page 99 Required Supplementary Information) are from the 2013 experience study. A new experience study will be completed based on the 2018 actuarial valuation in 2019. GASB 74 OPEB liabilities are used to prepare GASB 75 - Accounting and Financial Reporting for Postemployment Benefits Plans Other than Pension for KRS employers.

Sensitivity to the NPL to Changes in the Discount Rate Fiscal Year 2018
As of June 30, 2018 (\$ in Thousands)

	KERS		CERS		SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
	Current 5.25%	Current 6.25%	Current 6.25%	Current 6.25%	Current 5.25%
1% Decrease	\$15,497,813	\$646,326	\$7,667,063	\$3,030,168	\$823,796
Current Discount Rate	13,603,775	505,125	6,090,305	2,418,457	702,050
1% Increase	\$12,026,279	\$387,876	\$4,769,258	\$1,912,763	\$601,850

Sensitivity of the Net OPEB Liability to Changes in the Discount Rate and Healthcare Trend Rate
As of June 30, 2018 (\$ in Thousands)

	KERS		CERS		SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
	Single 5.86%	Single 5.88%	Single 5.85%	Single 5.97%	Single 6.02%
Sensitivity of the Net OPEB Liability to Changes in the Discount Rate					
1% Decrease	\$2,781,765	\$33,379	\$2,306,064	\$991,049	\$149,812
Single Discount Rate	2,370,912	(33,168)	1,775,480	712,959	110,165
1% Increase	\$2,028,977	\$(86,528)	\$1,323,520	\$490,342	\$77,519
Sensitivity of the Net OPEB Liability to Changes in the Current Healthcare Cost Trend Rate of 3.62%					
1% Decrease	\$2,015,770	\$(85,174)	\$1,321,863	\$485,560	\$75,342
Current Healthcare Cost Trend Rate	2,370,912	(33,168)	1,775,480	712,959	110,165
1% Increase	\$2,798,022	\$31,172	\$2,310,165	\$994,603	\$152,264



November 15, 2018

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:

The reports provided herein contain certain information for the Kentucky Employees Retirement System (KERS), the County Employees Retirement System (CERS), and 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, 2018. Separate reports will be provided at a later date with additional accounting information determined in accordance with GASB Statement No. 68, “Accounting and Financial Reporting for Pensions”.

Basis of Calculations

The liability calculations presented in the reports 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.

The total pension liability, net pension liability, and sensitivity information are based on an actuarial valuation date of June 30, 2017. The total pension liability was rolled-forward from the valuation date to the plan’s fiscal year ending June 30, 2018 using generally accepted actuarial principles.

Assumptions

There have been no changes in actuarial assumptions since June 30, 2017.

Plan Provisions

During the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. Benefits paid to the spouses of deceased members have been increased from 25% of the member’s final rate of pay to 75% of the member’s average pay. If the member does not have a surviving spouse, benefits paid to surviving dependent children have been increased from 10% of the member’s final pay rate to 50% of average pay for one child, 65% of average pay for two children, or 75% of average pay for three children. The Total Pension liability as of June 30, 2018 is determined using these updated benefit provisions.

Discount Rates

A single discount rate of 5.25% was used for the non-hazardous KERS system and the SPRS system and a single discount rate of 6.25% was used for the hazardous KERS system, the non-hazardous CERS system and the hazardous CERS system to measure the total pension liability for the fiscal year ending June 30, 2018. These single discount rates are 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 (determined without regard to enactment of SB 151 in 2018, which is currently being reviewed by the State Supreme Court).

401(h) Subaccount

Based on guidance issued by GASB in connection with GASB Statement No. 74, 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 positions as of June 30, 2017 and later are net of the 401(h) asset balance.

Additional Disclosures


The reports are 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 "Actuarial Valuation Report as of June 30, 2017" for additional discussion of the nature of actuarial calculation and more information related to participant data, economic and demographic assumptions, and benefit provisions. These reports should be considered together as a complete report for KRS's fiscal year ending June 30, 2018.

To the best of our knowledge, the reports are complete and accurate and are 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



Schedule of Employer NPL - KERS Non-Hazardous**As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total Pension Liability (TPL)	\$15,608,221	\$15,445,206
Plan Net Position	2,004,446	2,056,870
Net Pension Liability	\$13,603,775	\$13,388,336
Ratio of Plan Net Position to TPL	12.84%	13.32%
Covered Employee Payroll	\$1,509,955	\$1,602,396
Net Pension Liability as a Percentage of Covered Employee Payroll	900.94%	835.52%

Schedule of Employer NPL - KERS Hazardous**As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total Pension Liability (TPL)	\$1,150,610	\$1,098,630
Plan Net Position	645,485	601,529
Net Pension Liability	\$505,125	\$497,101
Ratio of Plan Net Position to TPL	56.10%	54.75%
Covered Employee Payroll	\$152,936	\$178,511
Net Pension Liability as a Percentage of Covered Employee Payroll	330.29%	278.47%

Schedule of Employers NPL - CERS Non-Hazardous**As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total Pension Liability (TPL)	\$13,109,268	\$12,540,545
Plan Net Position	7,018,963	6,687,237
Net Pension Liability	\$6,090,305	\$5,853,308
Ratio of Plan Net Position to TPL	53.54%	53.32%
Covered Employee Payroll	\$2,454,927	\$2,376,290
Net Pension Liability as a Percentage of Covered Employee Payroll	248.08%	246.32%

Total Pension Liability (NPL) - CERS Hazardous**As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total Pension Liability (TPL)	\$4,766,794	\$4,455,275
Plan Net Position	2,348,337	2,217,996
Net Pension Liability	\$2,418,457	\$2,237,279
Ratio of Plan Net Position to TPL	49.26%	49.78%
Covered Employee Payroll	\$562,853	\$526,559
Net Pension Liability as a Percentage of Covered Employee Payroll	429.68%	424.89%

Schedule of Employer (NPL) - SPRS**As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total Pension Liability (TPL)	\$969,622	\$943,271
Plan Net Position	267,572	255,737
Net Pension Liability	\$702,050	\$687,534
Ratio of Plan Net Position to TPL	27.60%	27.11%
Covered Employee Payroll	\$50,346	\$54,065
Net Pension Liability as a Percentage of Covered Employee Payroll	1394.45%	1271.68%

1 Based on derived compensation for fiscal years ending 2018 and 2017 using the provided employer contribution information.



November 15, 2018

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

Re: GASB 74 Reporting – Actuarial Information

Dear Members of the Board:

The reports provided herein contain certain information for the Kentucky Employees Retirement System (KERS), the County Employees Retirement System (CERS), and the State Police Retirement System (SPRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 74, "Financial Reporting for Postemployment Benefit Plans Other than Pension Plans" for the fiscal year ending June 30, 2018. Separate reports will be provided at a later date with additional accounting information determined in accordance with GASB Statement No. 75, "Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions".

Basis of Calculations

The liability calculations presented in the reports were performed for the purpose of satisfying the requirements of GASB No. 74 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.

The total OPEB liability, net OPEB liability, and sensitivity information are based on an actuarial valuation date of June 30, 2017. The total OPEB liability was rolled-forward from the valuation date to the plan's fiscal year ending June 30, 2018 using generally accepted actuarial principles.

Assumptions

There have been no changes in actuarial assumptions since June 30, 2017.

Plan Provisions

During the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. The system shall now pay 100% of the insurance premium for spouses and children of all active members who die in the line of duty. The Total OPEB liability as of June 30, 2018 is determined using these updated benefit provisions.

Implicit Employer Subsidy for non-Medicare retirees

The fully-insured premiums KRS pays for the Kentucky Employees' Health Plan are blended rates based on the combined experience of active and retired members. Because the average cost of providing health care benefits to retirees under age 65 is higher than the average cost of providing health care benefits to active employees, there is an implicit employer subsidy for the non-Medicare eligible retirees. GASB 74 requires that the liability associated with this implicit subsidy be included in the calculation of the Total OPEB Liability.

Discount Rates

The following single discount rates were used to measure the total OPEB liability as of June 30, 2017.

KERS Non-Hazardous	5.86%
KERS Hazardous	5.88%
CERS Non-Hazardous	5.85%
CERS Hazardous	5.97%
SPRS	6.02%

The single discount rates are based on the expected rate of return on OPEB plan investments of 6.25% and a municipal bond rate of 3.62%, as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 30, 2018. Future contributions are projected in accordance with the Board's current funding policy, which includes the requirement that each participating employer in the System contribute the actuarially determined contribution rate, which is determined using a closed funding period (25 years as of June 30, 2018) and the actuarial assumptions and methods adopted by the Board of Trustees. These projected contributions are determined without regard to the enactment of SB 151 in 2018, which is currently being reviewed by the State Supreme Court. Current assets, future contributions, and investment earnings are projected to be sufficient to pay the projected benefit payments from the retirement system. However, the cost associated with the implicit employer subsidy is not currently being included in the calculation of the System's actuarial determined contributions, and it is our understanding that any cost associated with the implicit subsidy will not be paid out of the System's trust. Therefore, the municipal bond rate was applied to future expected benefit payments associated with the implicit subsidy.

401(h) Subaccount

Based on guidance issued by GASB in connection with GASB Statement No. 74, 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 includes these 401(h) assets. Additionally, these member contributions and associated investment income are included in the reconciliation of the fiduciary net position.



Additional Disclosures

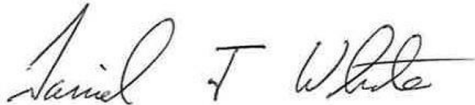
The reports are based upon information, furnished to us by the Retirement System, which includes benefit provisions, membership information, and financial data. We did not audit this data and information, but we did apply a number of tests and concluded that it was reasonable and consistent. GRS is not responsible for the accuracy or completeness of the information provided by the Retirement System. Please see the "Actuarial Valuation Report as of June 30, 2017" for additional discussion of the nature of actuarial calculation and more information related to participant data, economic and demographic assumptions, and benefit provisions. These reports should be considered together as a complete report for KRS's fiscal year ending June 30, 2018.

To the best of our knowledge, the reports are complete and accurate and are in accordance with generally recognized actuarial practices and methods. Mr. Newton, Mr. Riazi, and Mr. White are Enrolled Actuaries. All 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



Mehdi Riazi, FSA, EA, MAAA
Consultant and Actuary

Development of Single Discount Rate As of June 30, 2018

	KERS	KERS	CERS	CERS	SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
2018					
Single Discount Rate	5.86%	5.88%	5.85%	5.97%	6.02%
Long-Term Expected Rate of Return	6.25%	6.25%	6.25%	6.25%	6.25%
Long-Term Municipal Bond Rate	3.62%	3.62%	3.62%	3.62%	3.62%

2017

Single Discount Rate	5.83%	5.87%	5.84%	5.96%	6.01%
Long-Term Expected Rate of Return	6.25%	6.25%	6.25%	6.25%	6.25%
Long-Term Municipal Bond Rate	3.56%	3.56%	3.56%	3.56%	3.56%

Note: Fixed -income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20 - Year Municipal GO AA Index" as of June 30, 2018 (or as of June 30, 2017).

Schedule of the Employers' Net OPEB Liability - KERS Non-Hazardous Plan As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$3,262,117	\$891,205	\$2,370,912	27.32%	\$1,573,898	150.64%
2017	\$3,353,332	\$817,370	\$2,535,962	24.37%	\$1,593,097	159.18%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - KERS Hazardous Plan As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$485,904	\$519,072	\$(33,168)	106.83%	\$190,317	-17.43%
2017	\$494,869	\$488,838	\$6,031	98.78%	\$171,087	3.53%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - CERS Non-Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$4,189,606	\$2,414,126	\$1,775,480	57.62%	\$2,570,156	69.08%
2017	\$4,222,878	\$2,212,536	\$2,010,342	52.39%	\$2,480,130	81.06%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - CERS Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$1,993,941	\$1,280,982	\$712,959	64.24%	\$588,526	121.14%
2017	\$2,015,673	\$1,189,001	\$826,672	58.99%	\$542,710	152.32%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability-SPRS Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$301,012	\$190,847	\$110,165	63.40%	\$50,064	220.05%
2017	\$313,234	\$178,838	\$134,396	57.10%	\$48,873	275.00%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Note N. Pension Legislation

Background

During the 2018 Regular Session of the General Assembly, Senate Bill 151 was passed changing retirement eligibility and benefits with various effective dates for active, inactive, and future members of the KRS. Other legislation enacted into law during the 2018 legislative session of importance to KRS members is summarized below.

The Attorney General, the Kentucky Education Association and the Kentucky State Fraternal Order of Police filed a lawsuit regarding Senate Bill 151 asking the court to declare the new law unconstitutional and unenforceable. On June 20, 2018, Franklin Circuit Judge Shepherd ruled that Senate Bill 151 is unenforceable because the legislative process violated certain provisions of the Kentucky Constitution. This ruling has been appealed to the Kentucky Supreme Court. KRS staff is monitoring the lawsuit closely and will provide updates on pertinent developments while continuing to work diligently to meet the deadlines imposed by Senate Bill 151.

Timeline of Legislative Changes

The following legislative changes became law as of the effective date.

Effective January 1, 2018 (Tax Year 2018)

House Bill 366 reduced the pension income exclusion from \$41,110 to \$31,110 for taxable years beginning on or after January 1, 2018.

Effective April 13, 2018 (Fiscal Year 2018)

House Bill 185 made changes to death in the line of duty benefits for a surviving spouse and dependent children.

Effective April 14, 2018 (Fiscal Year 2018)

House Bill 366 added re-employment exceptions for county police departments and school resource officers. Effective April 14, 2018, the following exemptions apply to county police departments and participating agencies employing school resource officers: The employer is not required to reimburse KRS for the health insurance contribution paid on behalf of the retiree. The employer is not required to pay employer contributions on behalf of the retiree.

Effective April 14, 2018 (Fiscal Year 2019)

House Bill 362 caps CERS employer contribution rate increases up to 12% per year over the prior fiscal year for the period of July 1, 2018, to June 30, 2028.

Effective April 27, 2018 (Fiscal Year 2019)

House Bill 265 reduced the employer contribution rate for Regional Mental Health/Mental Retardation Boards, Local and District Health Departments, State Universities, Community Colleges and any other agency eligible to voluntarily cease participating in KERS. These agencies will continue to pay the same employer contribution rate that was paid in fiscal year 2018 in fiscal year 2019.

Timeline of Senate Bill 151 Changes

An explanation and timeline of changes included in Senate Bill 151 are provided below. As noted above, Senate Bill 151 cannot be implemented at this time due to court proceedings.

Effective August 1, 2018 (Fiscal Year 2019)

Tier 2 members retiring on or after August 1, 2018, cannot use sick leave service credit to reduce actuarial penalties for early retirement benefits.

KERS and CERS agencies not participating in a KRS sick leave program cannot opt-in after this date.

Effective January 1, 2019 (Fiscal Year 2019)

There are changes to retired re-employed rules, employer contributions and employer health insurance reimbursement costs for members retiring on or after January 1, 2019, who later re-employ.

Tier 1 members with a participation date on or after July 1, 2003, but before September 1, 2008, will begin paying a non-refundable 1% health insurance contribution.

Tier 1 members retiring on or after January 1, 2019, must use the highest complete fiscal year-salaries (i.e. each fiscal year must have 12 months of service credit) to calculate the retirement benefit. Partial years will not be considered unless three or five complete fiscal years do not exist.

Members who first began participating in a retirement system administered by KRS on or after January 1, 2014, are no longer eligible for the \$5,000 death benefit.

Uniform, equipment, and other expense allowances paid on or after January 1, 2019, are excluded from creditable compensation.

Effective June 30, 2019 (Fiscal Year 2019)

Tier 3 interest payment calculation changes for KERS non-hazardous and CERS non-hazardous members for fiscal year 2019.

Effective July 1, 2019 (Fiscal Year 2020)

Start date for optional Tier 4 defined contribution 401(a) Money Purchase Plan.

Effective July 1, 2020 (Fiscal Year 2021)

The employer contribution calculation changes so that employers will begin paying the normal cost as a percentage of payroll plus fixed dollar amount each year towards the unfunded liability.

Effective July 1, 2023 (Fiscal Year 2024)

Tier 1 members retiring on or after July 1, 2023, cannot use sick leave service credit for retirement eligibility service requirements or to reduce actuarial penalties for early retirement benefits. Sick leave credit will be used in the benefit calculation but is not considered for retirement eligibility.

Effective August 1, 2023 (Fiscal Year 2024)

Compensatory payouts at terminations for Tier 1 non-hazardous members retiring after July 1, 2023, will no longer be considered creditable compensation.

Note O. Litigation

City of Fort Wright

In June 2014, the City of Fort Wright, a participating employer in CERS, filed a lawsuit against KRS alleging that the Board invested CERS funds in investments that were prohibited by both statutory and common law. In addition, the City of Fort Wright alleged that the Board paid substantial asset management fees, which the suit alleges were improper. On September 20, 2018, Franklin Circuit Court issued an Opinion and Order denying the City of Fort Wright's Motion for Declaratory Judgment and granting the Kentucky Retirement Systems' Cross-Motion for Declaratory Judgment. The Court stated in relevant part, "There is nothing in the record or in the City's pleadings to this Court that persuades this Court that the Board did not follow the law or did not appropriately apply the facts to the law." The City of Fort Wright filed its Notice of Appeal in this action on October 15, 2018.

On September 2, 2015, a CERS member filed a complaint that is substantially similar in terms of allegation and ambiguous requests for relief to that of the City of Fort Wright. The exact nature and scope of the relief sought is unclear; therefore, no provision has been made in the combining financial statements. The member's complaint is currently being held in abeyance pending the outcome of the City of Fort Wright's appeal. No new action has been taken in this matter to date.

Seven Counties

Seven Counties Services, Inc. ("Seven Counties") filed for Chapter 11 bankruptcy in the United States Bankruptcy Court for the Western District of Kentucky (the "Bankruptcy Court") in April 2013. Seven Counties provides mental health services for the Cabinet for Health and Family Services for the greater Louisville, Kentucky area and surrounding counties. Seven Counties participated in the Kentucky Employees Retirement System ("KERS") for approximately twenty-five years. Seven Counties identified KERS as a creditor with a primary objective of discharging its continuing obligation to remit retirement contributions for approximately 1,300 employees and to terminate its participation in KERS. If Seven Counties is successful in discharging its obligations to KERS, the estimated member pension and insurance actuarial accrued liability is in the range of \$145 to \$150 million.

KERS opposed Seven Counties' attempt to discharge its obligations and terminate its participation. KERS asserted that Seven Counties is a Governmental Unit properly participating in KERS by Executive Order issued in 1978 and thus ineligible for Chapter 11 relief. Consequently, Seven Counties would remain statutorily obligated to continue participation and remit contributions. On May 30, 2014, the Bankruptcy Court held that Seven Counties was not a Governmental Unit and could move forward with its Chapter 11 bankruptcy case. The Bankruptcy Court further held that Seven Counties' statutory obligation to continue to participate in and remit contributions to KERS was a "contract" eligible for rejection. KRS appealed this decision.

On August 24, 2018, the U.S. Court of Appeals for the Sixth Circuit ("the Sixth Circuit") issued a two to one Opinion affirming the decision that Seven Counties is eligible to file under Chapter 11. However, the Sixth Circuit went on to state, "lacking state court precedent characterizing the nature of the relationship between Seven Counties and KERS, we CERTIFY that question to the Kentucky Supreme Court." KERS filed a petition to have the Opinion Reheard En Banc by the entire Sixth Circuit. On October 5, 2018, the Sixth Circuit issued an order holding the petition in abeyance pending a response from the Kentucky Supreme Court on the certified question of law. On November 1, 2018, the Supreme Court of Kentucky issued an Order granting certification of the law. At the time of this note, the certified question of law is being briefed by the parties and will subsequently be set for oral arguments before the Supreme Court of Kentucky.

Mayberry

In December 2017, Members and beneficiaries of the Kentucky Employee Retirement System (KERS) filed a derivative action suit in Franklin Circuit Court naming Kentucky Retirement Systems (KRS) as a nominal defendant. The suit alleges that investment managers actively pursued KRS while it was under the control of Trustees acting adversely to its interests, and recommended risky investments in alternative investment strategies, resulting in billions of dollars in losses to KRS. The Amended Complaint alleges numerous claims against KRS Trustees and Officers, hedge fund sellers, actuarial, fiduciary, and investment advisors, and an annual report certifier for breach of statutory, fiduciary, and other duties; claims against all defendants for civil conspiracy; claims against Officers, and hedge fund sellers, actuarial, fiduciary, and investment advisors, and an annual report certifier for aiding and abetting breaches of statutory, fiduciary, and other duties. Plaintiffs seek compensatory and punitive damages, as well as equitable relief. More specifically, Plaintiffs seek compensatory damages against defendants for the violations of statutory,

fiduciary, and other duties; while also seeking punitive damages against hedge fund sellers, investment, actuarial, and fiduciary advisors and each of their principals/officers named as defendants. Further, Plaintiffs request several forms of equitable relief, which include directing a complete accounting of fees associated with fund of hedge funds, and other absolute return strategies.

On April 19, 2018, KRS and Plaintiffs filed a Joint Notice to the Court and Parties notifying the parties that (1) KRS will not pursue the claims asserted by Plaintiffs; and (2) KRS would not have been in a position to pursue those claims had they been brought prior to the filing of the Complaint. Currently, defendants' motions to dismiss are pending before the Court. While this suit does not seek any direct damages from KRS, and KRS has limited financial exposure, it is still named as a nominal defendant. Moreover, while this litigation was initiated a year ago, very limited discovery has taken place and motions to dismiss are still pending.

Northern Trust Settlement

In 2014, KRS filed litigation against Northern Trust disputing fees charged by Northern Trust to KRS when Northern Trust was acting as KRS' securities lending agent from September 2007 until approximately December 2011. KRS alleged Northern Trust overcharged them by approximately \$3.5 million. In December 2017, KRS reached a settlement agreement with Northern Trust where Northern Trust agreed to pay KRS a lump sum payment of \$1,000,000. In addition, Northern Trust agreed to waive asset management fees for asset management services for KRS at a rate of \$125,000 per quarter, not to exceed \$1,000,000.00 in total fee waivers. In exchange, KRS agreed to dismiss this action with prejudice. Both parties also agreed to release all claims arising from this action.

Western Kentucky University

On November 17, 2016, Western Kentucky University (WKU), a participating employer, filed a petition for declaration of rights in the Franklin Circuit Court in Frankfort, KY. The petition involved a dispute as to whether WKU can terminate a group of its employees which participated in KERS and reutilize those same employees through a privatization process excusing WKU from its obligations to pay contributions to the KERS Fund. This matter is currently still in litigation. No substantive decisions have been issued on the merits of the case. The exact nature and scope of the relief sought is still unclear; therefore, no provision has been made in the combined financial statements.

Note P. Reciprocity Agreement

KRS has a reciprocity agreement with Kentucky Teachers' Retirement System (KTRS) for the payment of insurance benefits for those members who have creditable service in both systems.

Note Q. Reimbursement of Retired Re-Employed and Active Member Health Insurance

As a result of the passage of House Bill 1 on September 1, 2008, if a retiree is re-employed in a regular full time position and has chosen health insurance coverage through KRS, the employer is required to reimburse KRS for the health insurance premium paid on the retiree's behalf, not to exceed the cost of the single premium rate. For the fiscal years ended June 30, 2018, and 2017, the reimbursement totaled \$9.8 million and \$8.9 million respectively. Also, for new plan participants after August 31, 2008, House Bill 1 required an active member contribution of 1% in addition to the member pension contribution. This 1% is applicable to all non-hazardous and hazardous plans. For the fiscal years ended June 30, 2018, and 2017, the contribution totaled \$19.8 million and \$17.0 million, respectively.

Note R. Related Party

Perimeter Park West, Inc. (PPW) was established in 1998 as a 501(c) 25 corporation located at 1260 and 1270 Louisville Road, Frankfort, Kentucky. As such, the Corporation can only acquire and hold title to real property; it cannot have any employees. The only source of revenue for the Corporation is rent paid from Kentucky Retirement Systems (KRS). When excess cash is on hand at PPW, the money is paid back to its shareholders (Kentucky Employees Retirement System, County Employees Retirement System, and State Police Retirement System) in the form of dividends. The expenses of the Corporation are for the maintenance of the property. Title to the property is held in the name of PPW and no mortgage is on the property. KRS does not have title to the property, however, KRS maintains the Corporation as an investment on its books and its pension plans are the sole shareholders. The asset value as of June 30, 2018 was \$5.4 million. PPW is audited annually and submits IRS Form 990 as required for this entity.

The sole purpose of PPW is to protect the Pension and Insurance Trusts of KRS should someone become injured on the property. If this occurred and a lawsuit was filed against the property, the suit would be filed against PPW instead of the Pension and Insurance Trusts.

The current lease between PPW and KRS was entered into as of May 16, 2013, and expires June 30, 2023. The premises, consisting of 85,357 square feet, are rented for the fiscal year period of July 1 to June 30. The contractual lease payments through June 30, 2023, are:

FY 2018 - \$722,776
FY 2019 - \$735,425
FY 2020 - \$748,295
FY 2021 - \$761,390
FY 2022 - \$774,714
FY 2023 - \$788,272

Note S. Reduction of Receivables

Employers in the KERS plans reported two weeks of June 2017 wages at the beginning of the 2018 fiscal year. Based on START programming, these wages had the 2018 increased Annual Required Contribution (ARC) rate applied. The Commonwealth's approved budget guidelines paid contributions at the fiscal year 2017 ARC rate in effect when the wages were earned. It is unlikely that KRS will receive payments at the new ARC rate for that period; therefore, contribution receivables have been reduced as of June 30, 2018, as noted in the chart. This adjustment was also made in previous years and will be required if KERS ARC rates increase annually.

Reduction of Receivables		
As of June 30, 2018 (\$ in Thousands)		
	2018	2017
KERS Non-Hazardous	\$428	\$4,645
SPRS	43	261
TOTAL	\$471	\$4,906

Note T. Governance Reorganization

SB2 passed in the 2017 legislative session codified Executive Order 2016-340 issued by Governor Matt Bevin on June 17, 2016, and made other changes.

- Expanded the Board of Trustees to seventeen members from thirteen;
- Investment experience is a prerequisite for six members of the Board;
- The Kentucky Senate must confirm gubernatorial board appointees;
- Requires that the Governor approve the Executive Director appointed by the Board of Directors;
- KRS employees were transferred to the Commonwealth's personnel system under Kentucky Revised Statute Chapter 18A;
- KRS must follow the Model Procurement Code for purchases and contracts;
- KRS must disclose net investment fees, investment returns, and commissions on its website and upon an open records request;
- The Chair and Vice Chair of the Board are to be elected by the members of the Board of Trustees; and,
- Board, staff, and investment consultants should abide by the Chartered Financial Analyst code of conduct.

The Board of Trustees consists of ten members appointed by the Governor, six members elected by the membership, two from KERS; three from CERS; and one from SPRS; and, the Personnel Secretary Ex-Officio. All members have four-year term limits with various start dates. The Board of Trustees has established several committees; Audit; Investment; Retiree Health Plan; Administrative & Disability Appeal; and, the Actuarial Subcommittee to govern the affairs of the trusts.

The Executive Director reports to the Board of Trustees. The Chief Investment Officer reports functionally to the Investment Committee and administratively to the Executive Director. The Director of Internal Audit reports functionally to the Audit Committee and administratively to the Executive Director. The Deputy Executive Director, the Executive Director Office of Benefits, Executive Director Office of Legal Services, Division Director Human Resources, and Division Director Communications report to the Executive Director.

Detailed Board member information and an organizational chart is provided in the introduction of this document.

Note U. Subsequent Events

Management has evaluated the period June 30, 2018, to November 29, 2018, (the date the combining financial statements were available to be issued) for items requiring recognition or disclosure in the combining financial statements.

REQUIRED

SUPPLEMENTARY INFORMATION

INCLUDING GASB 67 AND 74

Schedule of Employer NPL

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Schedule of Changes in Employers' TPL

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Notes to Schedule of Employers' Contributions

Schedule of Employers' Contributions Pension

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Schedule of Employers' NOL

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Schedule of Changes in Employers' Net OPEB Liability

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Notes to Schedule of Employers' OPEB Contribution

Schedule of Employers' OPEB Contributions

KERS Non-Hazardous

KERS Hazardous

CERS Non-Hazardous

CERS Hazardous

SPRS

Money Weighted Rates of Return

Additional Supporting Schedules

Schedule of Administrative Expenses

Schedule of Direct Investment Expenses

Schedule of Professional Consultant Fees

Report on Internal Control

Schedule of Employer NPL - KERS Non-Hazardous Pension Funds

As of June 30, 2018 (\$ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability (TPL)	\$15,608,221	\$15,445,206	\$13,379,781	\$12,359,673	\$11,550,110
Fiduciary Net Position	2,004,446	2,056,870	1,980,292	2,327,783	2,578,291
Net Pension Liability	\$13,603,775	\$13,388,336	\$11,399,489	\$10,031,890	\$8,971,819
Ratio of Plan Net Position to TPL	12.84%	13.32%	14.80%	18.83%	22.32%
Covered Employee Payroll (1)	\$1,509,955	\$1,602,396	\$1,631,025	\$1,544,234	\$1,577,496
Net Pension Liability as a Percentage of Covered Employee Payroll	900.94%	835.52%	698.92%	649.64%	568.74%

Schedule of Employer NPL - KERS Hazardous Pension Funds

As of June 30, 2018 (\$ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability (TPL)	\$1,150,610	\$1,098,630	\$919,517	\$895,433	\$816,850
Fiduciary Net Position	645,485	601,529	527,879	552,468	561,484
Net Pension Liability	\$505,125	\$497,101	\$391,638	\$342,965	\$255,366
Ratio of Plan Net Position to TPL	56.10%	54.75%	57.41%	61.70%	68.74%
Covered Employee Payroll (1)	\$152,936	\$178,511	\$158,828	\$128,680	\$129,076
Net Pension Liability as a Percentage of Covered Employee Payroll	330.29%	278.47%	246.58%	266.53%	197.84%

Schedule of Employer NPL - CERS Non-Hazardous Pension Funds

As of June 30, 2018 (\$ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability (TPL)	\$13,109,268	\$12,540,545	\$11,065,013	\$10,740,325	\$9,772,522
Fiduciary Net Position	7,018,963	6,687,237	6,141,395	6,440,800	6,528,146
Net Pension Liability	\$6,090,305	\$5,853,308	\$4,923,618	\$4,299,525	\$3,244,376
Ratio of Plan Net Position to TPL	53.54%	53.32%	55.50%	59.97%	66.80%
Covered Employee Payroll (1)	\$2,454,927	\$2,376,290	\$2,417,187	\$2,296,716	\$2,272,270
Net Pension Liability as a Percentage of Covered Employee Payroll	248.08%	246.32%	203.69%	187.20%	142.78%

Schedule of Employer NPL - CERS Hazardous Pension Funds

As of June 30, 2018 (\$ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability (TPL)	\$4,766,794	\$4,455,275	\$3,726,116	\$3,613,308	\$3,288,826
Fiduciary Net Position	2,348,337	2,217,996	2,010,177	2,078,202	2,087,002
Net Pension Liability	\$2,418,457	\$2,237,279	\$1,715,941	\$1,535,106	\$1,201,824
Ratio of Plan Net Position to TPL	49.26%	49.78%	53.95%	57.52%	63.46%
Covered Employee Payroll (1)	\$562,853	\$526,559	\$526,334	\$483,641	\$479,164
Net Pension Liability as a Percentage of Covered Employee Payroll	429.68%	424.89%	326.02%	317.41%	250.82%

Schedule of Employer NPL - SPRS Pension Funds

As of June 30, 2018 (\$ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability (TPL)	\$969,622	\$943,271	\$795,421	\$734,156	\$681,118
Fiduciary Net Position	267,572	255,737	218,012	247,228	260,974
Net Pension Liability	\$702,050	\$687,534	\$577,409	\$486,928	\$420,144
Ratio of Plan Net Position to TPL	27.60%	27.11%	27.41%	33.68%	38.32%
Covered Employee Payroll (1)	\$50,346	\$54,065	\$46,685	\$45,765	\$44,616
Net Pension Liability as a Percentage of Covered Employee Payroll	1394.45%	1271.68%	1236.82%	1063.97%	941.69%

(1) Based on derived compensation using the provided employer contribution information for fiscal years 2018 and later.

These tables are intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' TPL - KERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

Total Pension Liability (TPL)	2018	2017	2016	2015	2014
Service Cost	\$195,681	\$143,858	\$139,631	\$143,847	\$133,361
Interest	785,123	870,725	891,897	859,509	853,653
Benefit Changes	9,624	-	-	-	-
Difference between Expected and Actual Experience	153,565	(134,379)	-	30,958	-
Changes of Assumptions	-	2,145,530	923,999	694,592	-
Benefit Payments	(980,978)	(960,309)	(935,419)	(919,343)	(903,564)
Net Change in TPL	163,015	2,065,425	1,020,108	809,563	83,450
TPL – Beginning	15,445,206	13,379,781	12,359,673	11,550,110	11,466,660
TPL – Ending (a)	\$15,608,221	\$15,445,206	\$13,379,782	\$12,359,673	\$11,550,110
Fiduciary Net Position (1)					
Contributions – Employer	689,143	757,121	513,084	521,691	296,836
Contributions – Member (2)	104,972	100,543	106,494	104,606	97,487
Net Investment Income (2)	144,881	220,985	(20,663)	44,570	337,922
Retirement Benefit	(967,375)	(948,490)	(923,288)	(905,791)	(889,937)
Administrative Expense	(10,692)	(10,957)	(10,989)	(10,474)	(11,145)
Refunds of Contributions	(13,603)	(11,819)	(12,130)	(13,552)	(13,627)
Other (4)	301	(30,805)	-	8,442	-
Net Change in Fiduciary Net Position	(52,373)	76,578	(347,491)	(250,508)	(182,463)
Fiduciary Net Position – Beginning	\$2,056,870	\$1,980,292	\$2,327,783	\$2,578,291	\$2,760,754
Prior Year Adjustment	(51)	-	-	-	-
Fiduciary Net Position – Ending (b)	\$2,004,446	\$2,056,870	\$1,980,292	\$2,327,783	\$2,578,291
Net Pension Liability – Ending (a) – (b)	\$13,603,775	\$13,388,336	\$11,399,489	\$10,031,890	\$8,971,819
Plan Fiduciary Net Position as a					
Percentage	12.84%	13.32%	14.80%	18.83%	22.32%
Covered Employee Payroll (3)	\$1,509,955	\$1,602,396	\$1,631,025	\$1,544,234	\$1,577,496
Net Pension Liability as a Percentage of Covered Employee Payroll	900.94%	835.52%	698.92%	649.64%	568.74%

(1) Does not include 401(h) assets for fiscal years 2017 and later.

(2) Does not include 401(h) contributions and investment income on 401(h) contributions for fiscal years 2017 and later.

(3) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' TPL - KERS Hazardous

As of June 30, 2018 (\$ in Thousands)

Total Pension Liability (TPL)	2018	2017	2016	2015	2014
Service Cost	\$28,641	\$21,081	\$20,751	\$18,729	\$16,880
Interest	66,536	66,589	64,851	61,005	59,594
Benefit Changes	705	-	-	-	-
Difference between Expected and Actual Experience	24,215	26,902	-	6,067	-
Changes of Assumptions	-	127,878	-	52,165	-
Benefit Payments	(68,117)	(63,338)	(61,518)	(59,383)	(57,151)
Net Change in TPL	\$51,980	\$179,112	\$24,084	\$78,583	\$19,323
TPL – Beginning	1,098,630	919,517	895,433	816,850	797,527
TPL – Ending (a)	\$1,150,610	\$1,098,630	\$919,517	\$895,433	\$816,850
Fiduciary Net Position (1)					
Contributions – Employer	\$43,661	\$52,974	\$23,759	\$28,536	\$11,670
Contributions - Member (2)	17,891	17,524	15,739	13,207	12,546
Net Investment Income	51,467	70,994	(1,653)	8,701	80,724
Retirement Benefit	(65,616)	(61,231)	(59,306)	(56,773)	(54,320)
Administrative Expense	(975)	(919)	(916)	(844)	(897)
Refunds of Contributions	(2,501)	(2,106)	(2,211)	(2,610)	(2,830)
Other (4)	33	(3,586)	-	767	-
Net Change in Fiduciary Net Position	43,960	73,650	(24,588)	(9,016)	46,893
Fiduciary Net Position – Beginning	\$601,529	\$527,879	\$552,468	\$561,484	\$514,591
Prior Year Adjustment	\$(4)	-	-	-	-
Fiduciary Net Position – Ending (b)	\$645,485	\$601,529	\$527,879	\$552,468	\$561,484
Net Pension Liability – Ending (a) – (b)	\$505,125	\$497,101	\$391,638	\$342,965	\$255,366
Plan Fiduciary Net Position as a Percentage	56.10%	54.75%	57.41%	61.70%	68.74%
Covered Employee Payroll (3)	\$152,936	\$178,511	\$158,828	\$128,680	\$129,076
Net Pension Liability as a Percentage of Covered Employee Payroll	330.29%	278.47%	246.58%	266.53%	197.84%

(1) Does not include 401(h) assets for fiscal years 2017 and later.

(2) Does not include 401(h) contributions and investment income on 401(h) contributions for fiscal years 2017 and later.

(3) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' TPL - CERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

Total Pension Liability (TPL)	2018	2017	2016	2015	2014
Service Cost	\$254,169	\$193,082	\$209,101	\$207,400	\$192,482
Interest	760,622	803,555	780,587	733,002	710,526
Benefit Changes	15,708	-	-	-	-
Difference between Expected and Actual Experience	279,401	(208,015)	-	49,966	-
Changes of Assumptions	-	1,388,800	-	606,293	-
Benefit Payments	(741,177)	(701,891)	(665,000)	(628,858)	(597,136)
Net Change in TPL	568,723	1,475,532	324,687	967,803	305,872
TPL – Beginning	12,540,545	11,065,013	10,740,325	9,772,522	9,466,650
TPL – Ending (a)	\$13,109,268	\$12,540,545	\$11,065,013	\$10,740,325	\$9,772,522
Fiduciary Net Position (1)					
Contributions – Employer	\$358,017	\$333,554	\$284,105	\$298,565	\$324,231
Contributions – Member (2)	160,370	150,715	141,674	140,311	128,568
Net Investment Income (2)	573,829	825,900	(40,800)	110,568	895,530
Retirement Benefit	(726,569)	(687,461)	(651,246)	(615,335)	(582,850)
Administrative Expense	(19,592)	(19,609)	(19,385)	(18,212)	(18,615)
Refunds of Contributions	(14,608)	(14,430)	(13,753)	(13,523)	(14,286)
Other (4)	361	(42,827)	-	10,280	-
Net Change in Fiduciary Net Position	331,808	545,843	(299,405)	(87,346)	732,578
Fiduciary Net Position - Beginning	\$6,687,237	\$6,141,395	\$6,440,800	\$6,528,146	\$5,795,568
Prior Year Adjustment	(82)	-	-	-	-
Fiduciary Net Position – Ending (b)	\$7,018,963	\$6,687,237	\$6,141,395	\$6,440,800	\$6,528,146
Net Pension Liability – Ending (a) – (b)	\$6,090,305	\$5,853,308	\$4,923,618	\$4,299,525	\$3,244,376
Plan Fiduciary Net Position as a Percentage	53.54%	53.32%	55.50%	59.97%	66.80%
Covered Employee Payroll (3)	\$2,454,927	\$2,376,290	\$2,417,187	\$2,296,716	\$2,272,270
Net Pension Liability as a Percentage of Covered Employee Payroll	248.08%	246.32%	203.69%	187.20%	142.78%

(1) Does not include 401(h) assets for fiscal years 2017 and later.

(2) Does not include 401(h) contributions and investment income on 401(h) contributions for fiscal years 2017 and later.

(3) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' TPL - CERS Hazardous

As of June 30, 2018 (\$ in Thousands)

Total Pension Liability (TPL)	2018	2017	2016	2015	2014
Service Cost	\$81,103	\$58,343	\$66,249	\$71,934	\$66,761
Interest	270,694	270,860	262,886	247,008	238,665
Benefit Changes	2,172	-	-	-	-
Difference between Expected and Actual Experience	205,882	92,588	-	41,935	-
Changes of Assumptions	-	536,667	-	166,849	-
Benefit Payments	(248,332)	(229,299)	(216,327)	(203,244)	(192,299)
Net Change in TPL	311,519	729,159	112,807	324,482	113,127
TPL – Beginning	4,455,275	3,726,115	3,613,308	3,288,826	3,175,699
TPL – Ending (a)	4,766,794	4,455,275	3,726,115	3,613,308	3,288,826
Fiduciary Net Position (1)					
Contributions – Employer	\$127,660	\$115,947	\$105,713	\$108,071	\$115,240
Contributions – Member (2)	61,089	60,101	52,972	47,692	43,722
Net Investment Income (2)	191,324	270,473	(9,020)	37,104	288,490
Retirement Benefit	(244,118)	(226,984)	(213,448)	(200,134)	(189,635)
Administrative Expense	(1,504)	(1,421)	(1,366)	(1,288)	(1,721)
Refunds of Contributions	(4,214)	(2,315)	(2,879)	(3,111)	(2,664)
Other (4)	111	(7,979)	-	2,865	-
Net Change in Fiduciary Net Position	130,348	207,822	(68,028)	(8,801)	253,432
Fiduciary Net Position – Beginning	\$2,217,996	\$2,010,174	\$2,078,202	\$2,087,002	\$1,833,570
Prior Year Adjustment	(7)	-	-	-	-
Fiduciary Net Position – Ending (b)	\$2,348,337	\$2,217,996	\$2,010,174	\$2,078,202	\$2,087,002
Net Pension Liability – Ending (a) – (b)	\$2,418,457	\$2,237,279	\$1,715,941	\$1,535,106	\$1,201,824
Plan Fiduciary Net Position as a Percentage	49.26%	49.78%	53.95%	57.52%	63.46%
Covered Employee Payroll (3)	\$562,853	\$526,559	\$526,334	\$483,641	\$479,164
Net Pension Liability as a Percentage of Covered Employee Payroll	429.68%	424.89%	326.02%	317.41%	250.82%

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(2) Does not include 401(h) contributions and investment income on 401(h) contributions for fiscal years 2017 and later.

(3) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Total Pension Liability (TPL) - SPRS
As of June 30, 2018 (\$ in Thousands)

Total Pension Liability (TPL)	2018	2017	2016	2015	2014
Service Cost	\$11,890	\$8,297	\$8,402	\$7,695	\$7,142
Interest	47,978	51,769	52,951	50,661	50,391
Benefit Changes	184	-	-	-	-
Difference between Expected and Actual Experience	25,126	8,143	-	9,331	-
Changes of Assumptions	-	136,602	56,191	40,201	-
Benefit Payments	(58,827)	(56,960)	(56,279)	(54,850)	(53,239)
Net Change in TPL	26,351	147,850	61,265	53,038	4,294
TPL - Beginning	943,271	795,421	734,156	681,118	676,824
TPL - Ending (a)	\$969,622	\$943,271	\$795,421	\$734,156	\$681,118
Fiduciary Net Position (1)					
Contributions – Employer	\$46,877	\$63,239	\$25,822	\$31,990	\$20,279
Contributions - Member (2)	5,522	5,348	5,263	5,244	5,075
Net Investment Income (2)	18,437	26,795	(3,843)	3,426	40,374
Retirement Benefit	(58,805)	(56,934)	(56,268)	(54,765)	(53,026)
Administrative Expense	(194)	(181)	(178)	(201)	(215)
Refunds of Contributions	(22)	(26)	(11)	(85)	(213)
Other (4)	21	(517)	-	645	-
Net Change in Fiduciary Net Position	11,836	37,724	(29,215)	(13,746)	12,274
Plan Net Position - Beginning	\$255,737	\$218,012	\$247,228	\$260,974	\$248,700
Prior Year Adjustment	(1)	-	-	-	-
Fiduciary Net Position – Ending (b)	\$267,572	\$255,737	\$218,012	\$247,228	\$260,974
Net Pension Liability – Ending (a) – (b)	\$702,050	\$687,534	\$577,409	\$486,928	\$420,144
Plan Fiduciary Net Position as a Percentage	27.60%	27.11%	27.41%	33.68%	38.32%
Covered Employee Payroll (3)	\$50,346	\$54,065	\$46,685	\$45,765	\$44,616
Net Pension Liability as a Percentage of Covered Employee Payroll	1394.45%	1271.68%	1236.82%	1063.97%	941.69%

(1) Does not include 401(h) assets for fiscal years 2017 and later.

(2) Does not include 401(h) contributions and investment income on 401(h) contributions for fiscal years 2017 and later.

(3) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

The actuarially determined contribution rates effective for fiscal year ending 2018 that are documented in the schedule on the previous pages are calculated as of June 30, 2017. Based on the June 30, 2017, actuarial valuation report, the actuarial methods and assumptions used to calculate these contribution rates are below:

Notes to Schedule of Employer's Contribution					
Item	KERS	KERS	CERS	CERS	SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
Determined by the Actuarial Valuation as of:	June 30, 2016	June 30, 2016	June 30, 2016	June 30, 2016	June 30, 2016
Actuarial Cost Method:	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	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	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	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	Level Percent of Pay	Level Percent of Pay	Level Percent of Pay	Level Percent of Pay
Amortization Period:	27 Years, Closed	27 Years, Closed	27 Years, Closed	27 Years, Closed	27 Years, Closed
Investment Return:	6.75%	7.50%	7.50%	7.50%	6.75%
Inflation:	3.25%	3.25%	3.25%	3.25%	3.25%
Salary Increase:	4.00%, average	4.00%, average	4.00%, average	4.00%, average	4.00%, average
Mortality:	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)

Schedule of Employer Contribution Pension - KERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

Fiscal Year Ending	Actuarially Determined Contribution (1)	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll (2)	Actual Contributions as a Percentage of Covered Payroll
2018	\$633,879	\$689,143	\$(55,264)	\$1,509,955	45.64%
2017	623,813	757,121	(133,308)	1,602,396	47.25%
2016	512,670	513,084	(414)	1,631,025	31.46%
2015	520,948	521,691	(743)	1,544,234	33.78%
2014	520,765	296,836	223,929	1,577,496	18.82%
2013	485,396	280,874	204,522	1,644,409	17.08%
2012	441,094	214,786	226,308	1,644,897	13.06%
2011	381,915	193,754	188,161	1,731,633	11.19%
2010	348,495	144,051	204,444	1,815,146	7.94%
2009	\$294,495	\$112,383	\$182,112	\$1,754,413	6.41%

(1) Actuarially determined contribution rate for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(2) Based on derived compensation using the provided employer contribution information for fiscal year ending 2017 and later.

Schedule of Employer Contribution Pension - KERS Hazardous

As of June 30, 2018 (\$ in Thousands)

Fiscal Year Ending	Actuarially Determined Contribution (1)	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll (2)	Actual Contributions as a Percentage of Covered Payroll
2018	\$31,321	\$43,661	\$(12,340)	\$152,936	28.55%
2017	37,630	52,974	(15,344)	178,511	29.68%
2016	23,690	23,759	(69)	158,828	14.96%
2015	28,374	28,536	(162)	128,680	22.18%
2014	13,570	11,670	1,900	129,076	9.04%
2013	21,502	27,334	(5,832)	131,015	20.86%
2012	20,265	20,809	(544)	131,977	15.77%
2011	20,605	19,141	1,464	133,054	14.39%
2010	17,815	17,658	157	143,558	12.30%
2009	\$15,708	\$15,843	\$(135)	\$146,044	10.85%

(1) Actuarially determined contribution rate for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(2) Based on derived compensation using the provided employer contribution information for fiscal year ending 2017 and later.

Schedule of Employer Contribution Pension - CERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

Fiscal Year Ending	Actuarially Determined Contribution (1)	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll (2)	Actual Contributions as a Percentage of Covered Payroll
2018	\$355,473	\$358,017	\$(2,544)	\$2,454,927	14.58%
2017	331,492	333,554	(2,062)	2,376,290	14.04%
2016	282,767	284,106	(1,339)	2,417,187	11.75%
2015	297,715	298,566	(851)	2,296,716	13.00%
2014	324,231	324,231	-	2,272,270	14.27%
2013	294,914	294,914	-	2,236,277	13.19%
2012	261,764	275,736	(13,972)	2,236,546	12.33%
2011	218,985	248,519	(29,534)	2,276,596	10.92%
2010	186,724	207,076	(20,352)	2,236,855	9.26%
2009	\$161,097	\$179,285	\$(18,188)	\$2,183,612	8.21%

(1) Actuarially determined contribution rate for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(2) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

Schedule of Employer Contribution Pension - CERS Hazardous

As of June 30, 2018 (\$ in Thousands)

Fiscal Year Ending	Actuarially Determined Contribution (1)	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll (2)	Actual Contributions as a Percentage of Covered Payroll
2018	\$124,953	\$127,660	\$(2,707)	\$562,853	22.68%
2017	114,316	115,947	(1,631)	526,559	22.02%
2016	104,952	105,713	(761)	526,334	20.08%
2015	107,514	108,071	(557)	483,641	22.35%
2014	115,240	115,240	-	479,164	24.05%
2013	120,140	120,140	-	461,673	26.02%
2012	83,589	89,329	(5,740)	464,229	19.24%
2011	78,796	85,078	(6,282)	466,964	18.22%
2010	76,391	82,887	(6,496)	466,549	17.77%
2009	\$69,056	\$78,152	\$(9,096)	\$469,315	16.65%

(1) Actuarially determined contribution rate for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(2) Based on derived compensation using the provided employer contribution information for fiscal years 2017 and later.

Schedule of Employer Contribution Pension - SPRS

As of June 30, 2018 (\$ in Thousands)

Fiscal Year Ending	Actuarially Determined Contribution (1)	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll (2)	Actual Contributions as a Percentage of Covered Payroll
2018	\$36,033	\$46,877	\$(10,844)	\$50,346	93.11%
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%

(1) Actuarially determined contribution rate for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

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

Schedule of the Employers' Net OPEB Liability - KERS Non-Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$3,262,117	\$891,205	\$2,370,912	27.32%	\$1,573,898	150.64%
2017	\$3,353,332	\$817,370	\$2,535,962	24.37%	\$1,593,097	159.18%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - KERS Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$485,904	\$519,072	\$(33,168)	106.83%	\$190,317	(17.43)%
2017	\$494,869	\$488,838	\$6,031	98.78%	\$171,087	3.53%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - CERS Non-Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$4,189,606	\$2,414,126	\$1,775,480	57.62%	\$2,570,156	69.08%
2017	\$4,222,878	\$2,212,536	\$2,010,342	52.39%	\$2,480,130	81.06%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of the Employers' Net OPEB Liability - CERS Hazardous Plan

As of June 30, 2018 (\$ in Thousands)

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$1,993,941	\$1,280,982	\$712,959	64.24%	\$588,526	121.14%
2017	\$2,015,673	\$1,189,001	\$826,672	58.99%	\$542,710	152.32%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

**Schedule of the Employer's Net OPEB Liability-SPRS Plan
As of June 30, 2018 (\$ in Thousands)**

Year	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability/(Asset)	Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	Covered Employee Payroll (1)	Net OPEB Liability as a Percentage of Covered Employee Payroll
2018	\$301,012	\$190,847	\$110,165	63.40%	\$50,064	220.05%
2017	\$313,234	\$178,838	\$134,396	57.10%	\$48,873	275.00%

(1) Based on derived compensation using the provided employer contribution information.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' Net OPEB Liability - KERS Non-Hazardous Plan
As of June 30, 2018 (\$ in Thousands)

	2018	2017
Total OPEB Liability		
Service Cost	\$66,360	\$46,992
Interest	191,178	192,911
Benefit Changes	1,865	-
Difference between Expected and Actual Experience	(191,147)	(3,921)
Changes of Assumptions	(11,235)	414,835
Benefit Payments (1)	(148,236)	(139,601)
Net Change in Total OPEB Liability	(91,215)	511,216
Total OPEB Liability - Beginning	3,353,332	2,842,116
Total OPEB Liability - Ending (a)	\$3,262,117	\$3,353,332
Plan Fiduciary Net Position		
Contributions – Employer (2)	\$152,985	\$162,636
Contributions – Member	5,786	5,156
Benefit Payments (1)	(148,236)	(139,601)
OPEB Plan Net Investment Income	64,028	94,239
OPEB Plan Administrative Expense	(760)	(861)
Other (4)	32	-
Net Change in Plan Fiduciary Net Position	73,835	121,569
Plan Fiduciary Net Position – Beginning	817,370	695,801
Plan Fiduciary Net Position – Ending (b)	891,205	817,370
Net OPEB Liability – Ending (a) – (b)	\$2,370,912	\$2,535,962
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	27.32%	24.37%
Covered Employee Payroll (3)	\$1,573,898	\$1,593,097
Net OPEB Liability as a Percentage of Covered Employee Payroll	150.64%	159.18%
<i>(1) Includes expected benefits due to the implicit subsidy for members under age 65.</i>		
<i>(1) Benefit payments are also offset by insurance premiums received from retirees and by Medicare Drug Reimbursements.</i>		
<i>(2) Includes expected benefits due to the implicit subsidy for members under age 65.</i>		
<i>(3) Based on derived compensation using the provided employer contribution information.</i>		
<i>(4) Northern Trust Settlement for fiscal year 2018.</i>		
<i>This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.</i>		

Schedule of Changes in Employers' Net OPEB Liability - KERS Hazardous Plan
As of June 30, 2018 (\$ in Thousands)

	2018	2017
Total OPEB Liability		
Service Cost	\$12,893	\$8,002
Interest on Total OPEB liability	28,500	27,591
Benefit Changes	167	-
Difference between Expected and Actual Experience	(31,240)	(1,029)
Assumption Changes	(581)	89,401
Benefit Payments (1)	(18,704)	(16,618)
Net Change in Total OPEB Liability	(8,965)	107,347
Total OPEB Liability - Beginning	494,869	387,522
Total OPEB Liability - Ending (a)	\$485,904	\$494,869
Plan Fiduciary Net Position		-
Contributions – Employer (2)	5,165	4,579
Contributions – Member	909	811
Benefit Payments (1)	(18,704)	(16,618)
OPEB Plan Net Investment Income	42,950	59,614
OPEB Plan Administrative Expense	(104)	(105)
Other (4)	18	-
Net Change in Plan Fiduciary Net Position	30,234	48,281
Plan Fiduciary Net Position – Beginning	488,838	440,557
Plan Fiduciary Net Position – Ending (b)	519,072	488,838
Net OPEB Liability – Ending (a) – (b)	\$(33,168)	\$6,031
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	106.83%	98.78%
Covered Employee Payroll (3)	\$190,317	\$171,087
Net OPEB Liability as a Percentage of Covered Employee Payroll	(17.43)%	3.53%

(1) Includes expected benefits due to the implicit subsidy for members under age 65.

(1) Benefit payments are also offset by insurance premiums received from retirees and by Medicare Drug Reimbursements.

(2) Includes expected benefits due to the implicit subsidy for members under age 65.

(3) Based on derived compensation using the provided employer contribution information.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

**Schedule of Changes in Employers' Net OPEB Liability - CERS Non-Hazardous Plan
As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Total OPEB Liability		
Service Cost	\$122,244	\$85,468
Interest on Total OPEB liability	242,048	240,854
Benefit Changes	4,306	-
Difference between Expected and Actual Experience	(240,568)	(6,641)
Assumption Changes	(4,876)	520,286
Benefit Payments (1)	(156,426)	(140,120)
Net Change in Total OPEB Liability	(33,272)	699,847
Total OPEB Liability - Beginning	4,222,878	3,523,031
Total OPEB Liability - Ending (a)	\$4,189,606	\$4,222,878
Plan Fiduciary Net Position		
Contributions – Employer (2)	145,809	133,326
Contributions – Member	10,825	9,158
Benefit Payments (1)	(156,426)	(140,120)
OPEB Plan Net Investment Income	202,068	264,782
OPEB Plan Administrative Expense	(761)	(789)
Other (4)	75	-
Net Change in Plan Fiduciary Net Position	201,590	266,357
Plan Fiduciary Net Position – Beginning	2,212,536	1,946,179
Plan Fiduciary Net Position – Ending (b)	2,414,126	2,212,536
Net OPEB Liability – Ending (a) – (b)	\$1,775,480	\$2,010,342
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	57.62%	52.39%
Covered Employee Payroll (3)	\$2,570,156	\$2,480,130
Net OPEB Liability as a Percentage of Covered Employee Payroll	69.08%	81.06%

(1) Includes expected benefits due to the implicit subsidy for members under age 65.

(1) Benefit payments are also offset by insurance premiums received from retirees and by Medicare Drug Reimbursements.

(2) Includes expected benefits due to the implicit subsidy for members under age 65.

(3) Based on derived compensation using the provided employer contribution information.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employers' Net OPEB Liability - CERS Hazardous Plan
As of June 30, 2018 (\$ in Thousands)

	2018	2017
Total OPEB Liability		
Service Cost	\$33,948	\$20,493
Interest on Total OPEB liability	118,009	113,166
Benefit Changes	484	-
Difference between Expected and Actual Experience	(100,348)	(2,470)
Assumption Changes	(2,500)	391,061
Benefit Payments (1)	(71,325)	(63,656)
Net Change in Total OPEB Liability	(21,732)	458,594
Total OPEB Liability - Beginning	2,015,673	1,557,079
Total OPEB Liability - Ending (a)	1,993,941	2,015,673
Plan Fiduciary Net Position		
Contributions – Employer (2)	51,615	44,325
Contributions – Member	2,173	1,708
Benefit Payments (1)	(71,325)	(63,656)
OPEB Plan Net Investment Income	109,854	143,892
OPEB Plan Administrative Expense	(376)	(381)
Other (4)	40	-
Net Change in Plan Fiduciary Net Position	91,981	125,888
Plan Fiduciary Net Position – Beginning	1,189,001	1,063,113
Plan Fiduciary Net Position – Ending (b)	1,280,982	1,189,001
Net OPEB Liability – Ending (a) – (b)	\$712,959	\$826,672
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	64.24%	58.99%
Covered Employee Payroll (3)	\$588,526	\$542,710
Net OPEB Liability as a Percentage of Covered Employee Payroll	121.14%	152.32%

(1) Includes expected benefits due to the implicit subsidy for members under age 65.

(1) Benefit payments are also offset by insurance premiums received from retirees and by Medicare Drug Reimbursements.

(2) Includes expected benefits due to the implicit subsidy for members under age 65.

(3) Based on derived compensation using the provided employer contribution information.

(4) Northern Trust Settlement for fiscal year 2018.

This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Changes in Employer's Net OPEB Liability - SPRS Plan
As of June 30, 2018 (\$ in Thousands)

	2018	2017
Total OPEB Liability		
Service Cost	\$6,087	\$4,147
Interest on Total OPEB liability	18,432	17,993
Benefit Changes	34	-
Difference between Expected and Actual Experience	(23,320)	(573)
Assumption Changes	(358)	57,312
Benefit Payments (1)	(13,097)	(12,123)
Net Change in Total OPEB Liability	(12,222)	66,756
Total OPEB Liability - Beginning	313,234	246,478
Total OPEB Liability - Ending (a)	\$301,012	\$313,234
Plan Fiduciary Net Position		
Contributions – Employer (2)	\$8,535	\$7,862
Contributions – Member	155	131
Benefit Payments (1)	(13,097)	(12,123)
OPEB Plan Net Investment Income	16,470	21,627
OPEB Plan Administrative Expense	(62)	(66)
Other (4)	8	-
Net Change in Plan Fiduciary Net Position	12,009	17,431
Plan Fiduciary Net Position – Beginning	178,838	161,407
Plan Fiduciary Net Position – Ending (b)	190,847	178,838
Net OPEB Liability – Ending (a) – (b)	\$110,165	\$134,396
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	63.40%	57.09%
Covered Employee Payroll (3)	\$50,064	\$48,873
Net OPEB Liability as a Percentage of Covered Employee Payroll	220.05%	274.99%
<i>(1) Includes expected benefits due to the implicit subsidy for members under age 65.</i>		
<i>(1) Benefit payments are also offset by insurance premiums received from retirees and by Medicare Drug Reimbursements.</i>		
<i>(2) Includes expected benefits due to the implicit subsidy for members under age 65.</i>		
<i>(3) Based on derived compensation using the provided employer contribution information.</i>		
<i>(4) Northern Trust Settlement for fiscal year 2018.</i>		
<i>This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.</i>		

The actuarially determined contributions rates effective for fiscal year ending 2018, that are documented in the schedule, Sensitivity of the Net OPEB Liability to Changes in the Discount Rate and Healthcare Trend Rate, in Note L of the financial statements, are calculated as of June 30, 2017. Based on the June 30, 2017, actuarial valuation report, the actuarial methods and assumptions used to calculate these contributions are below:

Notes to Schedule of Employers' OPEB Contributions					
	KERS	KERS	CERS	CERS	SPRS
Item	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
Determined by the Actuarial Valuation as of:	June 30, 2016	June 30, 2016	June 30, 2016	June 30, 2016	June 30, 2016
Actuarial Cost Method:	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	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	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	20 % of the difference between the market value of assets and the expected actuarial value of assets is recognized	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	Level Percent of Pay	Level Percent of Pay	Level Percent of Pay	Level Percent of Pay
Amortization Period:	27 Years, Closed	27 Years, Closed	27 Years, Closed	27 Years, Closed	27 Years, Closed
Payroll Growth Rate:	4.00%	4.00%	4.00%	4.00%	4.00%
Investment Return:	7.50%	7.50%	7.50%	7.50%	7.50%
Inflation:	3.25%	3.25%	3.25%	3.25%	3.25%
Salary Increase:	4.00%, average	4.00%, average	4.00%, average	4.00%, average	4.00%, average
Mortality:	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)	RP-2000 Combined Mortality Table, projected to 2013 with Scale BB (set back 1 year for females)
Healthcare Trend Rates:					
Pre-65	Initial trend starting at 7.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 5 years.	Initial trend starting at 7.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 5 years.	Initial trend starting at 7.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 5 years.	Initial trend starting at 7.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 5 years.	Initial trend starting at 7.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 5 years.
Post-65	Initial trend starting at 5.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 2 years.	Initial trend starting at 5.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 2 years.	Initial trend starting at 5.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 2 years.	Initial trend starting at 5.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 2 years.	Initial trend starting at 5.50% and gradually decreasing to an ultimate trend rate of 5.00% over a period of 2 years.

Schedule of Employers' OPEB Contributions - KERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

1	2	3	4		
Fiscal Year Ending	Actuarially Determined Contribution	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll	Actual Contributions as a Percentage of Covered Payroll
2018	\$132,365	\$136,419	(4,054)	\$1,573,898	8.67%
2017	133,024	152,356	(19,332)	1,593,097	9.56%
2016	121,899	135,816	(13,917)	1,529,249	8.88%
2015	130,455	135,940	(5,485)	1,544,234	8.80%
2014	208,881	166,610	42,271	1,577,496	10.56%
2013	286,143	165,331	120,812	1,644,409	10.05%
2012	297,904	156,057	141,847	1,644,897	9.49%
2011	294,898	129,336	165,562	1,731,633	7.47%
2010	376,556	102,528	274,028	1,815,146	5.65%
2009	\$362,707	\$82,711	\$279,996	\$1,754,413	4.71%

(1) Data for years prior to 2018 are based on contribution data provided in the 2017 CAFR, based on calculations provided by the prior actuary.

(2) Actuarially determined contribution for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(3) Employer contributions do not include the expected implicit subsidy.

(4) Based on derived compensation using the provided employer contribution information.

Schedule of Employers' OPEB Contributions - KERS Hazardous

As of June 30, 2018 (\$ in Thousands)

1	2	3	4		
Fiscal Year Ending	Actuarially Determined Contribution	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll	Actual Contributions as a Percentage of Covered Payroll
2018	\$2,550	\$5,288	(2,738)	\$190,317	2.78%
2017	4,688	5,620	(932)	171,087	3.28%
2016	9,186	16,766	(7,580)	147,563	11.36%
2015	13,152	14,882	(1,730)	128,680	11.57%
2014	15,627	23,874	(8,247)	129,076	18.50%
2013	26,253	25,682	571	132,015	19.45%
2012	28,326	24,538	3,788	131,977	18.59%
2011	29,585	19,953	9,632	133,054	15.00%
2010	35,045	22,241	12,804	143,558	15.49%
2009	\$34,670	\$20,993	\$13,677	\$146,044	14.37%

(1) Data for years prior to 2018 are based on contribution data provided in the 2017 CAFR, based on calculations provided by the prior actuary.

(2) Actuarially determined contribution for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(3) Employer contributions do not include the expected implicit subsidy.

(4) Based on derived compensation using the provided employer contribution information.

Schedule of Employers' OPEB Contributions - CERS Non-Hazardous

As of June 30, 2018 (\$ in Thousands)

1	2	3	4		
Fiscal Year Ending	Actuarially Determined Contribution	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll	Actual Contributions as a Percentage of Covered Payroll
2018	\$120,797	\$124,619	\$(3,822)	\$2,570,156	4.85%
2017	122,270	120,712	1,558	2,480,130	4.87%
2016	110,987	111,836	(849)	2,352,762	4.75%
2015	119,511	119,444	67	2,296,716	5.20%
2014	130,652	123,278	7,374	2,272,270	5.43%
2013	195,561	159,993	35,568	2,236,277	7.15%
2012	214,421	171,925	42,496	2,236,546	7.69%
2011	213,429	186,886	26,543	2,276,596	8.21%
2010	266,331	175,764	90,567	2,236,855	7.86%
2009	\$264,734	\$131,476	\$133,258	\$2,183,612	6.02%

(1) Data for years prior to 2018 are based on contribution data provided in the 2017 CAFR, based on calculations provided by the prior actuary.

(2) Actuarially determined contribution for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(3) Employer contributions do not include the expected implicit subsidy.

(4) Based on derived compensation using the provided employer contribution information.

Schedule of Employers' OPEB Contributions - CERS Hazardous

As of June 30, 2018 (\$ in Thousands)

1	2	3	4		
Fiscal Year Ending	Actuarially Determined Contribution	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll	Actual Contributions as a Percentage of Covered Payroll
2018	\$55,027	\$56,002	\$(975)	\$588,526	9.52%
2017	53,131	51,537	1,594	542,710	9.50%
2016	64,253	67,619	(3,366)	492,851	13.72%
2015	69,103	71,778	(2,675)	483,641	14.84%
2014	74,360	74,792	(432)	479,164	15.61%
2013	102,011	85,319	16,692	461,673	18.48%
2012	110,763	92,564	18,199	464,229	19.94%
2011	109,227	98,592	10,635	466,964	21.11%
2010	129,227	84,536	44,691	466,549	18.12%
2009	\$126,757	\$71,413	\$55,344	\$469,315	15.22%

(1) Data for years prior to 2018 are based on contribution data provided in the 2017 CAFR, based on calculations provided by the prior actuary.

(2) Actuarially determined contribution for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(3) Employer contributions do not include the expected implicit subsidy.

(4) Based on derived compensation using the provided employer contribution information.

Schedule of Employer's OPEB Contributions - SPRS
As of June 30, 2018 (\$ in Thousands)

1	2	3	4	5	
Fiscal Year Ending	Actuarially Determined Contribution	Total Employer Contribution	Contribution Deficiency (Excess)	Covered Employee Payroll	Actual Contributions as a Percentage of Covered Payroll
2018	\$9,062	\$9,397	\$(335)	\$50,064	18.77%
2017	9,222	9,222	0	48,873	18.87%
2016	8,553	10,237	(1,684)	45,551	22.47%
2015	9,890	10,382	(492)	45,765	22.69%
2014	20,879	14,493	6,386	44,616	32.48%
2013	27,234	16,829	10,405	45,256	37.19%
2012	28,247	11,960	16,287	48,373	24.72%
2011	25,773	11,051	14,722	48,693	22.70%
2010	30,302	8,643	21,659	51,507	16.78%
2009	\$29,325	\$7,643	\$21,682	\$51,660	14.79%

(1) Data for years prior to 2018 are based on contribution data provided in the 2017 CAFR, based on calculations provided by the prior actuary.

(2) Actuarially determined contribution for fiscal year ending 2018 is based on the contribution rate calculated with the June 30, 2016, actuarial valuation.

(3) Employer contributions do not include the expected implicit subsidy.

(4) Based on derived compensation using the provided employer contribution information

Money-Weighted Rates of Return

In accordance with GASB, KRS provides this additional disclosure regarding its money-weighted rate of return for the Pension Funds and Insurance Fund. The money-weighted rate of return is a method of calculating period-by-period returns on Pension Funds and Insurance Fund investments that adjusts for the changing amounts actually invested. For purposes of this Statement, money weighted-rate of return is calculated as the internal rate of return on Pension Funds and Insurance Fund investments, net of Pension Funds and Insurance Fund investment expense, adjusted for the changing amounts actually invested.

See below for the money-weighted rates of return for multiple periods including fiscal year June 30, 2018, as calculated by the custodian bank, BNY Mellon:

Money - Weighted Rates of Return As of June 30, 2018						
	KERS	KERS	CERS	CERS	SPRS	
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		
Pension Funds						
2018	7.63%	8.69%	8.82%	8.82%	7.68%	
2017	12.08%	13.45%	13.80%	13.72%	12.50%	
2016	-0.97%	-0.33%	-0.62%	-0.46%	-1.76%	
2015	1.89%	1.69%	1.65%	1.88%	1.71%	
2014	15.50%	15.65%	15.56%	15.50%	15.66%	
Insurance Fund						
	KERS	KERS	CERS	CERS	SPRS	
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous		
2018	7.95%	8.93%	9.22%	9.35%	9.39%	
2017	13.77%	13.75%	13.67%	13.69%	13.69%	

Note: This table is intended to show information for ten years; additional year's information will be displayed as it becomes available.

Schedule of Administrative Expenses As of June 30, 2018 (\$ in Thousands)

	2018	2017
Personnel		
Salaries and Per Diem	\$13,926	\$13,999
Pension, Insurance Related Benefits	9,744	10,014
Unemployment Compensation	-	-
Tuition Assistance	16	18
Total Personnel	23,686	24,031
Contractual		
Actuarial Services	453	334
Audit Services	168	152
Healthcare	963	10
Legal Counsel	1,107	571
Medical Review Services	279	420
Miscellaneous	69	57
Total Contractual	3,039	1,544
Communication		
Printing	309	206
Telephone	121	191
Postage	257	471
Travel	59	61
Total Communication	746	929
Internal Audit		
Travel/Conferences	1	1
Dues/Subscriptions	-	1
Miscellaneous	-	2
Total Internal Audit	1	4
Investments-Pension Fund		
Travel/Conferences	21	34
Dues/Subscriptions	9	12
Contractual	-	-
Miscellaneous	-	1
Tuition	-	2
Legal	157	380
Total Investments	\$187	\$429

Schedule of Administrative Expenses (cont...)

	2018	2017
Rentals		
Office Space	\$754	\$743
Equipment	70	85
Total Rentals	824	828
Information Technology		
Software	1,932	320
Hardware	-	878
Services	-	1,594
Total Information Technology	1,932	2,792
Miscellaneous		
Utilities	204	211
Supplies	81	119
Insurance	345	235
Dues & Subscriptions	31	46
Maintenance	1	4
Other	6	17
Total Miscellaneous	668	632
Depreciation/Amortization	1,874	1,920
Total Pension Fund Administrative Expense	32,957	33,109
Healthcare Fees	2,063	2,202
Total Insurance Fund Administrative Expense	2,063	2,202
Total Administrative Expenses	\$35,020	\$35,311

Schedule of Direct Investment Expenses As of June 30, 2018 (\$ in Thousands)

	2018	2017
PENSION FUNDS		
Security Lending Fees		
Borrower (Income) Rebates	\$4,712	\$734
Lending Agent Fees	445	351
Total Security Lending	5,157	1,085
Contractual Services		
Investment Management	50,813	53,780
Security Custody	1,299	29,651
Investment Consultant	1,385	1,084
Private Equity Performance Fees	39,100	1,005
Total Contractual Services	92,597	85,520
INSURANCE FUNDS		
Security Lending Fees		
Borrower (Income) Rebates	1,813	187
Lending Agent Fees	201	133
Total Security Lending	2,014	320
Contractual Services		
Investment Management	26,425	23,094
Security Custody	846	718
Investment Consultant	568	409
Private Equity Performance Fees	18,078	10,007
Total Contractual Services	45,917	34,228
Total Investment Expenses	\$145,685	\$121,153

**Schedule of Professional Consultant Fees
As of June 30, 2018 (\$ in Thousands)**

	2018	2017
Actuarial Services	\$453	\$344
Medical Review Services	279	420
Audit Services	168	152
Legal Counsel	1,264	951
Healthcare	963	10
Miscellaneous	69	57
Total	\$3,196	\$1,934

REPORT ON INTERNAL CONTROL

over financial reporting and on compliance and other matters based on an audit of financial statements performed in accordance with
GOVERNMENT AUDITING STANDARDS



MIKE HARMON
AUDITOR OF PUBLIC ACCOUNTS

Report On Internal Control Over Financial Reporting And
On Compliance And Other Matters Based On An Audit Of Financial
Statements Performed In Accordance With *Government Auditing Standards*

Independent Auditor's Report

Kentucky Retirement Systems
Board of Directors

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of KRS as of and for the year ended June 30, 2018, and the related notes to the financial statements, which collectively comprise KRS' basic financial statements, and have issued our report thereon dated November 29, 2018.

Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered KRS' internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of KRS' internal control. Accordingly, we do not express an opinion on the effectiveness of KRS' internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

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REPORT ON INTERNAL CONTROL

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Report On Internal Control Over Financial Reporting And
On Compliance And Other Matters Based On An Audit Of Financial
Statements Performed In Accordance With *Government Auditing Standards*
(Continued)

Our consideration of internal control over financial reporting was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies and therefore, material weaknesses or significant deficiencies may exist that were not identified. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified. We did identify certain deficiencies in internal control, described in the accompanying schedule of financial statement findings, that we consider to be significant deficiencies identified as 2018-01, 2018-02, and 2018-03.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether KRS' financial statements are free of material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

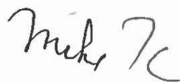
KRS' Responses to the Findings

The KRS' responses to the findings identified in our audit are described in the accompanying schedule of financial statement findings. The KRS' response was not subjected to the auditing procedures applied in the audit of the financial statements and, accordingly, we express no opinion on it.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the result of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Respectfully Submitted,



Mike Harmon
Auditor of Public Accounts

November 29, 2018

REPORT ON INTERNAL CONTROL

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KENTUCKY RETIREMENT SYSTEMS SCHEDULE OF FINANCIAL STATEMENT FINDINGS For the Year Ended June 30, 2018

FINDING 2018-01: The Kentucky Retirement Systems Does Not Have Adequate Procedures To Ensure Financial Statements Are Prepared In Accordance With Generally Accepted Accounting Principles

During the FY 18 audit of the Kentucky Retirement Systems (KRS), the KRS financial statement preparation process did not identify instances of departure from Generally Accepted Accounting Principles (GAAP) in the notes to the financial statements. The Governmental Accounting Standards Board (GASB) issues accounting and financial reporting standards that defines GAAP for governmental entities. The departures from GAAP included:

1. Disclosures related to derivatives omitted certain information required by GASB, such as clearly defining investments as held for investment or hedging purposes and did not include the change in fair value or accurate market values. After KRS was notified of the omissions, KRS revised the note to be in compliance with the statement; however, the revised note totals did not agree to the Statement of Fiduciary Net Position. Further investigation by KRS determined investments were improperly classified by the custodial bank. As a result, the financial statements had to be adjusted to decrease derivatives for pension and insurance by \$26.4 million and \$11.6 million, respectively. Other investment accounts were increased as a result of this reclassification.
2. The GASB requires specific disclosures related to leases. KRS disclosed a relationship involving office space lease; however, the note did not include the required information for leases, such as the lease term or future payments associated with the lease.
3. The notes did not disclose the money weighted average rate of return of investments, as required by GASB.
4. Upon review of the prior audit, it was noted that KRS included certain investments in the notes classified in a fair value hierarchy rather than at net asset value as required by GASB. This was discussed with KRS and a correction was made for FY18.

In addition to the GASB disclosure issues, many revisions were necessary after auditing the financial statement notes and RSI. While KRS reviewed and adjusted the notes and RSI for accuracy and to comply with GAAP, the issues and errors were not identified in the financial statement preparation process.

KRS personnel did not detect the errors or GAAP departures during the preparation or review process. Ineffective internal controls over financial statement preparation could lead to misstatements and departures from GAAP.

Management must ensure proper internal controls over financial statement preparation are present and operating effectively. This includes having procedures in place to identify errors and omissions of financial statement amounts and disclosures.

Recommendation

We recommend KRS evaluate the financial statement preparation process to ensure sufficient controls are in place to promote financial reporting that adheres to GAAP. The supporting information used to prepare notes and RSI should be evaluated for accuracy.

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KENTUCKY RETIREMENT SYSTEMS
SCHEDULE OF FINANCIAL STATEMENT FINDINGS
For the Year Ended June 30, 2018

FINDING 2018-01: The Kentucky Retirement Systems Does Not Have Adequate Procedures To Ensure Financial Statements Are Prepared In Accordance With Generally Accepted Accounting Principles (Continued)

Management's Response and Planned Corrective Action

Management concurs with the findings and recommendations. The process that the APA uses differs from a more consultant approach from KRS' external auditor. During external audit period and during the preparation of the annual CAFR, we collaborate with the external auditor to review and incorporate new GASB requirements and other required CAFR revisions from the prior year based on their recommendations. For the 2018 CAFR, we have automated many of the tables and supporting schedules. Management will continue review and improve the financial statement preparation processes to ensure sufficient controls are in place to prepare the annual GASB 67 and GAB 74 reports and the CAFR.

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KENTUCKY RETIREMENT SYSTEMS SCHEDULE OF FINANCIAL STATEMENT FINDINGS For the Year Ended June 30, 2018

FINDING 2018-02: The Kentucky Retirement Systems Did Not Have Written Policies For Waiving Penalties

During fiscal year 2018, Kentucky Retirement Systems (KRS), waived penalties over delinquent monthly employer contribution invoices. Currently, three members of management approve waivers of penalties for employers submitting late reports or making late payments, although no written policies or procedures exist regarding the practice. Employers are charged with a penalty when payments or reports for the monthly contributions are not paid or submitted on or before the 10th of each month. Kentucky Revised Statutes do not specifically address the waiving of these penalties, and therefore, it does not appear that KRS has the statutory authority to waive penalties. Additionally, auditors did not see justification noted for the reason individual waivers were determined to be warranted.

KRS produced a report indicating 95 delinquent monthly employer contribution penalties were waived, totaling \$104,245 for fiscal year 2018.

Management used their judgment when waiving these penalties. Penalties and related waivers are not reported to the KRS Board. KRS management indicated that it had discussed penalties with the KRS Audit Committee in the past, and that the general feeling was that penalties were an administrative function.

The absence of clear authority to waive a penalty required by statute increases the risk of inconsistent treatment of employers because there are no defined boundaries on how management should assess each situation. Additionally, without written guidance on evaluating each situation, management risks allowing personal, structural, or external pressures to influence their judgment. By not enforcing statutorily mandated penalties, incentives for compliance by employers are reduced. When penalties are waived, KRS loses potential funds that could have been invested and earned interest.

The assessment of penalties is addressed by the Kentucky Revised Statutes; however, the statutes do not address the waiving of penalties.

Per Kentucky Revised Statute 78.625:

If the agency reporting official fails to file at the retirement office all contributions and reports on or before the tenth day of the month following the period being reported, interest on the delinquent contributions at the actuarial rate adopted by the board compounded annually, but not less than one thousand (\$1000), shall be added to the amount due the system.

Written policies and procedures provide guidance to management on the waiver of penalties and allow the process to be consistent and transparent among the various employers.

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**KENTUCKY RETIREMENT SYSTEMS
SCHEDULE OF FINANCIAL STATEMENT FINDINGS
For the Year Ended June 30, 2018**

FINDING 2018-02: The Kentucky Retirement Systems Did Not Have Written Policies For Waiving Penalties (Continued)

Recommendation

We recommend:

- KRS should determine the legality of waiving statutorily mandated penalties. If the waiving of penalties is not permissible, KRS should cease this practice.
- If the agency's authority for applying penalty waivers is determined to be allowable, KRS should adopt formal written policies and procedures on waiving penalties. These policies and procedures should be approved by the Board of Trustees. KRS management should provide the Board of Trustees with a regular report of any penalties waived under this policy.

Management's Response and Planned Corrective Action

Management has reviewed the statutes and KRS is provided language to administer employer reporting errors or omissions. There is statutory authority in KRS 61.685 to correct contribution errors, stating in relevant part, "(1) Notwithstanding the provisions of KRS Chapter 413, upon discovery of any error or omission in the system records, the system shall correct all records including, but not limited to, membership in the system, service credit, member and employer contributions, and benefits paid and payable..." This KERS records law in Chapter 761 is also incorporated in CERS by way of the "matters not specified" statute in KRES 78.545(25) = "correction of errors in records, as provided for by KRS 61.685" and also in SPRS vis KRS 16.645(15) – "correction of errors in records, as provided for by KRS 61.685"

If KRS doesn't have the administrative flexibility in reporting errors or omissions, then an increase in Accounts Receivable would result, due to employers unable to pay penalty invoices caused by error or omission.

Management will request more defined language in a housekeeping bill to be approved by the legislature in the upcoming 2019 session.

Management will adopt formal written policies and procedures on waiving penalties. The KRS Audit Committee will approve these policies and procedures.

Auditor's Reply

We appreciate that management is accepting our recommendation to adopt formal written policies for waiving penalties in an effort to improve documentation, transparency, and consistency. During the audit, KRS indicated to the auditor that the penalties were waived for reasons other than error correction. This is the reason we recommend determining the legality of waiving penalties.

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KENTUCKY RETIREMENT SYSTEMS SCHEDULE OF FINANCIAL STATEMENT FINDINGS For the Year Ended June 30, 2018

FINDING 2018-03: The Kentucky Retirement Systems Did Not Adequately Monitor Outstanding Invoices

Kentucky Retirement Systems' (KRS) financial statements included balances from invoices over multiple years. KRS sends invoices to employers when funds are due to KRS or when overpayments occur. Procedures for collecting overdue invoices are documented in a PowerPoint presentation. Several issues were noted regarding the invoicing process:

- The list of outstanding invoices provided by KRS included \$626,089 in credits due to employers from 2012, \$1,229,677 from 2013, and \$514,448 from 2014, for a total of \$2,370,214. As of the end of FY18, employers had not taken these credits when submitting monthly reports and payments.
- Employers are made aware of all outstanding invoices through the computer system each month when payments are due to KRS, however, the aggregate accounts receivable balance consists of \$19,230, \$43,026, and \$921,764 still due to KRS from employers from 2012, 2013, and 2014 respectively.

In summary, the process for monitoring and resolving outstanding invoices is not operating effectively.

The employer credits on invoices are mostly due to overpaid employer and member contributions. According to KRS, employers may not be taking the refunds since they may not have a good mechanism to repay the employees who overpaid.

In situations where amounts due to employers are the result of employee overpayments, employees in the pension plan are not receiving refunds for overpayments. Employees may be unaware they are owed funds from employers, especially if employment has been terminated. By not collecting balances due, KRS does not have the opportunity to invest and earn a return on these funds.

Proper internal controls over financial reporting dictate that adequate procedures should be in place to prevent, detect, and correct potential misstatements or errors related to outstanding invoices. Effective operational controls allow for the recording, monitoring, and collection on overdue invoices.

Recommendation

We recommend KRS, for those invoices with aged credit or debit balances, work with employers to resolve individual issues in a timely manner.

REPORT ON INTERNAL CONTROL

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**KENTUCKY RETIREMENT SYSTEMS
SCHEDULE OF FINANCIAL STATEMENT FINDINGS
For the Year Ended June 30, 2018**

FINDING 2018-03: The Kentucky Retirement Systems Did Not Adequately Monitor Outstanding Invoices (Continued)

Management's Response and Planned Corrective Action

Management concurs that aged invoices are problematic and we have changed internal processes to further address outstanding balances. However, KRS is challenged by several factors:

- The majority of employer credits are due to member overpayments. After working with the employer to identify the member, KRS cannot remit the over contributions directly to the member. The correction must be processed through the employer's payroll for proper W-2 reporting. Additionally, KRS cannot directly remit overpayment of employer contributions. The employer must process the credits.*
- KRS agencies (especially State Police and Department of Corrections) are dependent on general fund appropriations to pay sick leave invoices and employer pension spiking. These appropriations are subject to the State's bi-annum budget process. Although KRS works with the budget office to provide balance amounts, rarely have the full appropriations been made.*
- Regardless of the outstanding invoice amount, KRS is statutorily required to pay the retiree benefits and has limited options to collect past due amounts.*

While working with these limitations, KRS during 2018 improved employer reporting officials training to include outstanding invoices, invoice aging, and expanding efforts to refresh/assist collection project on the invoice payment process of paying and taking credit invoices. Additionally, as employer-reporting errors have decreased during the fiscal year, more KRS resources have been allocated to invoice collection. Improved internal processes include escalation to our legal department after 120 days and expanding notification to agency management.

INVESTMENTS

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Market Environment

The 2018 fiscal year proved to be another positive year for investors as a result of continued global growth, low inflation, and continued demand for risk assets. In the U.S., the S&P 500 returned 14.3% over the period, while the Dow Jones Industrial Average (DJIA) and Nasdaq Composite Index (NASDAQ) posted similar returns of 16.3% and 23.6%, respectively. Overall the U.S. economy continued its robust performance. The unemployment rate hit 3.8% in May, the lowest figure in 18 years¹, and U.S. Gross Domestic Product (GDP) posted an annualized 4.1% growth rate in the fourth quarter of 2018.²

Some of the key market indicators that influenced fiscal year 2018 performance were:

Real Gross Domestic Product (GDP) grew by 2.0% in the second quarter, but was offset by weak consumer spending; however, business investment during the same period increased by 10.4% which contributed to 2.8% year over year growth.³ The labor market added an average of 196,000 jobs per month over the fiscal year.⁴

- Modest median wage growth of around 3.2%⁵, however, real average hourly earnings remained stagnant from June 2017 through June 2018.⁶
- The Tax Cuts and Jobs Act (TCJA) that was implemented in January 2018, lowered individual and business tax burdens. For example, an individual in 2017 was assessed a 25% marginal income tax rate on income over \$37,950⁷, whereas in 2018, the individual will pay a 22% marginal tax rate on income over \$38,700.⁸ If we consider an individual making \$40,000 (excluding exemptions), annual savings would be around \$999.35.
- The lower individual tax burden has been correlated to increased consumer confidence and, therefore, increased near-term spending. Likewise, business investment growth, estimated to be around 6%, has been attributed to a reduced tax burden.⁹
- The housing market saw decreases in the supply of single-family homes for sale in 2017 causing an increase in prices. Nonetheless, the rate of homeowners increased for the first time since 2004. It should be noted that increasing interest rates and student debt could lead to greater uncertainty in the housing market.¹⁰

¹Wells, Peter. "US Unemployment Rate Hits 18-Year Low of 3.8%." *FinancialTimes*, June 2018, <https://www.ft.com/content/bbf85c42-6594-11e8-90c2-9563a0613e56>.

²"An Update to the Economic Outlook: 2018 to 2018." *Congressional Budget Office*. August 13, 2018, <https://www.cbo.gov/publication/54318>.

³Bahuguna, Anwiti. "Trade Wars or Strong U.S. Growth?" *Columbia Threadneedle Investments*, July 31, 2018, <https://seekingalpha.com/article/4192318-trade-wars-strong-u-s-growth>.

⁴Databases, Tables & Calculators by Subject." *Bureau of Labor Statistics*, July 2017 through June 2018, https://data.bls.gov/timeseries/CES0000000001?output_view=net_1mth.

⁵Wage Growth Tracker." *Federal Reserve Bank of Atlanta: Center for Human Capital Studies*, July 2017 through June 2018, <https://www.frbatlanta.org/chcs/wage-growth-tracker.aspx?panel=1>.

⁶El-Sibaie, Amir. "2018 Tax Brackets (Updated)." *Tax Foundation*, January 2018, <https://files.taxfoundation.org/20170123140911/TaxFoundation-FF534.pdf>.

⁷Pomerleau, Kyle. "2017 Tax Brackets." *Tax Foundation*, November 2016, <https://files.taxfoundation.org/20170123140911/TaxFoundation-FF534.pdf>.

⁸El-Sibaie, Amir. "2018 Tax Brackets (Updated)." *Tax Foundation*, January 2018, <https://files.taxfoundation.org/20170123140911/TaxFoundation-FF534.pdf>.

⁹Bahuguna, Anwiti. "Trade Wars or Strong U.S. Growth?" *Columbia Threadneedle Investments*, July 31, 2018, <https://seekingalpha.com/article/4192318-trade-wars-strong-u-s-growth>.

¹⁰"The State of the Nation's Housing 2018." *Joint Center for Housing Studies of Harvard University*, http://www.jchs.harvard.edu/sites/default/files/Harvard_JCHS_State_of_the_Nations_Housing_2018.pdf.

- The administration issued several tariffs that impacted the market, and, therefore, performance. The first tariffs imposed on January 22, 2017, were on solar panels (\$8.5 billion) and washing machines (\$1.8 billion). On March 1, 2018, the president announced a 25% tariff on steel and a 10% tariff on aluminum that would apply to many countries that included those within the European Union (EU) and Canada. Those tariffs went into effect on March 23, 2018, with exemptions for Canada, Mexico, the EU, South Korea, Brazil, Argentina, and Australia. On that day the DJIA fell by 462 points. The majority of the tariffs have been aimed at China, which has retaliated with its own tariffs on American goods, and has created volatility in the markets. This tariff “war” has not abated and will likely continue to affect performance.¹¹

Anwiti Bahuguna, Senior Portfolio Manager for Columbia Threadneedle Investments, writes, “Growth may slow down a bit in the second half of the year, but the economy is still poised to grow almost to 3% in 2018. After years of not reaching the Fed’s target, inflation is firming and core personal consumption expenditure (PCE) is expected to be around 2% this year.”¹² The Fed continued their methodical increases of interest rates and raised the interest rate three times from a range of 1.00% to 1.25% at the start of the period to 1.75% to 2.00% by June 30, 2018. However, interest rates are still low by historical standards.¹³ In the face of rising rates and a flattening yield curve, bond investors took a hit as the Bloomberg Barclay’s US Aggregate Index returned -.40% for the fiscal year. Investors who favored Credit over interest rates fared better, with the Bloomberg Barclay’s US High Yield Index returning 2.62%, and the S&P Leveraged Loan Index returning 4.37%.

Asset Allocation Changes

The Investment Committee, upon recommendation from KRS’ general consultant, Wilshire Associates, approved a new asset allocation policy for each of the plans in June that decreased the allocation in public equities in favor of fixed income holdings. The general reduction in equities was a theme for the plans over the past fiscal year, as KRS reduced its exposure to stocks from 49.6% to 40.3% by the end of the period. The Committee felt it was prudent to sell into a strong equity market to reduce the exposure in what has proven to be the longest bull market for stocks in history. The Investment Staff continued to reduce hedge funds by paring down exposure from 7.6% to 5.6% by the end of the fiscal year.

Performance

The Pension Fund returned 8.57%, net of fees, for the fiscal year versus 7.91% for the Allocation Index Benchmark. Individual plan net of fees returns ranged from 7.50% for the KERS Non-Hazardous plan to 8.77% for the CERS Hazardous Plan. The Insurance Fund returned 9.05% net of fees for the period versus 8.48% for the Allocation Index Benchmark. In both funds, equities led the way with Private Equity returning 14.52% and Public Equity returning 12.43% for the year. Real Estate also performed very well, posting a return of 11.22% versus 7.11% for the Real Estate benchmark. Absolute Return posted a return of 5.52%, beating its benchmark of 5.39%. For the year, all asset classes had positive absolute performance, with only U.S. Public Equity trailing the benchmark by 26 basis points. Most importantly, all plans produced performance well above their respective assumed rates of return. While the Investment Staff and the Investment Committee of the Board are pleased with the performance of the assets over the fiscal year, it is important to remain focused on the long road ahead to achieve a healthy funded status for each plan. Investment returns are only one part of this process, but KRS looks forward to continuing the momentum they have created over the last 2 years.

¹¹Brown, Chad P, and Kolb, Melina. “Trump’s Trade War Timeline: An Up-to-Date Guideline.” Peterson Institute for International Economics, August 23, 2018, <https://piie.com/system/files/documents/trump-trade-war-timeline.pdf>.

¹²Bahuguna, Anwiti. “Trade Wars or Strong U.S. Growth?” *Columbia Threadneedle Investments*, July 31, 2018, <https://seekingalpha.com/article/4192318-trade-wars-strong-u-s-growth>.

¹³Tankersly, Jim & Irwin, Neil. “Fed Raises Interest Rates and Signals 2 More Increases Are Coming.” *The New York Times*, June 13, 2018, <https://www.nytimes.com/2018/06/13/us/politics/federal-reserve-raises-interest-rates.html>.

Investment Committee Initiatives

New Members

Sherry Lynn Kremer was elected to serve as one of two KRS Board of Trustees representatives from the Kentucky Employees Retirement System (KERS) in March 2018, and was appointed to the Investment Committee by the Board.

Continued Restructuring of Absolute Return Investments

Staff continued their work to review and restructure the Absolute Return portfolio. In late 2016, the Investment Committee started a detailed review of the entire Absolute Return portfolio. In March 2017, KRS began to redeem some investments and started to transfer several investments previously held in fund-of-funds vehicles to direct ownership by KRS. In October 2017, new general investment consultant, Wilshire Associates, began their review of the Absolute Return portfolio and provided recommendations to staff in early 2018. In April, staff issued redemption notices to two more funds and on May 7, 2018 KRS issued a full redemption notice to Prisma indicating the desire to fully liquidate the last fund-of-funds investment. Prisma provided KRS a schedule of liquidations on May 18th. They estimate that KRS will receive \$265,300,000 (48.7% of the total) in October 2018, \$159,000,000 in January 2019 (29.2%), \$68,600,000 (12.6%) in July 2019, \$44,100,000 (8.1%) in July 2020, and the remainder in early 2021. Overall hedge fund investments at KRS have been reduced from a high of \$1,646,000,000 in January 2016 down to \$965,325,000 as of May 2018. Of that total, roughly \$600,000,000 is currently in the redemption queue.

Asset Allocation

At the May 1, 2018, Investment Committee meeting the new general consultant, Wilshire Associates, presented their first asset liability study which contained a proposal for new asset allocations for all systems. While this proposal contained a recommendation to increase equity exposure in CERS, KERS Hazardous, and all Insurance plans, it also suggested a substantial reduction to the equity positions in the KERS and SPRS plans because of their severe underfunded status. No action was taken at the meeting because the committee wanted more time to study the recommendations, and asked Wilshire to rerun their analysis for the KERS and SPRS plans to reflect the increased funding recently provided by the legislature. Wilshire was also asked to focus on increasing the probability of the KERS and SPRS plans hitting the assumed rate of return of 5.25% over a 10-year period, while decreasing the annual volatility that those plans are expected to experience. On June 7th, Wilshire presented a new Asset Allocation for those plans, and the recommended allocations for all 10 plans were approved by the Committee.

Assumed Rates of Return

The Investment Committee also made recommendations to the Board to lower the assumed rates of return for each of the systems. The committee reviewed capital market assumptions from eight leading investment and/or consulting firms, e.g., JP Morgan, PIMCO, RVK, Goldman Sachs, and Blackrock. The assumptions from these firms were compared to each system's asset allocation where the resulting portfolio returns were averaged to produce an estimated return for each system. As a result of this work, the Committee recommended lowering the assumed rates of return from 6.75% to 5.25% for the KERS Non-Hazardous and SPRS pension plans to more realistically reflect those systems' need to reduce volatility and increase the liquidity of the investments. For all other plans, the committee recommended a reduction from 7.5% to 6.25%. These recommendations were approved by the Board at their May and July 2017 meetings.

Investment Consultant

In May 2017 the Investment Committee asked staff to issue a Request for Proposal (RFP) for new investment consulting services. The Investment Committee felt that KRS might be able to increase service levels and reduce consulting fees by switching to a single consultant to work across all asset classes except Real Estate. An RFP was issued in June 2017, and eight out of nine of the largest investment consulting firms in the U.S. responded. The responses were scored by an internal review committee and four finalists were selected for in-person interviews with the selection committee. The committee recommended that Wilshire Associates be hired as the new investment consultant for all asset classes except for Real Estate; the committee continued to retain the incumbent Real Estate manager, ORG Portfolio Management, for this asset class. This recommendation was approved by the Investment Committee in August 2017 and the Board at its September 2017 meeting.

Senate Bill 2

In March 2017, the Kentucky Legislature passed a new set of pension system transparency requirements, collectively known as Senate Bill 2 (SB 2). This new legislation required:

- Posting all investment contracts to the KRS website;
- Investment managers working for the systems to adhere to the CFA Asset Manager Code of Conduct and the CFA Standards of Professional Conduct;
- All KRS Trustees to adhere to the CFA Institute Code of Conduct for Pension Scheme Governing Bodies; and,
- KRS to develop a procurement policy for all investment services and to have that policy approved by the Finance and Administration Cabinet as being representative of industry best practice.

Staff from both the Investments and Legal departments have worked diligently to implement these new requirements. A new Procurement Policy was developed with the Finance and Administration Cabinet and approved by the Board in September 2017. The Investment staff has begun to contact each of manager to inform them of the new requirements and to request minimally redacted copies of investment management contracts. The KRS Communications staff created a section on KRS' website to host these contracts and continue to collect and post them as they become available.

Investment Activity

- New State Capital Partners Fund II (Private Equity): The Investment Committee approved a \$25 million investment in the Fund at the February 6, 2018, meeting; however, due to the requirements of 2017 SB2, New State declined to accept our investment.
- Davidson Kempner (DK) LP (Absolute Return): In March 2018, KRS received notice from DK requesting KRS to withdraw the ~\$70 million investment in the fund, citing the SB2 requirements and recent litigation involving KRS as the reason.
- Equity Reduction (Public Equities): At the beginning of April 2018, staff conducted another equity reduction trade, removing roughly \$365 million of exposure (Pension \$250 million, Insurance \$115 million).
- Manulife Global Fixed Income (Core Fixed Income): In April 2018, KRS sent an additional deposit of \$135 million to the existing Manulife Global Bond portfolio. These funds were the result of a reduction to the Public Equity exposure at the beginning of the month.
- BNY Mellon Intermediate Credit Index CTF (Core Fixed Income)– On April 18, 2018, KRS made an additional deposit of \$288 million to the BNY Int Credit Index Fund. These funds were the result of a reduction to the Public Equity exposure at the beginning of the month.
- Shenkman Capital (US Bank Loans) – On May 22, 2018, staff made an additional deposit of \$40 million to Shenkman.

Investment Summary

The KRS Board is charged with the responsibility of investing the Kentucky Retirement Systems (Systems) assets to provide benefits to the members of the Systems. To achieve this goal, the Board follows an investment policy that thoughtfully grows the asset base while at the same time protects against undue risks and losses in all investment areas. The Board recognizes its fiduciary duty not only to invest the funds in compliance with the Prudent Person Rule, but to also manage the funds while recognizing the long-term nature of the Systems' investments. In order to carry out their fiduciary duties the Board has created clearly defined investment policies, objectives, and strategies for both the Pension and Insurance portfolios.

Investment Policy

As of June 30, 2018, the KRS Pension Funds aimed for the following asset allocations for each system: 17.5% of the assets in U.S. Equities; 17.5% in broad market International Equities; 4.0% (10.0% for KERS Non-Hazardous and SPRS) in Global Fixed Income; 24.0%(17.0% for KERS Non-Hazardous and SPRS) in Credit Fixed Income; 10.0% in Private Equity; 10.0% in Real Return; 10.0% in Absolute Return; 5.0% in Real Estate; and, 2.0%(3.0% for KERS Non-Hazardous and SPRS) in Cash or Short-Term Securities. As of June 30, 2018, the KRS Insurance Fund's allocation policy set investment goals of: 17.5% of the assets in U.S. Equities; 17.5% in broad market International Equities; 4.0% in Global Fixed Income; 24.0% in Credit Fixed Income; 10.0% in Private Equity; 10.0% in Real Return;

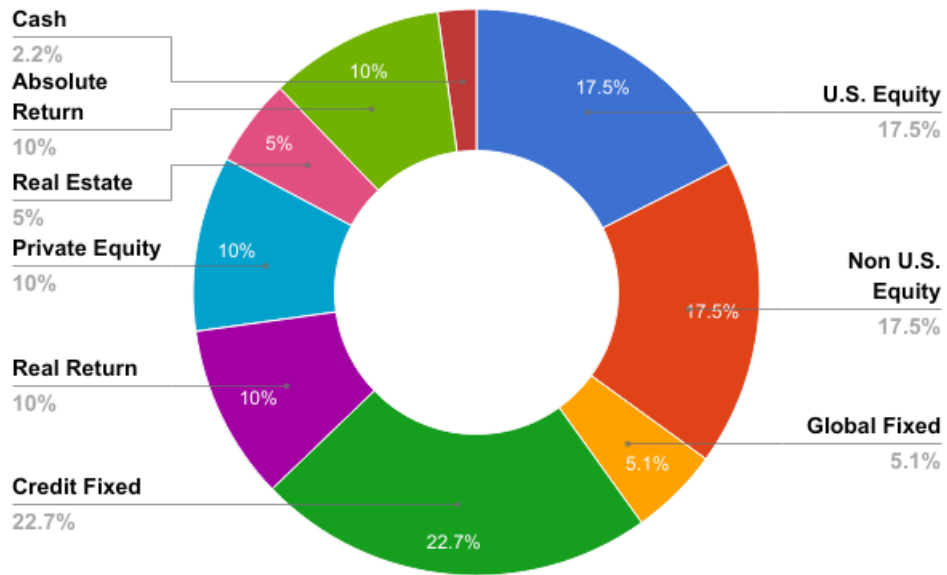
10.0% in Absolute Return; 5.0% in Real Estate; and, 2.0% in Cash or Short-Term Securities.

The following charts represent the composites for the total Pension and Insurance funds (dollar weighted by plan).

Pension Board Policy vs. Actual Asset Allocation As of June 30, 2018 (\$ in Thousands)

	Total Plan	U.S. Equity	Non U.S. Equity	Global Fixed	Credit Fixed	Real Return	Private Equity	Real Estate	Absolute Return	Cash
Policy's Pension Asset Allocation	100.00%	17.50%	17.50%	5.10%	22.70%	10.00%	10.00%	5.00%	10.00%	2.20%
Actual Pension Asset Allocation	100.00%	17.27%	21.08%	19.95%	10.27%	8.60%	9.88%	3.55%	5.71%	3.69%

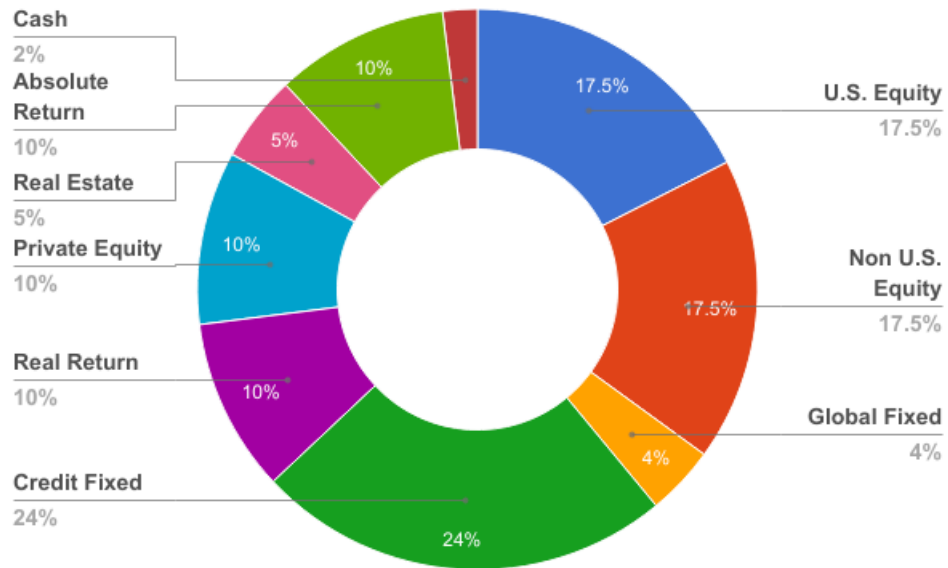
Assets Allocation Policy - Pension



Insurance Board Policy vs. Actual Asset Allocation As of June 30, 2018 (\$ in Thousands)

	Total Plan	U.S. Equity	Non U.S. Equity	Global Fixed	Credit Fixed	Real Return	Private Equity	Real Estate	Absolute Return	Cash
Policy's Insurance Asset Allocation	100.00%	17.50%	17.50%	4.00%	24.00%	10.00%	10.00%	5.00%	10.00%	2.00%
Actual Insurance Asset Allocation	100.00%	18.31%	22.02%	19.44%	9.46%	8.68%	10.29%	3.47%	5.57%	2.76%

Asset Allocation Policy - Insurance



Investment Strategies

Diversification

KRS portfolios are diversified on several levels, primarily through the use of the aforementioned multiple asset classes. Asset allocations are revisited on a periodic basis and represent an efficient allocation to maximize returns and minimize risks at a level appropriate for each system. The individual asset classes are diversified through the use of multiple portfolios that are managed by both the Investment Division Staff and external Investment Advisors. Finally, portfolios within each of the asset classes are diversified through both investment styles and the selection of individual securities. Each portfolio advisor is afforded discretion to diversify its portfolio(s) within the parameters established by the KRS Board.

Rebalancing

Proper implementation of the investment policy requires that a periodic adjustment, or rebalancing, of assets be made to ensure conformance with KRS' Investment Policy Statement (IPS) target levels. Such rebalancing is necessary to reflect sizable cash flows and performance imbalances among asset classes and investment advisors. KRS' rebalancing policies call for an immediate rebalancing to within its allocation ranges if an asset class exceeds or falls outside its allowable range as defined in the IPS. As the previous charts depict, there were several asset classes that were significantly out of range; however, this was a result of rebalancing, e.g. this fiscal year the Investment Committee instructed staff to focus funding on Fixed Income rather than Absolute Returns.

Investments Performance Review Procedures

At least once each quarter, the Investment Committee, on behalf of the KRS Board, reviews the performance of the portfolio to determine compliance with the Statement of Investment Policy. The Investment Committee also reviews a report created and presented by the KRS Compliance Officer who is part of the independent Internal Audit Division. The Compliance Officer performs tests daily, monthly, and quarterly to assure compliance with the restrictions imposed by the ISP.

Investment Consulting

The Board employs industry leading external consultants to assist in determining and reviewing the asset allocation guidelines. Consultants also provide performance reports for both the internally managed and externally managed assets. A letter from each consulting firm utilized follows this section and each provides a discussion of current allocations, performance, and significant changes during the fiscal year.

Investment Objectives

The investment objectives of the portfolios are to produce results that exceed the stated goals over both short-term and long-term periods.

- **Shorter-Term** (5 years and less): The returns of the particular asset classes of the managed funds of the Systems, measured on an annual basis, should exceed the returns achieved by a policy benchmark portfolio composed of comparable unmanaged market indices.
- **Medium-Term** (5 to 20 years): The returns of the particular asset classes of the managed funds of the Systems, measured on a rolling year basis, should exceed the returns achieved by a policy benchmark portfolio composed of comparable unmanaged market indices and perform above the median of an appropriate peer universe, if there is one.
- **Longer-Term**: The total assets of the Systems should achieve a return of 5.25% for KERS Non-Hazardous and SPRS pensions and 6.25% for all other Pension and Insurance plans. This is measured for 20 years and beyond and should exceed the actuarially required rate of return as well as the return achieved by its total fund benchmark.

In keeping with the KRS Board's fiduciary responsibility, where all else is equal, the Board encourages the investment of the Systems' assets in securities of corporations that provide a positive contribution to the economy of the Commonwealth of Kentucky.

This section was prepared by the KRS Interim Chief Investment Officer and Investment staff members with support from the KRS' Investment Committee. Information reported in the respective schedules and supplemental information was provided by our investment consultants and custodial bank.

Investment Results

For the purposes of this report, total fund return information is net of investment manager fees with audited data beginning in July 2011. At the manager or individual account level, returns are net of fees beginning in July 2011 and gross of fees are used for prior historical data. All rates of return are calculated using time-weighted rates of return.

Fiscal Year 2018 Results

For the fiscal year ending on June 30, 2018, the KRS Pension Funds earned a net return of 8.57%, outpacing its benchmark return of 7.91%. The KRS Insurance Funds return for that period earned a return net of fees of 9.1% compared to the 8.48% benchmark.

Net Returns By System: Pension Fund As of June 30, 2018 (\$ in Thousands)

Plan	Market Value	% of Total	1 Year		3 Years		5 Years		10 Years		Inception		
			KRS	Index	KRS	Index	KRS	Index	GANIR	KRS	Index	KRS	Index
KERS	\$2,007,002	16.33%	7.50	7.15	6.17	6.50	7.19	7.24	2.00	5.96	6.31	9.07	9.20
KERS HAZ	647,918	5.27%	8.68	8.22	7.14	6.91	7.70	7.52	2.65	6.21	6.45	9.15	9.24
CERS	7,033,654	57.22%	8.75	8.22	7.18	6.91	7.71	7.52	2.54	6.22	6.45	9.15	9.24
CERS HAZ	2,345,934	19.09%	8.77	8.22	7.21	6.90	7.73	7.52	2.75	6.23	6.45	9.15	9.24
SPRS	256,966	2.09%	7.65	7.68	6.06	6.54	7.04	7.28	2.21	5.89	6.34	9.05	9.20
Total	\$12,291,474	100.00%	8.57	7.91	7.01	6.86	7.63	7.57		6.18	6.48	9.14	9.25

Net Returns By System: Insurance Fund As of June 30, 2018 (\$ in Thousands)

Plan	Market Value	% of Total	1 Year		3 Years		5 Years		10 Years		Inception	
			KRS	Index	KRS	Index	KRS	Index	KRS	Index	KRS	Index
KERS	\$834,386	16.25%	7.96	8.43	6.92	7.09	7.23	7.66	5.31	5.95	7.39	7.79
KERS HAZ	512,697	9.99%	8.88	8.60	7.31	7.16	7.69	7.73	5.54	5.98	7.46	7.80
CERS	2,333,374	45.45%	9.21	8.60	7.46	7.18	7.79	7.76	5.59	5.99	7.48	7.80
CERS HAZ	1,264,027	24.62%	9.32	8.60	7.55	7.18	7.84	7.76	5.61	5.99	7.49	7.80
SPRS	189,075	3.68%	9.34	8.60	7.53	7.19	7.82	7.77	5.60	6.00	7.49	7.80
Total	\$5,133,559	100.00%	9.05	8.48	7.40	7.22	7.71	7.90	5.55	6.06	7.47	7.83

Benchmarks

The Kentucky Retirement Systems Pension and Insurance Funds' benchmarks are weighted averages that are composites of the various asset class indices that exist within each of KRS' investment portfolios. KRS uses the Modified Dietz Method as its basis for calculations, which is used to determine the performance of an investment portfolio based on a time weighted cash flow. The various asset class benchmarks are shown below:

Benchmarks			
As of June 30, 2018 (\$ in Thousands)			
Index		Pension	Insurance
Russell 3000	U.S. Equity	17.50%	17.50%
MSCI ACWI Ex-US IMI	Non U.S. Equity	17.50%	17.50%
Barclays Universal Index	Global Fixed Income	5.10%	4.00%
Barclays U.S. High Yield	Credit Fixed Income	22.70%	24.00%
NCREIF ODCE	Real Estate	5.00%	5.00%
HFRI Diversified FOF	Absolute Return	10.00%	10.00%
Custom-Allocation Specific	Real Return	10.00%	10.00%
Actual Performance	Private Equity < 5 years	10.00%	10.00%
Russell 3000 Quarter Lagged + 300 bps	Private Equity > 5 years	10.00%	10.00%
Cit Grp 3-mos Treasury Bill	Cash	2.20%	2.00%

Note: These benchmarks are intended to be objective, measurable, investable/replicable, and representative of the investment mandates. The benchmarks are developed from publicly available information and accepted by the investment advisor and KRS as the neutral position consistent with the investment mandate and status. KRS' Investment Staff and Consultants recommend the indices and benchmarks, which are reviewed and approved by the Investment Committee and ratified by the KRS Board. It is anticipated that as KRS continues to diversify through other markets and asset classes, both the Pension and Insurance Fund Total benchmarks will evolve to reflect these exposures.

Long-Term Results

The schedule below details annual returns over the last ten years. Returns range from a minimum of -17.21% in 2009 to a maximum of 18.96% in 2011. For the year ending June 30, 2018, the KRS total Pension Fund portfolio earned the then current annualized net returns. As previously noted, beginning with the 2017 valuation, the Board lowered the actuarial required rates of return for KERS and SPRS to 5.25% and 6.25% return for CERS Non-Hazardous, CERS Hazardous, and KERS Hazardous. The growth of a dollar chart below displays the differences between \$1,000 invested in 2009 at an assumed rate of return of 5.25% for KRS and SPRS and 6.25% for CERS Non-Hazardous, CERS Hazardous, and KERS Hazardous, where an investment of \$1,000 would have earned \$1,890 for KERS Non-Hazardous and SPRS and \$1,922 for CERS Non-Hazardous, CERS Hazardous, and KERS Hazardous. Further, the Pension Fund Growth chart indicates that the total Pension Fund would have earned \$2,209 per \$1,000.

Pension Fund Growth

As of June 30, 2018 (in Whole \$)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Fund Return	-17.21%	15.81%	18.96%	0.14%	10.82%	15.55%	2.01%	-0.52%	13.47%	8.57%
Performance BM	-14.88%	13.16%	20.34%	0.90%	11.21%	14.91%	3.13%	-0.19%	13.28%	7.91%
Actuarial Assumed ROR CERS, CERS-H, and KERS-H	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.50%	7.50%	6.25%
Actuarial Assumed ROR KERS and SPRS	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.50%	6.75%	5.25%
KRS Pension Fund	\$1,000	\$1,158	\$1,378	\$1,380	\$1,529	\$1,767	\$1,802	\$1,793	\$2,034	\$2,209
Performance Benchmark	1,000	1,132	1,362	1,374	1,528	1,756	1,811	1,807	2,047	2,209
Actuarial Assumed ROR CERS, CERS-H, and KERS-H	1,000	1,078	1,161	1,251	1,348	1,452	1,565	1,682	1,809	1,922
Actuarial Assumed ROR KERS and SPRS	\$1,000	\$1,078	\$1,161	\$1,251	\$1,348	\$1,452	\$1,565	\$1,682	\$1,796	\$1,890

The chart below shows annual returns for the Insurance Fund since June 30, 2009, where returns range from a minimum of -23.18% in 2009 to a maximum of 23.47% in 2011. As of June 30, 2018, the Insurance Fund portfolios earned an annualized total net return of 9.05% versus the benchmark annualized return of 8.48%. The chart below indicates that the performance of \$1,000 invested in the Insurance portfolios would grow to \$2,237, the policy benchmark to \$2,358, and the actuarial assumption to \$1,922 over the 10 year period.

Insurance Fund

As of June 30, 2018 (in Whole \$)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Fund Return	-23.18%	15.46%	23.47%	-1.71%	10.11%	14.89%	1.86%	-0.09%	13.72%	9.05%
Performance BM	-23.15%	13.07%	26.93%	0.58%	11.05%	15.03%	3.79%	0.03%	13.55%	8.48%
Actuarial Assumed ROR	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.50%	7.50%	6.25%
KRS Insurance Fund	\$1,000	\$1,155	\$1,426	\$1,401	\$1,543	\$1,773	\$1,806	\$1,804	\$2,051	\$2,237
Performance Benchmark	1,000	1,131	1,435	1,444	1,603	1,844	1,914	1,914	2,174	2,358
Actuarial Assumed ROR	\$1,000	\$1,078	\$1,161	\$1,251	\$1,348	\$1,452	\$1,565	\$1,682	\$1,809	\$1,922

U.S. Equity

For the fiscal year ending June 30, 2018, the KRS Pension Funds' U.S. Equity portfolio posted a return of 14.52% versus the benchmark return of 14.78%. The KRS Insurance U.S. Equity portfolio posted a return of 14.42% compared to the benchmark return of 14.78%. Since inception, performance has remained sound. The Pension Fund's Public Equity portfolio has generated an annualized return of 11.36% throughout its duration against a benchmark with an annualized return of 11.39%. The Insurance Fund has returned 9.74% since inception, while the benchmark returned 9.61%.

Return on U.S. Equity As of June 30, 2018

	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Apr-84	14.52%	11.08%	12.66%	9.97%	11.36%
Performance Benchmark		14.78%	11.58%	13.29%	10.34%	11.39%
KRS Insurance	Jul-92	14.42%	11.40%	12.83%	9.91%	9.74%
Performance Benchmark		14.78%	11.58%	13.29%	10.19%	9.61%

Note: Pension and Insurance benchmark is the Russell 3000.

2018 Top 10 U.S. Equity Holdings

Pension Funds

As of June 30, 2018 (\$ in Thousands)

Company	Shares	Market Value
APPLE INC	251,326	\$46,523
MICROSOFT CORP	387,902	38,251
AMAZON.COM INC	21,243	36,109
FACEBOOK INC	132,506	25,749
BERKSHIRE HATHAWAY INC	130,213	24,304
ALPHABET INC-CL C	16,642	18,567
ALPHABET INC-CL A	16,173	18,262
JPMORGAN CHASE & CO	160,595	16,734
EXXON MOBIL CORP	195,232	16,152
VISA INC	120,062	15,902
Total	1,431,894	\$256,553

2018 Top 10 U.S. Equity Holdings

Insurance Fund

As of June 30, 2018 (\$ in Thousands)

Company	Shares	Market Value
APPLE INC	111,549	\$20,649
MICROSOFT CORP	172,141	16,975
AMAZON.COM INC	9,428	16,026
FACEBOOK INC	58,820	11,430
BERKSHIRE HATHAWAY INC	58,116	10,847
ALPHABET INC-CL C	7,388	8,242
ALPHABET INC-CL A	7,180	8,108
JPMORGAN CHASE & CO	71,215	7,421
EXXON MOBIL CORP	86,586	7,163
VISA INC	53,313	7,061
Total	635,736	\$113,922

A complete list of holdings is located at <https://kyret.ky.gov/Investments/Investments-Library/Pages/Investments-Holdings.aspx>.

Non-U.S. Equity

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Non-U.S. Equity portfolio returned 10.86%, compared to its benchmark of 7.84%. The KRS Insurance Non-U.S. Equity portfolio returned 10.63% versus its benchmark of 7.84% during the same twelve-month period. Non-U.S. Equity investors have experienced a volatile period of returns over the past several years as a result of geopolitical issues, commodity price swings, and currency valuation moves. Even so, over the past five years both funds have outperformed their respective benchmarks. The KRS Pension and Insurance Funds posted annualized returns for the period of 7.24% and 7.13% respectively, compared to the benchmark's return of 6.50%. The Systems began their Non-U.S. Equity program in 2000. Since inception, the Pension Non-U.S. Equity portfolio has underperformed the benchmark, while the Insurance Non-U.S. Equity portfolio has outperformed the benchmark.

Return on Non-U.S. Equity

As of June 30, 2018

	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Jul-00	10.86%	6.85%	7.24%	3.74%	3.28%
Performance Benchmark		7.84%	5.60%	6.50%	3.26%	3.54%
KRS Insurance	Apr-00	10.63%	6.77%	7.13%	3.34%	3.25%
Performance Benchmark		7.84%	5.60%	6.50%	2.91%	2.69%

Note: Pension and Insurance benchmark is the MSCI ACWI ex-US IMI.

2018 Top 10 Non-U.S. Equity Holdings

Pension Funds

As of June 30, 2018 (\$ in Thousands)

Company	Shares	Market Value
CSL LTD	148,170	\$21,087
DIAGEO PLC	520,235	18,696
DON QUIJOTE HOLDINGS CO LTD	366,600	17,608
HDFC BANK LTD	159,750	16,777
UMICORE SA	291,260	16,714
SYMRISE AG	190,140	16,672
KBC GROUP NV	211,080	16,295
BOMBARDIER INC	3,918,990	15,492
FERGUSON PLC	186,099	15,110
START TODAY CO LTD	411,700	14,923
Total	6,404,024	\$169,374

2018 Top 10 Non U.S. Equity Holdings

Insurance Fund

As of June 30, 2018 (\$ in Thousands)

Company	Shares	Market Value
CSL LTD	64,290	\$9,150
DIAGEO PLC	228,243	8,202
DON QUIJOTE HOLDINGS CO LTD	160,600	7,714
UMICORE SA	127,450	7,314
KBC GROUP NV	92,700	7,156
HDFC BANK LTD	67,520	7,091
SYMRISE AG	80,530	7,061
BOMBARDIER INC	1,721,890	6,807
FERGUSON PLC	81,810	6,643
UBISOFT ENTERTAINMENT SA	59,513	6,530
Total	2,684,546	\$73,668

A complete list of holdings is located at <https://kyret.ky.gov/Investments/Investments-Library/Pages/Investments-Holdings.aspx>.

Fixed Income

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Fixed Income portfolio returned 1.41% versus the benchmark return of 1.17%. The KRS Insurance Fixed Income portfolio posted a 1.34% rate of return, which outperformed the index by 0.17%. Over the five-year period, the Pension Funds underperformed the benchmark while the Insurance Fund lagged behind the benchmark of 4.40%. Over the ten-year period, the Pension Funds outperformed the benchmark by 0.11% while the Insurance Fund has trailed the benchmark by 0.07%.

Return on Fixed Income

As of June 30, 2018

Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	April-84	1.41%	4.22%	4.21%	4.90%	7.50%
Performance Benchmark	December-99	1.17%	5.08%	4.40%	4.79%	7.32%
KRS Insurance	July-92	1.34%	4.10%	3.78%	4.42%	6.32%
Performance Benchmark	December-99	1.17%	5.08%	4.40%	4.49%	6.30%

Note: Pension and Insurance benchmark is Barclays Universal Index (Global) and Barclays U.S. High Yield (High Yield).

2018 Top 10 Fixed Income Holdings

Pension Funds

As of June 30, 2018 (\$ in Thousands)

Issuer	Par Value/ Shares	Base Market Value
EB DV INT CRED BOND IDX FD	2,409	\$881,383
INTERMEDIATE TERM CREDIT BD IDX	9,156	493,981
MARATHON BLUEGRASS LP	313,254	313,254
U S TREASURY NOTE	215,210	212,215
EB TEMP IVN FD	170,533	170,533
CERBERUS KRS LEVERED LOAN OPP	85,666	85,666
H/2 CREDIT PARTNERS LP	85,337	85,337
MESA WEST CORE LENDING FUND LP	58,547	58,547
U S TREASURY BOND	54,630	56,457
COMMIT TO PUR FNMA SF MTG	42,177	39,968
Total	1,036,919	\$2,397,341

2018 Top 10 Fixed Income Holdings

Insurance Fund

As of June 30, 2018 (\$ in Thousands)

Issuer	Par Value/ Shares	Base Market Value
MARATHON BLUEGRASS LP	436,642	\$436,642
EB DV INT CRED BOND IDX FD	971	355,255
U S TREASURY NOTE	302,985	298,772
INT TERM CREDIT BOND INDEX NL	5,945	218,217
EB TEMP IVN FD	185,343	185,343
U S TREASURY BOND	76,820	79,433
COMMIT TO PUR FNMA SF MTG	47,865	39,968
CERBERUS KRS LEVERED LOAN OPP	36,714	36,714
COMMIT TO PUR GNMA II JUMBOS	43,134	35,831
MESA WEST CORE LENDING FUND LP	34,694	34,694
Total	1,171,113	\$1,720,869

Note: A complete list of holdings is located at <https://kyret.ky.gov/Investments/Investments-Library/Pages/Investments-Holdings.aspx>.

Private Equity

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Private Equity portfolio posted a return of 14.5%. The portfolio consists primarily of investments within Private Equity limited partnerships. The Insurance Private Equity portfolio returned 18.3%. The Investment Committee determined that the short-term benchmark (1-, 3-, & 5-year) should match actual performance experienced by the portfolios because of the difficulty in assessing short-term returns. Performance is typically based on appraisals of a business's value, so managers are often slow to mark valuations up or down. This can distort relative performance against a public market benchmark when that index moves dramatically. A better indication of the performance of the program would be the mid- to longer-term time periods because businesses have likely been sold and transacted at a true price (rather than estimate of value), which provides a better performance measurement.

For the five years ending June 30, 2018, the Pension and Insurance Funds' Private Equity portfolios returned 12.9% and 15.59%, respectively. For the ten-year period, the Pension Fund trailed its benchmark by 4.6%; the Insurance Fund underperformed by 1.8%. Since its inception in October 1990, the Pension portfolio has underperformed compared its benchmark by 0.14%, while the Insurance portfolio has underperformed compared to its benchmark since its July 2001 inception by 0.5%.

Return on Private Equity

As of June 30, 2018

Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Oct-90	14.52%	10.84%	12.87%	8.80%	11.17%
Performance Benchmark		14.52%	10.84%	12.87%	13.38%	11.31%
KRS Insurance	Jul-01	18.34%	13.85%	15.59%	11.02%	10.26%
Performance Benchmark		18.34%	13.85%	15.59%	12.80%	10.73%

Note: Pension and Insurance Benchmark 5 years and beyond is the Russell 3000 Lagged + 300bps. For shorter term periods, the benchmark matches actual performance experienced.

Real Estate

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Real Estate portfolio saw returns of 11.22%, exceeding its benchmark return of 7.11%. The KRS Insurance Real Estate portfolio also surpassed the benchmark, returning 11.14% compared to 7.11%. For the five years ending June 30, 2018, both the Pension and Insurance Fund portfolios underperformed the benchmarks return by 1.19%, respectively.

Return on Real Estate

As of June 30, 2018

Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Jul-84	11.22%	10.09%	9.23%	8.34%	6.10%
Performance Benchmark		7.11%	9.00%	10.42%	4.16%	6.46%
KRS Insurance	May-09	11.14%	10.44%	9.23%		9.22%
Performance Benchmark		7.11%	9.00%	10.42%		5.98%

Note: Pension and Insurance benchmark is NCREIF ODCE

Real Return

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Real Return portfolio returned 1.96% versus its benchmark return of 1.23%. The KRS Insurance Real Return portfolio posted a return of 1.87%, while the benchmark returned 1.33% for the period. Over the past three years, the Pension and Insurance Real Return portfolios have outperformed their respective benchmarks by 1.35% and 1.03%.

Return on Real Return

As of June 30, 2018 (\$ in Thousands)

Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Jul-11	1.96%	3.49%	3.01%		3.70%
Performance Benchmark		1.23%	2.40%	1.72%		2.52%
KRS Insurance	Jul-11	1.87%	3.31%	2.84%		3.42%
Performance Benchmark		1.33%	2.28%	1.83%		2.60%

Note: Pension and Insurance benchmark is Custom - Allocation Specific.

Absolute Return and Alternative Assets

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Absolute Return portfolio was 5.52% versus its benchmark which was 5.39%. The KRS Insurance Absolute Return portfolio returned 5.54%, while the benchmark was 5.39% for the period. For the five years ending June 30, 2018, the Pension and Insurance portfolios outperformed their respective benchmarks. Since inception, the Pension and Insurance portfolio has outperformed the benchmark by 1.06% and .99%, respectively. The portfolio was comprised of three fund-of-funds and 26 direct investments. However, over the past few fiscal years the fund-of-funds have been transitioned into direct relationships. As of June 30, 2018, the portfolios consist of only direct relationships.

Return on Absolute Return						
As of June 30, 2018 (\$ in Thousands)						
Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Apr-10	5.52%	1.40%	3.59%		4.15%
Performance Benchmark		5.39%	1.58%	3.15%		3.09%
KRS Insurance	Apr-10	5.54%	1.41%	3.59%		4.08%
Performance Benchmark		5.39%	1.58%	3.15%		3.09%

Note: Pension and Insurance benchmark is the HFRI Diversified FOF.

2018 Top 10 Alternative Assets Holdings Pension Funds		
As of June 30, 2018 (\$ in Thousands)		
Issuer	Sub Asset Class	Market Value
PRISMA CAPITAL	ABS RET	\$383,946
PIMCO ALL ASSET FUND-INST	REAL RET	346,428
US TREAS-CPI INFLAT	REAL RET	218,095
BAY HILLS EMERGING PARTNERS	PVT EQ	108,890
STOCKBRIDGE FUND LP	REAL EST	85,523
HARRISON STREET CORE PROPERTY	REAL EST	79,865
PROLOGIS TARGETED US LOGISTICS	REAL EST	74,227
HORSLEY BRIDGE INTERNATIONAL V	PVT EQ	64,094
BLACKSTONE CAPITAL PARTNERS VI	PVT EQ	59,307
BAY HILLS EMERGING PTNRS II-B	PVT EQ	55,855
Total		\$1,476,230

2018 Top 10 Alternative Assets Holdings Insurance Fund		
As of June 30, 2018 (\$ in Thousands)		
Issuer	Sub Asset Class	Market Value
PRISMA CAPITAL	ABS RET	\$159,485
PIMCO ALL ASSET FUND-INST	REAL RET	141,217
US TREAS-CPI INFLAT	REAL RET	113,899
SECONDARY OPP FUND III LP	PVT EQ	53,757
BAY HILLS EMERGING PARTNERS	PVT EQ	44,279
KAYNE ANDERSON ENER FD VII LP	PVT EQ	42,664
BLACKSTONE CAPITAL PARTNERS VI	PVT EQ	39,538
STOCKBRIDGE FUND LP	REAL EST	36,950
HARRISON STREET CORE PROPERTY	REAL EST	34,664
PROLOGIS TARGETED US LOGISTICS	REAL EST	29,396
Total		\$695,849

A complete list of holdings is located at <https://kyret.ky.gov/Investments/Investments-Library/Pages/Investments-Holdings.aspx>.

Cash

For the fiscal year ending June 30, 2018, the KRS Pension Funds' Cash portfolio returned 1.90%, outpacing its benchmark, the Citi-Group 3-month Treasury, by 0.57%. The KRS Insurance Cash portfolio also outperformed the index, posting a return of 1.57% during the same 12-month period.

As the accompanying table indicates, the longer-term results from the Cash portfolios have performed well compared to their benchmark. For the five years ending June 30, 2018, the Pension Fund's portfolio has outperformed its custom benchmark by 0.57% on an annualized basis. Since its inception, the portfolio has exceeded its benchmark by 0.45% per year. The Insurance portfolio has also done very well, exceeding its benchmark return over the five-year and since inception periods by 0.20% and 0.13%, respectively.

Return on Cash

As of June 30, 2018

Portfolio	Inception Date	Fiscal Year	3-Year	5-Year	10-Year	Inception
KRS Pension	Jan-88	1.90%	1.12%	0.82%	0.77%	3.59%
Performance Benchmark		1.33%	0.64%	0.39%	0.31%	3.14%
KRS Insurance	Jul-92	1.57%	0.83%	0.59%	0.49%	2.64%
Performance Benchmark		1.33%	0.64%	0.39%	0.31%	2.51%

Note: Pension and Insurance benchmark is the Citi Group 3-month Treasury.

Additional Schedules

In the following pages are additional schedules which include the assets under management for each firm the Systems employs, external investment-related expenses, commissions paid, and portfolio summaries for each of the five Pension and Insurance plans for the fiscal year ending June 30, 2018. This section is followed by a letter from KRS' investment consultants.

Investment Advisors & Assets Under Management

As of June 30, 2018 (\$ in Thousands)

Advisor	Assets Under Management
American Century Investments	\$507,417
AMERRA Capital Management	101,506
Anchorage Capital	39,045
Arbor Investments	4,711
Arcano Capital	35,501
ARES Capital	19,819
Arrowmark	17,600
Bay Hills Emerging Partners	240,493
Black Diamond Capital Management	45,513
BlackRock ACWI Ex-US	1,509,949
Blackstone Capital Partners	114,946
Boston Company	888
BNY IG Credit Unit	1,236,638
BNY Mellon Accruals	(544)
BSP Private Credit	44,425
BTG Pactual	25,111
Cash Accounts	595,341
Cerberus	122,380
CM Growth Capital Partners	11,780
Coatue	30,140
Columbia Asset Management	295,336
Columbia Capital	4,542
Credit Suisse	43,899
Crestview Partners	78,708
CVC Capital Partners	34,624
DAG Ventures	127,917
Davidson-Kempner	68,380
DB Secondary Opportunities	71,676
DCM	14,731
DivcoWest	6,166
DSAM Capital Partners	410
Essex Woodland	15,722
Franklin Templeton	382,730
Fundamental Partners	48,056
Gotham Neutral Strategies	19,013

Investment Advisors & Assets Under Management

As of June 30, 2018 (\$ in Thousands)

Advisor	Assets Under Management
Governor's Lane	30,641
Green Equity Investors	136,524
Greenfield Acquisition Partners	53,719
GTCR Golder Rauner	7,283
H&F Spock	4,469
H/2 Credit Partners	118,524
Harrison Street	114,529
Harvest Partners	57,625
Hellman & Friedman	2,208
H.I.G Capital	41,540
Horsley Bridge International	72,068
IG Credit FI Unit	712,198
Institutional Venture Partners	11,405
Internal TIPS	340,669
Internal US Mid Cap	191,358
Invesco	1
JW Childs Equity	2
Kayne Anderson	85,329
KCP Capital	11,431
Keyhaven Capital Partners	41,087
Knighthead Capital	4,720
Lazard Asset Management	665,779
Levine Leichtman	80,171
Liquidalts H2O Force	22,828
Loomis, Sayles & Company	100
LSV Asset Management	567,872
Lubert-Adler	66,960
Luxor Capital	2,714
Magnetar Capital	25,642
Manulife Financial	679,986
Marathon Bluegrass	436,642
Matlin Patterson	22,102
Merit Capital Partners	7,450
Mesa West	108,841
MHR Institutional Advisors	1,789
Mill Road Capital	20,300
Myriad Opportunities	68,430
New Mountain Partners	73,228
NISA Investment Advisors	822,305
Non-US Transition	1,487
Northern Trust Global Investments	357,910
Nuveen Real Asset	298,549
Oak Hill Partners	26,234

Investment Advisors & Assets Under Management

As of June 30, 2018 (\$ in Thousands)

Advisor	Assets Under Management
Oaktree Capital Management	448
Pacific Alternative Asset Management Company	1,080
Patron Capital	20,379
Perimeter Park	7,300
PIMCO	487,856
Pine River Capital	808
Prisma Capital	543,431
Prologis	103,623
Prudential	23,059
Pyramis	2,910
River Road Asset Management	208,150
Riverside Capital	43,785
Rubenstein Capital	24,312
S&P 500	1,418,085
Scientific Beta	416,536
Senator PX	14,392
Shenkman Capital	352,257
SRS Partners	11,291
Stockbridge	121,664
Strategic Value Special Fund	5,124
Sun Capital Partners	527
Systematic Financial Management	355,924
Systematica Bluematrix	17,803
Taurus Mine Finance	25,713
Technology Crossover Ventures	582
Tenaska Power	760
Tide Point Partners	1,634
Tortoise Capital	196,765
Tourbillon Global	10,411
Transition KRS Internal Account	57
Tricadia Select	5,805
Triton Fund	31,052
VantagePoint Capital Partners	10,514
Vista Equity Partners	93,338
Walton Street	47,450
Warburg Pincus	26,699
Waterfall Investment	224,935
Wayzata Investment Partners	17,833
Westfield Capital	197,336
White Oak	44,187
Total	\$17,425,033

Note: Totals reflect external manager assets under management, therefore totals will differ from Total Fair Values.

External Investment Expense - Pension Funds Asset Class/Type Breakdown

As of June 30, 2018 (\$ in Thousands)

	US Public	Non US Equity	Fixed Income	Real Return	Private Equity	Real Estate	Absolute Return	Cash	Total
Fee for Long Balance	\$-	\$11	\$1	\$0	\$1	\$0	\$-	\$-	\$13
Lending Fee Rebate	3,484	147	1,126	(45)	0	0	0	0	4,712
Investment Advisory Fees	2,604	7,843	13,677	5,511	8,785	5,211	6,646	0	50,277
Performance/Incentive Fees	0	0	0	662	22,328	2,618	6,442	0	32,050
Stock Loan Fees	174	94	72	105	0	0	0	0	445
Taxes and Insurance	0	32	7	12	119	0	0	0	170
Administration	195	0	105	0	0	0	0	702	1,002
Miscellaneous	10	15	30	700	3,900	1,724	0	0	6,379
Commission on Future Contracts	2	0	19	1	0	0	0	0	22
Consultant Fees	0	0	0	0	0	0	0	1,385	1,385
Custodial Fees	0	0	0	0	0	0	0	1,299	1,299
	\$6,469	\$8,143	\$15,037	\$6,946	\$35,133	\$9,553	\$13,088	\$3,386	\$97,754

External Investment Expense - Insurance Fund Asset Class/Type Breakdown

As of June 30, 2018 (\$ in Thousands)

	US Public	Non US Equity	Fixed Income	Real Return	Private Equity	Real Estate	Absolute Return	Cash	Total
Fee for Long Balance	\$-	\$3	\$-	\$0	\$0	\$0	\$-	\$-	\$3
Lending Fee Rebate	1,528	45	292	(52)	0	0	0	0	1,813
Investment Advisory Fees	1,149	3,395	4,571	1,692	5,034	2,194	2,642	0	20,677
Performance/Incentive Fees	0	0	524	924	13,259	1,074	2,727	0	18,508
Stock Loan Fees	75	53	21	51	0	0	0	0	200
Administration	85	0	45	0	0	0	0	251	381
Miscellaneous	4	3	15	319	1,766	2,739	0	0	4,846
Taxes and Insurance	0	20	3	4	53	0	0	0	80
Commission on Future Contracts	1	0	7	1	0	0	0	0	9
Consultant Fees	0	0	0	0	0	0	0	569	569
Custodial Fees	0	0	0	0	0	0	0	846	846
	\$2,842	\$3,519	\$5,477	\$2,939	\$20,112	\$6,007	\$5,369	\$1,666	\$47,931

The Governmental Accounting Standards Board recognizes that it may not be possible or cost-beneficial to separate certain investment expenses from either the related investment income or the general administrative expenses of the plan. KRS has displayed all investment related fees and expenses identifiable and captured by our custodial bank, BNY Mellon and KRS staff.

Schedule of Commissions Paid (Whole \$)

As of June 30, 2018

Assets	Total Shares	Commissions Paid	Price per Share
U.S. Equities	62,071,136	\$1,073,139	0.02
Non U.S. Equities	154,664,005	1,422,368	0.01
Total Commissions Paid	216,735,141	\$2,495,507	0.01

External Investment Expenses

As of June 30, 2018 (\$ in Thousands)

Expense	Fees Paid	Share of Assets
Portfolio Management		
Pension Funds	\$95,071	65.26%
Insurance Fund	46,517	31.93%
Custody		
Pension Funds	1,299	0.89%
Insurance Fund	846	0.58%
Consultant		
Pension Funds	1,384	0.95%
Insurance Fund	568	0.39%
Total Pension Funds	97,754	67.10%
Total Insurance Fund	47,931	32.90%
Total Expenses	\$145,685	100.00%

Fair Values By Plan - Pension

As of June 30, 2018 (\$ in Thousands)

	KERS Non-Hazardous		KERS-Hazardous		CERS Non-Hazardous		CERS-Hazardous	
	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV
Assets								
Public Equity	\$662,793	33.02%	\$255,197	39.39%	\$2,779,070	39.51%	\$928,262	39.57%
US Equity	291,301	14.51%	115,515	17.83%	1,256,887	17.87%	419,500	17.88%
Non-US Equity	371,492	18.51%	139,682	21.56%	1,522,183	21.64%	508,762	21.69%
Fixed Income	657,491	32.76%	196,561	30.34%	2,082,039	29.60%	688,636	29.35%
Global	388,611	19.36%	131,051	20.23%	1,404,015	19.96%	465,903	19.86%
Credit	268,880	13.40%	65,510	10.11%	678,024	9.64%	222,733	9.49%
Real Return	160,946	8.02%	55,243	8.53%	610,523	8.68%	208,298	8.88%
Private Equity	238,186	11.87%	62,097	9.58%	666,110	9.47%	227,250	9.69%
Real Estate	67,252	3.35%	24,002	3.70%	253,421	3.60%	81,299	3.47%
Absolute Return	126,119	6.28%	33,733	5.21%	401,279	5.71%	127,289	5.43%
Cash	94,215	4.69%	21,085	3.25%	241,212	3.43%	84,900	3.62%
TOTAL PORTFOLIO	\$2,007,002	100.00%	\$647,918	100.00%	\$7,033,654	100.00%	\$2,345,934	100.00%

Insurance

	KERS Non-Hazardous		KERS-Hazardous		CERS Non-Hazardous		CERS-Hazardous	
	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV
Assets								
Public Equity	\$370,754	44.43%	\$202,614	39.52%	\$921,576	39.50%	\$499,380	39.51%
US Equity	170,728	20.46%	91,675	17.88%	417,048	17.87%	225,953	17.88%
Non-US Equity	200,026	23.97%	110,939	21.64%	504,528	21.62%	273,427	21.63%
Fixed Income	253,315	30.36%	153,483	29.94%	665,283	28.51%	357,662	28.30%
Global	155,662	18.66%	104,229	20.33%	455,325	19.51%	246,995	19.54%
Credit	97,653	11.70%	49,254	9.61%	209,958	9.00%	110,667	8.76%
Real Return	72,913	8.74%	43,055	8.40%	206,949	8.87%	107,545	8.51%
Private Equity	44,753	5.36%	49,164	9.59%	263,477	11.29%	148,301	11.73%
Real Estate	25,726	3.08%	18,847	3.68%	81,827	3.51%	44,780	3.54%
Absolute Return	45,137	5.41%	29,906	5.83%	128,067	5.49%	71,684	5.67%
Cash	21,787	2.61%	15,628	3.05%	66,195	2.84%	34,676	2.74%
TOTAL PORTFOLIO	\$834,385	100.00%	\$512,697	100.00%	\$2,333,374	100.00%	\$1,264,028	100.00%

Fair Values By Plan - Pension
As of June 30, 2018 (\$ in Thousands)

	SPRS		Total	
	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV
Assets				
Public Equity	\$88,989	34.63%	\$4,714,311	38.35%
US Equity	39,919	15.53%	2,123,122	17.27%
Non-US Equity	49,070	19.10%	2,591,189	21.08%
Fixed Income	89,941	35.00%	3,714,668	30.22%
Global	62,565	24.35%	2,452,145	19.95%
Credit	27,376	10.65%	1,262,523	10.27%
Real Return	22,007	8.56%	1,057,017	8.60%
Private Equity	20,821	8.10%	1,214,464	9.88%
Real Estate	9,815	3.82%	435,789	3.55%
Absolute Return	13,285	5.17%	701,705	5.71%
Cash	12,108	4.71%	453,520	3.69%
TOTAL PORTFOLIO	\$256,966	100.00%	\$12,291,474	100.00%

Insurance

	SPRS INS		Total	
	Fair Value (FV)	% of Total FV	Fair Value (FV)	% of Total FV
Assets				
Public Equity	\$75,755	40.07%	\$2,070,079	40.32%
US Equity	34,490	18.24%	\$939,894	18.31%
Non-US Equity	41,265	21.82%	\$1,130,185	22.01%
Fixed Income	54,553	28.85%	\$1,484,296	28.91%
Global	37,081	19.61%	\$999,292	19.46%
Credit	17,472	9.24%	\$485,004	9.44%
Real Return	14,880	7.87%	\$445,342	8.68%
Private Equity	22,499	11.90%	\$528,194	10.29%
Real Estate	7,189	3.80%	\$178,369	3.47%
Absolute Return	11,209	5.93%	\$286,003	5.57%
Cash	2,990	1.58%	\$141,276	2.76%
TOTAL PORTFOLIO	\$189,075	100.00%	\$5,133,559	100.00%

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Wilshire Consultants, Pittsburgh, Pennsylvania



MEMORANDUM

To: Kentucky Retirement Systems
From: Wilshire Associates
Subject: 2017-18 Fiscal Year Investment Portfolio CAFR Letter
Date: September 14, 2018

Economic Review

In September 2017 the Federal Reserve confirmed that they would begin their balance sheet normalization program in the fourth quarter. The market reaction was muted, however, given the steady and telegraphed actions that the Fed has undertaken since the global financial crisis. The program is expected to reduce their holdings by \$10B per month initially, increasing quarterly until reaching \$50B per month in both Treasury and mortgage-backed securities. This slow but steady pace would mirror the Fed's approach to post-2008 conditions.

The third quarter of 2017 was the second consecutive quarter of real GDP growth in excess of 3%, annualized. Businesses seemed to be gaining confidence in the global economy and increased spending on equipment while growing inventories during the quarter, contributing more than three-quarters of a percent to real GDP growth. Real GDP growth clocked in at 2.9%, annualized, for the fourth quarter. The main contributor for the quarter was personal consumption expenditures, adding 2.8%. Growth in consumer spending was the strongest it had been in three years. However, the trade deficit widened considerably, detracting from domestic growth, as imports aided in satisfying consumer demand.

In the first quarter of calendar year 2018, strong jobs reports and wage growth had investors rethinking their inflation expectations and led to concerns that the Federal Reserve might accelerate increases in their short-term rate. While consumer spending is highly interest rate sensitive, the increases in short-term rates that the Federal Reserve had a muted affect to this point. Consumer sentiment remained strong, and low unemployment, rising wage growth and borrowing by households are all positive signals. Real GDP growth slowed during the first quarter of 2018, at 2.2% annualized, but rebounded to 4.2% in Q2 (as of the second estimate on August 29th, 2018) which would be the highest quarterly rate since the third quarter of 2014.

A common measurement of the slope of the yield curve, the 10-year minus 2-year (constant maturity) Treasuries spread, has been on the decline since late 2013 and ended FY2018 at 0.33%, below the 20-year average of 1.31. It should be noted that the last three times that the spread went negative (1989, 2000 and 2007) the U.S. economy entered a recession not long afterwards. Continued economic growth without upward movement in long rates could be an indication that market participants are expecting a slowdown on the horizon. On the other hand, in this era of unprecedented central bank intervention the signal may have lost its predictive power, especially if the Fed proceeds to push the curve into inversion by continuing to raise short-term rates.



Capital Markets Review

U.S. Equity

The U.S. stock market, as measured by the Wilshire 5000 Index, was up 4.6% for the third quarter of 2017 and gained a further 6.4% for the fourth quarter of 2017. The second half of 2017 continued the trend of low volatility, with the largest drawdown for the year being -2.75% and only 4 trading days where the market was down 1% or more. Several factors contributed to this success including a rebound in global economic growth and continued strength domestically.

Volatility returned in the first quarter of 2018, and the Wilshire 5000 Index was down -0.76% for the quarter. While the market had not experienced a daily loss of 2% or more in 2017, there were five such down days during the first quarter of 2018. The downturn was short lived, as the Wilshire 5000 Index was up 3.83% for the second quarter of 2018, rebounding from only the second negative quarter in nearly six years. Equity market volatility returned in the first half of 2018, but is approximately in line with long-term historical figures. Although there were more up days than down during the first half of 2018, the daily losses were more substantial. The average daily loss was approximately 34% greater than the average daily gain, a spread not seen in more than a decade. Strong gains in personal income and consumer spending during the second quarter left room for optimism.

Non-U.S. Equity

Equity markets outside of the U.S. produced very strong returns during the second half of 2017 in both developed and emerging markets. Gains were broad based across Europe with all of the major foreign markets in positive territory. Japan was one of the strongest developed markets during the quarter due to stimulative policies by both the Bank of Japan and the national government. Emerging Markets led all global equities during 2017 and produced their second consecutive positive annual gain.

Equity markets outside of the U.S. produced mixed results during the first half of 2018 while currency had a major effect on U.S.-based investors. As global growth slowed and the Federal Reserve adopted a more aggressive stance on interest rates, the U.S. dollar was up approximately 5% versus a basket of currencies in Q2 2018. The European Union faces a fresh challenge with political developments in Italy, already being rattled by the Greek financial crisis and Brexit in past years.

Fixed Income

The U.S. Treasury yield curve continued to flatten during the second half of 2017, with short to intermediate term rates rising and long-term yields relatively stable. The bellwether 10-year Treasury yield ended the year at 2.40%. Credit spreads tightened over this same period.

The U.S. Treasury yield curve rose in a parallel fashion during Q1 2018, with most maturities up 35 basis points, on average. The bellwether 10-year Treasury yield ended the quarter at 2.74%. The Federal Open Market Committee decided to increase its overnight rate by 25 basis points in March to a range of 1.50% to 1.75%. Credit spreads widened during the quarter but remain narrow relative to historical observations.

The U.S. Treasury yield curve rose but returned to a flattening trend during the 2nd quarter of 2018. The Federal Open Market Committee decided to increase its overnight rate by 25 basis points in June to a range

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of 1.75% to 2.00%. Credit spreads widened during the quarter within investment grade credit but were little changed for the high yield market.

Real Assets

Real estate securities were up in the U.S. during the third and fourth quarters, with a stronger return globally due in part to a weakening dollar. Real estate declined in the U.S. during the first quarter of 2018, although March brought a strong rebound that continued into Q2 as real estate securities gained during the quarter on solid economic fundamentals.

Commodities were up for the second half of 2017 as crude oil rose 12.2% in Q3 and a further 16.9% in Q4. Commodity performance was mixed for the first quarter but crude oil continued to gain, rising 7.5%. Commodities were up big for the second quarter as crude oil rose 14.2%.

MLP returns were negative during the second half of 2017, and accelerated their decline in Q1 2018 after the Federal Energy Regulatory Commission (FERC) ruling in March moved to prevent interstate oil and natural gas pipelines from recovering the income tax allowance on cost of service rates. MLP returns bounced back in the second quarter of 2018, gaining +11.8%.

Asset Allocation Review

The Board approved changes to the Plans' target asset allocation at the June 7th, 2018 meeting, which maintain the probability of achieving the assumed rates of return while improving the liquidity profile of the portfolios. In addition, the new asset allocation policy for the significantly underfunded KERS Non-Hazardous and SPRS plans also decreases expected volatility and sensitivity to economic growth cycles. The new asset allocation targets align with the actuarial assumed rate of returns previously approved by the Board approved: 6.25% for the pension plans (CERS Non Hazardous, CERS Hazardous, and KERS Hazardous) and all of the insurance plans, and 5.25% for the KERS Non Hazardous and the State Police pension.

Assets are divided between three distinct buckets: growth, liquidity, and diversifying. This represents a slight change from previous asset allocations, which grouped by asset type (equity vs. fixed income) instead of risk type (growth oriented vs. safety oriented). This new distinction lead to high yield/credit-oriented fixed income to be counted with public and private equity allocations. Subsequently, the growth allocation target was reduced for all plans, with a corresponding increase to core fixed income to bolster the safety/liquidity bucket.

Pension Review

The KRS Pension Plan Composite ("Pension Plan") ended the fiscal year with assets of \$12.3 billion as of June 30, 2018, up from \$11.8 billion on June 30, 2017. The Pension Plan returned 8.56% net of fees for the year, outperforming the KRS Allocation Index (7.94%) and KRS IPS Benchmark (6.99%) in that time. The plan ranked in the 26th percentile of the TUCS Public Plan Total Return Universe, gross of fees, for the fiscal year. In addition, all of the plans outperformed their assumed rates of return for the year ended 6/30/2018.



Insurance Review

The KRS Insurance Plan Composite (“Insurance Plan”) ended the fiscal year with assets of \$5.1 billion as of June 30, 2018, up from \$4.8 billion on June 30, 2017. The Insurance Plan returned 9.04% net of fees for the year, outperforming the KRS Allocation Index (8.51%) and KRS IPS Benchmark (7.41%) in that time. The plan ranked in the 17th percentile of the TUCS Public Plan Total Return Universe, gross of fees, for the fiscal year. In addition, all of the plans outperformed their assumed rates of return for the year ended 6/30/2018.



August 28, 2018

ORG Portfolio Management LLC (“ORG”) serves as the Real Estate Investment Consultant for Kentucky Retirement Systems (“KRS”). It is ORG’s responsibility to present potential investment opportunities to the Investment Staff and Board and to make recommendations related to KRS’ real estate portfolio. It is ORG’s commitment to assist KRS in building a successful long term real estate investment portfolio for the KRS pension fund members.

U.S. Market Overview

U.S. real estate fundamentals have continued to remain positive, however transaction volumes continue to fall, down 0.4% over the trailing 12 months (as of 2Q 2018) from the same period a year ago, as the market bid-ask spread seems to be widening. ORG believes this may be symptomatic of a broad softening of the markets where many would-be sellers are not achieving their target pricing and therefore electing to not transact.

For closed end real estate funds, the capital available to invest, or dry powder, has continued to increase year-over-year and has reached an all-time high of \$278 billion. The debt markets have stabilized, financing is generally available, and a significant amount of capital has been raised for debt strategies. However, certain types of financing are difficult to obtain, which includes speculative development or highly leveraged transactions. ORG believes that interest rates will continue to rise, which should also cause capitalization rates to rise.

As of second quarter 2018, the capitalization rates for office and retail have increased and decreased for apartments and industrial over the previous second quarter in 2017.

Capitalization Rates	2 nd Qtr. 2018	2 nd Qtr. 2017	Basis Point Change
Total	4.46%	4.47%	-0.01
Apartments	4.16%	4.35%	-0.19
Retail	4.52%	4.45%	+0.07
Office	4.52%	4.42%	+0.10
Industrial/Warehouse	4.69%	4.86%	-0.17

Source: NCREIF – Current Value Weighted Capitalization Rates as of 6/30/2018.

Industrial Sector: The U.S. industrial sector has started to show signs of slowing down with rent growth decreasing 30 basis points from the first quarter to 1.3%. But, rents increased 5.6% year-over-year, exceeding the average annual growth rate of 5.0% since 2012, according to CoStar. Although rent growth moderated, the vacancy rate decreased and the supply increased over the previous quarter.

The square footage under construction in the U.S. expanded by 2.3% from the previous quarter at 253.5 million square feet. (Source: CoStar). As the supply continues to increase, the strong pre-leasing activity has helped keep the vacancy levels low at 4.9%. According to JLL, pre-leasing rates of new industrial product increased by 410 basis points from the first quarter reported at 48.9%.

ORG believes we are seeing several favorable trends benefiting the industrial sector. Most significantly, the impact of e-commerce on U.S. shopping habits and consumer expectations.

Apartment Sector: Transaction volumes totaled \$34.5 billion for the quarter, a decrease of 6.9% from the same period in 2017, according to Real Capital Analytics. According to JLL, new supply has primarily been concentrated in urban submarkets where over the past five years, average annual completions as a percentage of existing inventory are nearly double those of suburban submarkets, at 2.2% and 1.2% respectively. As a result of this increasing urban supply, suburban apartments have attracted an estimated 64.4% (\$90.0 billion) of apartment investment. ORG believes, the suburban apartment units are more affordable to a larger range of renters while still offering favorable amenities and are located in high demand areas.

For the second quarter, the U.S. Census Bureau stated that the homeownership rate was approximately 64.3%, which is slightly higher than the second quarter 2017 rate of 63.7%. While lower than the average homeownership rate of 65.3% (since 1965) the homeownership rate has been steadily increasing from previous lows of 62.9% in the second quarter of 2016. This lower than average homeownership rate is evidence of increased demand for apartment rentals.

ORG believes that this increased demand for apartments will continue for the foreseeable future due to a number of reasons, which include increasing interest rates, home prices, cost of construction and other factors. For example, according to the Federal Reserve Bank, student loan average balances now exceed \$32,000 per borrower, which can severely encumber college graduates from saving for a home down payment. Also, according to the National Association of Home Builders, the cost of framing lumber costs over the past two years has increased approximately 63.6%.

Office Sector: Office demand is slowing for both cyclical and secular reasons. U.S. office transactions for the last four quarters is down 13.6% year-over-year. Vacancy rates have continued to stay flat in the second quarter of 2018. Supply is expected to outpace demand over the next couple of years. According to CoStar, the 12 month rent growth, for the second quarter, has decreased approximately 40 basis points from 2.2% in the second quarter of 2017. Within the traditional office space, ORG sees a growing trend of space being converted into creative office use as well as development of creative office. In addition, office space per employee continues to decrease as tenants seek to occupy office space more efficiently with

creative work spaces. According to CoStar, the amount of square footage required per employee has dropped from 226 square feet to 215 square feet from 2Q13 to 2Q18.

In the U.S., 230,000 jobs have been added on average for the second quarter – driven by growth from the technology, advertising, media and information (“TAMI”) and financial insurance and real estate (“FIRE”) industries.

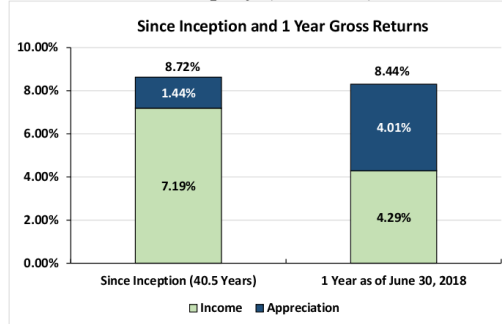
Retail Sector: Retail real estate performance continues to be affected by rapid technological change. During the first half of 2018, many retailers such as Toys “R” Us, Bon-Ton, Sears, Kmart, Sam’s Club, Macy’s and Winn-Dixie announced store closings. The most notable was Toys “R” Us which has announced over 40 million square feet in closures. According to CoStar, as of August 2018, an approximate 111 million square feet of retail space has been announced for closure. This highlights the growing threat that e-commerce poses to the consumer goods retail sector. E-commerce now represents 9.6% of total U.S. retail sales, which represents a 15.2% increase in from the previous year, according to the U.S. Census Bureau.

There continues to be an increase of importance on well-located brick-and-mortar locations. This is evident in the vacancies for Class A Malls (1-2%) and Class C Malls (8-9%), according to Costar. Additionally, CoStar indicated that the top 25% of U.S. malls accounted for 40% of total leasing volume over the past three years, despite having little availability.

According to Costar, only 6.2 million square feet was absorbed in the second quarter of 2018, down 32.7% from the same period in 2017. With new supply coming online as well as increased supply from store closures, ORG believes that there will continue to be stress on many retail properties.

ORG's View

Real estate markets in the U.S. have largely recovered from the 2008 financial crisis however we are still seeing signs of lower income returns compared to the historical income returns. The total returns gross of fees as reported by the National Council of Real Estate Investment Fiduciaries (“NCREIF”) Open-End Diversified Core Equity (“ODCE”) Index is shown below.



Source: NCREIF

The long-term Since Inception appreciation return for the ODCE is 1.44%. The current lower income return will require substantial rental rate growth in order for the ODCE funds to generate the projected 8-9% rate of return expected for Core over the long term. ORG continues to be concerned that the strategies targeting gateway core markets will underperform expectations for core real estate. These core gateway markets (San Francisco, Los Angeles, New York, Boston) are ‘priced to perfection’ with the income returns at an all-time low. ORG has also noted the impacts on e-commerce on the industrial and retail sectors and will continue to monitor the changes closely.

In Europe, outside a few gateway cities (London and Paris), the real estate fundamentals and capital markets continue to recover slower than the U.S.

As an alternative, ORG continues to recommend that investors focus on investment strategies where going in income returns are higher in certain overlooked strategies. The supply/demand fundamentals are favorable for the office market, although there are a few markets with cause for concern (Houston, Austin, Seattle).

ORG recommendations remain largely unchanged from prior periods. ORG recommends that a focus should be on sustainable and defensive cash flows by making investments with managers that target investments with existing cash flows or the creation of cash flows through value added investments. In addition, opportunities in real estate can be found in Western Europe, especially the United Kingdom outside of the primary asset types of office, retail, industrial and apartments.

ORG also recommends strategies in opportunistic funds where investors can capitalize on the continual de-leveraging of real estate that continues as debt originated during 2005-2007 continues to mature over the next several years. These opportunities to recapitalize high quality properties that have often been neglected could generate attractive risk adjusted returns over the next several years.

Kentucky Retirement Systems Real Estate Investments

All data below reflects activity through June 30, 2018.

2008-2010 Investment Activity: In December 2008, Kentucky Retirement Systems made \$40 million commitments each to the following funds:

- 1) Mesa West Real Estate Income Fund II, L.P.
- 2) PRIMA Mortgage Investment Trust.
- 3) Walton Street Real Estate Fund VI, L.P. In July 2013, an additional \$48.0 million was committed to PRIMA Mortgage Investment Trust increasing the total KRS commitment to \$82.0 million. In April 2015, \$15.5 million was withdrawn from PRIMA bring the total commitment down to \$66.5 million and in January 2016, the entire remaining position was liquidated and the funds returned to KRS.
 - Mesa West Real Estate Income Fund II – In December 2015, Mesa West completed the fund's liquidation. Since inception, \$33.4 million was funded and Mesa West returned \$46.5 million for an overall net IRR of 13.0% with a 1.4x equity multiple.
 - PRIMA Mortgage Investment Trust – In the 1st quarter 2016, KRS withdrew its entire remaining investment in PRIMA of \$76.1 million. Since inception, \$82 million was funded and PRIMA returned \$112.3 million for an overall net IRR of 8.6% with a 1.4x equity multiple.
 - Walton Street Real Estate Fund VI – For the fiscal year ending June 30, 2018, Walton Street VI made no capital calls and returned \$3.1 million in capital and gain distributions. Since inception, \$31.9 million has been funded with \$8.1 million remaining capital to be called.

2011 Investment Activity: Kentucky Retirement Systems made the following commitments:

- 1) \$100 million to H/2 Credit Partners, L.P. in April with an additional \$3 million commitment in October 2012. In 2013, \$3.3 million was withdrawn from the fund for a total commitment of \$99.7 million. In the 1st quarter 2016, KRS withdrew \$28.5 million, which reduced the commitment to \$71.2 million.
- 2) \$101.9 million to Harrison Street Core Property Fund, L.P. in December with an additional \$3.8 million commitment in October 2012 and \$17.9 million commitment in June 2013 for a total commitment of \$123.6 million. In the 1st quarter 2016, KRS withdrew \$46.7 million which reduced the commitment to \$76.8 million.
 - H/2 Credit Partners – For the fiscal year ending June 30, 2018, H/2 Credit Partners made no distributions. This investment is fully funded.
 - Harrison Street Core Property Fund – For the fiscal year ending June 30, 2018, Harrison Street returned \$4.9 million of income distributions and of that \$1.5 million was reinvested for the Insurance Fund. This investment is fully funded.

2012 Investment Activity: Kentucky Retirement Systems made the following commitments:

- 1) \$52.5 million to Walton Street Real Estate Fund VII, L.P. in August with an additional \$2.4 million commitment in October for a total commitment of \$54.9 million.
 - 2) \$54.9 million to Greenfield Acquisition Partners VI, L.P. in December.
 - 3) \$83 million to Mesa West Core Lending Fund, L.P. in December 2012.
- Walton Street Real Estate Fund VII – For the fiscal year ending June 30, 2018, Walton VII made no capital calls and returned \$14.2 million of capital, income and gain distributions. Since inception, \$24.0 million has been funded with \$30.9 million remaining capital to be called.
 - Greenfield Acquisition Partners VI – For the fiscal year ending June 30, 2018, Greenfield VI made no capital calls and returned \$4.4 million of capital, income and gain distributions. Since inception, \$52.6 million has been funded with \$2.3 million remaining capital to be called.
 - Mesa West Core Lending Fund – For the fiscal year ending June 30, 2018, Mesa West Core returned \$3.8 million of income distributions of which \$2.1 million was reinvested into the Insurance Fund.

2013 Investment Activity: Kentucky Retirement Systems made the following commitments:

- 1) \$30 million to Rubenstein Properties II, L.P. in July.
 - 2) \$30 million to H/2 Core Debt Fund, L.P. in August.
 - 3) \$70 million to Prologis Targeted U.S. Logistics Holdings, L.P. in October.
 - 4) \$95 million to Stockbridge Smart Markets, L.P. in December 2013.
- Rubenstein Properties II – For the fiscal year ending June 30, 2018, Rubenstein II made one capital call totaling \$3.3 million and returned \$3.1 million in capital and gain distributions. Since inception, \$27.7 million has been funded with \$2.3 million remaining capital to be called.
 - H/2 Core Debt Fund – In the 4th quarter 2016, KRS withdrew \$26.3 million and the investment was liquidated. Since inception, \$47.2 million was funded and H/2 returned \$127.5 million for an overall net IRR of 5.6% with a 1.1x equity multiple.
 - Prologis Targeted U.S. Logistics Holdings – For the fiscal year ending June 30, 2018, Prologis distributed \$3.5 million of income distributions. This investment is fully funded.
 - Stockbridge Smart Markets – For the fiscal year ending June 30, 2018, Stockbridge Smart Markets distributed \$3.2 million of which \$1.4 million was reinvested into the Insurance Fund. This investment is fully funded.

2014 Investment Activity: Kentucky Retirement Systems made the following commitments:

- 1) \$40 million to Lubert-Adler Real Estate Fund VII, L.P. in March with an additional commitment of \$10 million in November.
 - 2) \$30 million to Divco West IV, L.P. in April.
 - 3) \$40 million to Greenfield Acquisition Partners VII, L.P. in July.
- Lubert-Adler Real Estate Fund VII – For the fiscal year ending June 30, 2018, Lubert-Adler VII made no capital calls and returned \$9.0 million in capital, income and gain distributions. Since inception, \$45.9 million has been funded with \$4.1 million remaining to be called.
 - Divco West IV – For the fiscal year ending June 30, 2018, Divco West IV made no capital calls and returned \$6.3 million in capital, income and gain distributions. Since inception, \$27.5 million has been funded with \$2.5 million remaining to be called.
 - Greenfield Acquisition Partners VII – For the fiscal year ending June 30, 2018, Greenfield VII made five capital calls totaling \$8.8 million and returned \$5.2 million in capital, income and gain distributions. Since inception, \$30.0 million has been funded with \$10.0 million remaining capital to be called.

2015 Investment Activity: Kentucky Retirement Systems made no additional commitments to the Real Estate Portfolio in 2015.

Withdrawal requests were sent to managers for the following investments: PRIMA – complete withdrawal of \$76.1 million; Harrison Street Core Property Fund – withdrawal of \$47.6 million; and H/2 Credit Partners - \$28.5 million. Withdrawal requests were honored by the managers as noted in the individual fund write-up noted by year above.

2016 Investment Activity: Kentucky Retirement Systems made the following commitment:

- 1) €50 million (approximately \$55.7 million) to Patron Capital, LP V in June.
 - 2) \$50 million to Mesa West Real Estate Income Fund IV, L.P in June.
- Patron Capital V – For the fiscal year ending June 30, 2018, Patron V made three capital calls totaling \$11.8 million and had returned \$1.7 million in capital distributions. Since inception, \$18.9 million has been funded with approximately \$36.8 million remaining capital to be called.
 - Mesa West Real Estate Income IV - For the fiscal year ending June 30, 2018, Mesa West IV made two capital calls totaling \$8.6 million and returned \$0.8 million of income distributions. Since inception, \$15.6 million has been funded with \$34.4 million remaining capital to be called.

2017 Investment Activity: Kentucky Retirement Systems made the following commitments:

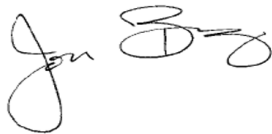
- 1) \$100 million to Fundamental Partners III, L.P. in March.
- 2) \$22.8 million to Lubert-Adler Real Estate Fund VII-B, L.P. in March with additional commitments of \$7.8 million in August and \$21.9 million in December 2017.

- Fundamental Partners III - For the fiscal year ending June 30, 2018, Fundamental III made two capital calls totaling \$15.1 million and returned \$5.3 million in income and gain distributions. Since inception, \$49.7 million has been funded with \$50.3 million remaining capital to be called.
- Lubert-Adler Real Estate Fund VII-B - For the fiscal year ending June 30, 2018, Lubert-Adler VII-B made three capital calls totaling \$22.3 million and returned \$0.9 million in income distributions. Since inception, \$22.3 million has been funded with \$30.2 million remaining capital to be called.

2018 Investment Activity: Kentucky Retirement Systems made no new commitments.

Please feel free to contact us regarding any of the information above.

Very truly yours,



Jonathan Berns
Principal



Edward Schwartz
Principal

ACTUARIAL

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Certification of Actuarial Results

Re: Certification for the Actuarial Results as of June 30, 2018.

Dear Board of Trustees:

Actuarial valuations are prepared annually as of June 30, for the Kentucky Employees Retirement System (KERS), the County Employees Retirement System (CERS), and the State Police Retirement System (SPRS). These reports describe the current actuarial condition of the Kentucky Retirement Systems (KRS) and document the calculated employer contribution rates as well as the changes in the financial condition since the prior actuarial valuation.

Under state statute, the Board of Trustees must approve the employer contribution rates determined by each actuarial valuation. The contribution rates are determined actuarially based upon the membership, plan assets, assumptions, and funding policies adopted by the KRS Board. The June 30, 2017 actuarial valuation was used by the Board of Trustees to certify the KERS and SPRS employer contribution rates for the biennial period beginning July 1, 2018 and ending June 30, 2020. The Board of Trustees uses this actuarial valuation (as of June 30, 2018) to certify the employer contribution rates for CERS for the fiscal year beginning July 1, 2019 and ending June 30, 2020.

FINANCING OBJECTIVES AND FUNDING POLICY

For each retirement system, KRS administers both a pension and insurance fund to provide for monthly retirement allowances and retiree health insurance benefits respectively. The total employer contribution rate is comprised of a contribution to each respective fund.

The contribution rate for each fund consists of a normal cost rate (which pays the current year’s cost) and an amortization rate to finance the existing unfunded actuarial accrued liability (UAAL). In accordance with state statute, the amortization period is a closed 30-year funding period beginning with the June 30, 2013 actuarial valuation, which results in the use of a closed 25-year funding period for use in the calculation of the contribution rates for the June 30, 2018 actuarial valuation. Absent changes in benefits, assumptions, or material liability or investment gains or losses, the total contribution rate for the funds are expected to remain stable, as a percentage of payroll, in future years.

If new legislation is enacted between the valuation date and the date the contribution rates become effective, the Board may adjust the calculated rates before certifying them, in order to reflect this new legislation. Such adjustments are based on information supplied by the actuary.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan’s funded status. In the absence of benefit improvements, assumption changes, or actuarial losses, it should increase over time, until it reaches at least 100%. As of June 30, 2018, the funded ratios for the pension and health insurance funds are as follows:

Funding Level	2018		2017		2016	
	Pension Fund	Insurance Fund	Pension Fund	Insurance Fund	Pension Fund	Insurance Fund
KERS Non-Hazardous	12.9%	36.4%	13.6%	30.7%	16.0%	30.3%
KERS Hazardous	55.5%	130.0%	54.1%	117.6%	59.7%	125.3%
CERS Non-Hazardous	52.7%	76.7%	52.8%	66.4%	59.0%	69.6%
CERS Hazardous	48.4%	74.6%	48.1%	66.9%	57.7%	72.9%
SPRS	27.1%	71.6%	27.0%	65.2%	30.3%	67.2%



ASSUMPTIONS AND METHODS

The Board of Trustees, in consultation with the actuary, sets the actuarial assumptions and methods used in the actuarial valuation. At any time, the Board may adopt updated assumptions for use in an actuarial valuation. There has been no change in assumptions since the prior actuarial valuation.

In our opinion, all the assumptions and methods adopted by the Board Trustees satisfy the requirements in the Actuarial Standards of Practice that are applicable for actuarial valuations of public retirement systems. The Board plans to have the next experience study conducted using the plan's experience for the five-year period ending June 30, 2018. The actuarial assumptions that result from that experience study will be first used to prepare the June 30, 2019 actuarial valuation.

It is our opinion that the actuarial assumptions used to perform this valuation are internally consistent and reasonably reflect the anticipated future experience of the System. The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rate, and funding periods. The actuarial calculations are intended to provide information for rational decision making.

The benefit structure is outlined in this section of the annual report. GRS prepared the following schedules in the actuarial section: *Summary of Actuarial Valuation Results, Recommended Employer Contribution Rates, Summary of Actuarial Unfunded Liabilities, the Solvency Test, the Summary of Active Member Valuation Data, the Summary of Retired Member Valuation Data, Summary of the Assumptions and Methods, and the Summary of the Benefit Provisions.*

In addition, GRS prepared the following schedules in the financial section in accordance with GASB Statement No. 67: *Net Pension Liability Schedule, Discount Rate Sensitivity Analysis, Schedule of Changes in the Employers' Net Pension Liability, Schedule of Employers' Net Pension Liability, and the Schedule of Employers' Contributions.*

DATA

Member data for retired, active and inactive members was supplied as of June 30, 2018, by the KRS staff. The staff also supplied asset information as of June 30, 2018. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data. GRS is not responsible for the accuracy or completeness of the information provided to us by the Systems.

CERTIFICATION

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Retirement Systems as of June 30, 2018. All of our work conforms with generally accepted actuarial principles and practices, and in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of Kentucky Code of Laws and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board.

The undersigned are independent actuaries and consultants. Mr. Newton and Mr. White are Enrolled Actuaries. All three of the undersigned are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries. All are experienced in performing valuations for large public retirement systems.

Sincerely,



Sincerely,
Gabriel, Roeder, Smith & Co.

A handwritten signature in black ink that reads "Joseph P. Newton". The signature is fluid and cursive, with a long horizontal stroke at the end.

Joseph P. Newton, FSA, MAAA, EA
Senior Consultant

A handwritten signature in black ink that reads "Daniel J. White". The signature is fluid and cursive, with a long horizontal stroke at the end.

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

A handwritten signature in black ink that reads "Janie Shaw". The signature is fluid and cursive, with a long horizontal stroke at the end.

Janie Shaw, ASA, MAAA
Consultant

Summary of Actuarial Assumptions

The results of the actuarial valuation are based upon the assumptions and funding policies adopted by the Board and statutory funding requirements. Assumptions and funding policies are reviewed against actual plan experience at least once every five years through the completion of the Actuarial Experience Study. In general, the assumptions and methods used in the June 30, 2018 valuation are based on the most recent 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.

1. Actuarial Cost Method: The actuarial valuation was prepared using the entry age normal cost (EANC) method as required by state statute. Under this method, the present value of future benefits is determined for each member and allocated equitably as a level percentage of payroll from the member's entry age into the plan to the assumed age of exit from the plan. The portion of the present value of future benefits allocated to the current valuation year is called the normal cost. The portion of the present value of future benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. Relative to the Pension funds and the Insurance Fund, an employer contribution rate has been established to be equal to the sum of the normal cost and the amount needed to amortize the unfunded actuarial accrued liability (UAAL).

2. UAAL Amortization Method: Effective for the June 30, 2017 valuation, the amortization of any unfunded actuarial accrued liability is established using a level percent of pay amortization method and a 0.00% payroll growth assumption for the KERS and SPRS Retirement Systems and a 2.00% payroll growth assumption for the CERS Retirement System. The amortization period was reestablished as a closed 30-year period beginning with the June 30, 2013 actuarial valuation. The amortization period will decrease by one each year in the future and there are 25 years remaining as of June 30, 2018.

3. Asset Valuation Method: The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the investment return assumption. The amount recognized each year is 20% of the difference between market value and expected market value.

4. Retiree Insurance Funding Policy: Effective for the June 30, 2017 valuation, the amortization of any unfunded actuarial accrued liability is established using a level percent of pay amortization method and a 0.00% payroll growth assumption for the KERS and SPRS Retirement Systems and a 2.00% payroll growth assumption for the CERS Retirement System. The amortization period was reestablished as a closed 30-year period beginning with the June 30, 2013 actuarial valuation. The amortization period will decrease by one each year in the future and there are 25 years remaining as of June 30, 2018.

5. Investment Return Assumption: The future investment earnings of plan assets are assumed to accumulate at a rate of 6.25% per annum for the CERS Non-Hazardous Retirement System, the CERS Hazardous Retirement System, the KERS Hazardous Retirement System, and all Insurance Systems. This rate consists of a 2.30% price inflation component and a 3.95% real rate of return component. The assumed rate of return for the KERS Non-Hazardous Retirement System and the State Police Retirement System is 5.25% and consists of a 2.30% inflationary component and a 2.95% real rate of return component.

6. Salary Increase Assumptions: Active member salaries are assumed to increase at the rates provided in Table 1. The rates include a 3.05% price inflation and productivity component, and an additional increase due to promotion based upon plan experience. The assumptions for additional increases due to promotion were adopted in 2014.

Table 1. Salary Increase Assumptions

Service	KERS	KERS	CERS	CERS	SPRS
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	
0	15.50%	19.55%	11.55%	18.55%	15.55%
1	7.55%	7.55%	8.05%	9.05%	10.55%
2	5.05%	5.55%	4.55%	5.05%	8.55%
3	4.55%	5.05%	4.55%	4.30%	7.55%
4	4.55%	4.55%	4.05%	4.05%	6.55%
5	4.55%	4.05%	4.05%	3.55%	5.55%
6	4.05%	3.55%	3.80%	3.05%	5.05%
7	4.05%	3.55%	3.80%	3.05%	5.05%
8	4.05%	3.55%	3.55%	3.05%	4.05%
9	3.55%	3.55%	3.55%	3.05%	3.55%
10 & over	3.55%	3.55%	3.30%	3.05%	3.05%

7. Medical Inflation Rate Assumption: The costs for retiree medical premiums are assumed to increase according to the assumptions provided in Table 2. This assumption was adopted in 2017.

Table 2: Medical Inflation Rate Assumption (See footnotes 1 and 2)

January 1	Non-Medicare Plans	Medicare Plans	Dollar Contribution 2	January 1	Non-Medicare Plans	Medicare Plans	Dollar Contribution 2
2020	7.00%	5.00%	1.50%	2027	5.25%	4.30%	1.50%
2021	6.75%	4.90%	1.50%	2028	5.00%	4.20%	1.50%
2022	6.50%	4.80%	1.50%	2029	4.75%	4.10%	1.50%
2023	6.25%	4.70%	1.50%	2030	4.50%	4.05%	1.50%
2024	6.00%	4.60%	1.50%	2031	4.25%	4.05%	1.50%
2025	5.75%	4.50%	1.50%	2032 & Over	4.05%	4.05%	1.50%
2026	5.50%	4.40%	1.50%				

1. All increases are assumed to occur on January 1. The 2019 premiums were known at the time of the valuation and were incorporated into the liability measurement.

2. Applies to members participating on or after July 1, 2003

8. Payroll Growth Assumption: For purposes of determining the amortization rate to finance the unfunded actuarial accrued liability, the active member payroll in KERS (Non-hazardous and Hazardous) and SPRS is assumed to increase at a rate of 0.00% per year and the active member payroll in CERS (Non-hazardous and Hazardous) is assumed to increase at the rate of 2.00% per annum. This assumption was adopted in 2017.

9. Retiree Cost of Living Adjustments (COLA): SB2 only allows the Cost of Living Adjustments (COLAs) to be awarded on a biennial basis if the State Legislature so authorizes and either (i) the system is over 100% funded or (ii) the Legislature appropriates sufficient funds to pay the increased liability for the COLA.

10. Retirement Rate Assumptions: The probability, or the likelihood, that a member will retire at a specified age or level of service is provided in Table 3. These assumptions were adopted in 2014.

Table 3: Retirement Rate Assumptions (See footnotes 1 - 9)

Age	Non-Hazardous				Hazardous					
	KERS 1	KERS 2	CERS 3	Service	KERS 4	KERS 5	CERS 6	CERS 7	SPRS 8	SPRS 9
55	8.00%		5.00%	20	40.00%		22.50%		22.00%	
56	8.00%		6.00%	21	40.00%		22.50%		22.00%	
57	8.00%		7.00%	22	40.00%		22.50%		22.00%	
58	8.00%		7.00%	23	40.00%		22.50%		28.00%	
59	8.00%		8.00%	24	40.00%		30.00%		28.00%	
60	10.00%	10.00%	9.00%	25	47.00%	40.00%	33.00%	22.50%	28.00%	22.00%
61	20.00%	20.00%	15.00%	26	47.00%	40.00%	33.00%	22.50%	28.00%	22.00%
62	20.00%	20.00%	18.00%	27	47.00%	40.00%	36.00%	22.50%	28.00%	22.00%
63	20.00%	20.00%	18.00%	28	47.00%	40.00%	39.00%	22.50%	44.00%	28.00%
64	20.00%	20.00%	18.00%	29	47.00%	40.00%	55.00%	30.00%	44.00%	28.00%
65	20.00%	25.00%	18.00%	30	47.00%	47.00%	33.00%	33.00%	44.00%	28.00%
66	20.00%	25.00%	18.00%	31	47.00%	47.00%	33.00%	33.00%	58.00%	28.00%
67	20.00%	25.00%	18.00%	32	50.00%	47.00%	50.00%	36.00%	58.00%	28.00%
68	20.00%	25.00%	18.00%	33	50.00%	47.00%	40.00%	39.00%	58.00%	44.00%
69	20.00%	25.00%	18.00%	34	50.00%	47.00%	40.00%	55.00%	58.00%	44.00%
70	20.00%	25.00%	18.00%	35	60.00%	47.00%	40.00%	33.00%	58.00%	44.00%
71	20.00%	25.00%	18.00%	36	60.00%	47.00%	40.00%	33.00%	58.00%	58.00%
72	20.00%	25.00%	18.00%	37	60.00%	50.00%	40.00%	50.00%	58.00%	58.00%
73	20.00%	25.00%	18.00%	38	60.00%	50.00%	40.00%	40.00%	58.00%	58.00%
74	20.00%	25.00%	18.00%	39	60.00%	50.00%	40.00%	40.00%	58.00%	58.00%
75+	100.00%	100.00%	100.00%	40	60.00%	60.00%	40.00%	40.00%	58.00%	58.00%

(1) For members participating before 9/1/2008. If service is at least 27 years, the rate is 35%.

(2) For members participating on or after 9/1/2008. If age plus service is at least 87, the rate is 35%.

(3) If service is at least 27 years, the rate is 30% for members participating before 9/1/2008. If age plus service is at least 87, the rate is 30% for members participating on or after 9/1/2008.

(4) For members participating before 9/1/2008. The annual rate of service retirement is 100% at age 65.

(5) For members participating on or after 9/1/2008. The annual rate of service retirement is 100% at age 60.

(6) For members participating before 9/1/2008. The annual rate of service retirement is 100% at age 62.

(7) For members participating on or after 9/1/2008. The annual rate of service retirement is 100% at age 60.

(8) For members participating before 9/1/2008. The annual rate of service retirement is 100% at age 55.

(9) For members participating on or after 9/1/2008. The annual rate of service retirement is 100% at age 60.

11. Mortality Assumptions: The mortality for active members is the 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%). The mortality table for healthy retired members and beneficiaries is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (female mortality rates are set back one year). The mortality table for disabled members is the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (male mortality rates are set back four years). At the time of the last experience study, performed as of June 30, 2013, this mortality assumption provided 37% and 19% margin for future improvement for males and females, respectively. This will be reviewed again when the next experience investigation is conducted during the 2018/2019 plan year.

Table 4: Sample Annual Rate of Mortality

Age	Active Member Mortality		Retired Member Mortality		Disabled Member Mortality	
	Males	Females	Males	Females	Males	Females
20	0.02%	0.01%	0.03%	0.02%		
22	0.02%	0.01%	0.04%	0.02%		
32	0.03%	0.01%	0.05%	0.03%		
42	0.06%	0.02%	0.12%	0.07%	2.17%	0.72%
52	0.13%	0.06%	0.26%	0.18%	2.54%	1.29%
62	0.39%	0.17%	0.78%	0.50%	3.50%	2.06%
72	1.12%	0.53%	2.24%	1.59%	4.68%	3.66%

12. Withdrawal Rates: The probability, or likelihood, of active members terminating employment prior to retirement is provided in Table 5. These assumptions were adopted in 2014.

Table 5: Selected Rates of Termination Prior to Retirement

KERS Non-Hazardous		KERS Hazardous	CERS Non-Hazardous		CERS Hazardous	SPRS	
Years of Service			Years of Service			Years of Service	
0	22.50%	25.00%	0	28.00%	20.50%	0	20.00%
1	15.50%	10.50%	1	16.00%	13.00%	1	7.00%
2	12.50%	7.50%	2	12.00%	10.50%	2-8	3.00%
3	10.50%	6.50%	3	10.00%	9.00%	9 & Over	2.50%
4	9.00%	5.50%	4	8.00%	8.00%		
5	6.50%	4.50%	5	6.00%	7.00%		
6	5.50%	3.00%	6	5.00%	7.00%		
7	5.00%	3.00%	7	5.00%	6.00%		
8	4.50%	3.00%	8-13	4.00%	6.00%		
9	4.50%	2.50%	14 & Over	3.00%	6.00%		
10	4.00%	2.50%					
11-12	4.00%	2.00%					
13-14	3.50%	2.00%					
15 & Over	3.00%	2.00%					

13. Assumption Changes Since Prior Valuation: None.

14. Rates of Disablement: KRS provides disability benefits for those individuals meeting specific qualifications established by state law. This assumption provides the probability, or likelihood, that a member will become disabled during the course of employment for various age levels. These assumptions were adopted in 2014.

Table 6: Sample Rates of Disablement

Nearest Age	KERS Non-Hazardous	KERS Hazardous	CERS Non-Hazardous	CERS Hazardous	SPRS
	Probability	Probability	Probability	Probability	Probability
20	0.02%	0.03%	0.02%	0.05%	0.05%
30	0.03%	0.05%	0.03%	0.09%	0.09%
40	0.07%	0.10%	0.07%	0.20%	0.20%
50	0.19%	0.28%	0.19%	0.56%	0.56%
60	0.49%	0.73%	0.49%	1.46%	1.46%

Summary of Actuarial Valuation Results (in Whole \$)

	KERS Non-Hazardous	KERS Hazardous	CERS Non-Hazardous	CERS Hazardous	SPRS
Recommended Contribution Rate (Fiscal Year 2018-2019)					
Pension Fund Contribution	74.54%	34.42%	22.52%	36.98%	120.54%
Insurance Fund Contribution	10.65%	0.00%	4.76%	9.52%	19.50%
Recommended Employer Contribution	85.19%	34.42%	27.28%	46.50%	140.04%

Funded Status as of Valuation Date As of June 30, 2018 (\$ in Thousands)

Pension Fund					
Actuarial Liability	\$15,675,232	\$1,151,923	\$13,191,505	\$4,792,548	\$989,528
Actuarial Value of Assets	2,019,278	639,262	6,950,225	2,321,721	268,259
Unfunded Liability on Actuarial Value of Assets	13,655,954	512,661	6,241,280	2,470,827	721,269
Funding Ratio on Actuarial Value of Assets	12.88%	55.50%	52.69%	48.44%	27.11%
Market Value of Assets	2,004,446	645,485	7,018,963	2,348,337	267,572
Unfunded Liability on Market Value of Assets	\$13,670,786	\$506,438	\$6,172,542	\$2,444,211	\$721,956
Funding Ratio on Market Value of Assets	12.79%	56.04%	53.21%	49.00%	27.04%
Insurance Fund					
Actuarial Liability	\$2,435,506	\$393,481	\$3,092,623	\$1,684,028	\$262,088
Actuarial Value of Assets	887,121	511,441	2,371,430	1,256,306	187,535
Unfunded Liability on Actuarial Value of Assets	1,548,385	(117,961)	721,193	427,722	74,553
Funding Ratio on Actuarial Value of Assets	36.42%	129.98%	76.68%	74.60%	71.55%
Market Value of Assets	891,205	519,072	2,414,126	1,280,982	190,847
Unfunded Liability on Market Value of Assets	\$1,544,301	\$(125,592)	\$678,497	\$403,046	\$71,242
Funding Ratio on Market Value of Assets	36.59%	131.92%	78.06%	76.07%	72.82%
Member Data (See Footnotes 1 and 2)					
Number of Active Members	35,139	3,929	81,818	9,263	886
Total Annual Payroll (Active Members) ¹	\$1,471,477	\$158,213	\$2,466,801	\$533,618	\$48,808
Average Annual Pay (Active Members) ²	\$41,876	\$40,268	\$30,150	\$57,607	\$55,088
Number of Retired Members & Beneficiaries	46,526	4,370	61,938	9,587	1,600
Average Annual Retirement Allowance ²	\$20,482	\$14,657	\$11,469	\$25,626	\$37,266
Number of Vested Inactive Members	13,230	886	17,621	954	176
Number of Inactive Members Due a Refund	37,205	4,841	69,539	2,113	323

(1) Annual payroll included in the Summary of Actuarial Valuation Results is based upon the annualized monthly payroll for active members as of the valuation date. The annual payroll recorded in the financial section is based upon the sum of the monthly payroll for active members recorded for each month of fiscal year ending June 30, 2018.

(2) Member data in actuarial section will differ from reported data in other CAFR sections. For this section, the data is reported by account instead of by person (ex: a member could have vested service in KERS, but is currently active in a CERS and is reported in two membership categories).

KERS Funds

The contribution rates for KERS Non-Hazardous and KERS Hazardous shown in the tables below are the full funding rates presented by the actuary for 2009 through 2018 annual valuations. However, the actual employer contribution was less than the recommended rates for years 2009 through 2014. SB2 required full funding starting in Fiscal Year 2015.

Recommended Employer Contribution Rates

As of June 30, 2018

KERS (Non-Hazardous Employers)

Valuation Date	Applicable Fiscal Year	Pension Fund: Normal Cost	Pension Fund: Payment on Unfunded Liability	Pension Fund Contribution	Insurance Fund Contribution	Recommended Employer Contribution
6/30/2009	2010-2011	4.26%	17.51%	21.77%	16.81%	38.58%
6/30/2010	2011-2012	4.23%	20.07%	24.30%	16.41%	40.71%
6/30/2011	2012-2013	4.38%	23.65%	28.03%	16.52%	44.55%
6/30/2012	2013-2014	4.26%	28.31%	32.57%	12.71%	45.28%
6/30/2013	2014-2015	4.13%	26.71%	30.84%	7.93%	38.77%
6/30/2014	2015-2016	4.10%	29.47%	33.57%	7.74%	41.31%
6/30/2015	2016-2017	3.60%	35.33%	38.93%	8.35%	47.28%
6/30/2016	2017-2018	4.93%	37.05%	41.98%	8.41%	50.39%
6/30/2017	2018-2019	8.17%	62.86%	71.03%	12.40%	83.43%
6/30/2018	2019-2020	7.98%	66.56%	74.54%	10.65%	85.19%

KERS (Hazardous Employers)

Valuation Date	Applicable Fiscal Year	Pension Fund Normal Cost	Pension Fund: Payment on Unfunded Liability	Pension Fund Contribution	Insurance Fund Contribution	Recommended Employer Contribution
6/30/2009	2010-2011	7.94%	6.17%	14.11%	20.26%	34.37%
6/30/2010	2011-2012	7.19%	6.92%	14.11%	19.73%	33.84%
6/30/2011	2012-2013	7.47%	8.69%	16.16%	19.73%	35.89%
6/30/2012	2013-2014	6.09%	10.91%	17.00%	11.84%	28.84%
6/30/2013	2014-2015	5.79%	10.58%	16.37%	9.97%	26.34%
6/30/2014	2015-2016	5.69%	11.40%	17.09%	7.12%	24.21%
6/30/2015	2016-2017	6.93%	14.15%	21.08%	2.74%	23.82%
6/30/2016	2017-2018	6.44%	14.04%	20.48%	1.34%	21.82%
6/30/2017	2018-2019	9.67%	24.72%	34.39%	2.46%	36.85%
6/30/2018	2019-2020	9.24%	25.18%	34.42%	0.00%	34.42%

(1) The contribution rates for KERS Non-Hazardous and KERS Hazardous shown in the above tables are the full funding rates presented by the actuary in the 2011 through 2017 annual valuations. However, the actual employer contribution rates have been less than those shown above. As a result of HB 1 passed in 2008, the statute called for an employer contribution rate at an increasing percentage of the full funding rates until 100% was achieved in 2025 for KERS Non-Hazardous and 2019 for KERS Hazardous. SB2 eliminated this phase-in beginning with the June 30, 2013 actuarial valuation. House Bill 265 passed during the 2018 legislative session which reduced the FY 2019 employer contribution rate to 49.47% for Regional Mental Health/Mental Retardation Boards, Local District Health Departments, State Universities, Community Colleges and any other agencies eligible for voluntarily cease participating in the KERS non-hazardous fund.

CERS Funds

The Insurance Fund contribution rates and the employer contribution rates for CERS Non-Hazardous and CERS Hazardous shown in the tables below are the full funding rates presented by the actuary in the 2009 through 2018 annual valuations.

House Bill 362 was enacted during the 2018 legislative session that limits the annual increase in the CERS employer contribution rate over the prior fiscal year to 12% per year for the period of July 1, 2018 to June 30, 2028, or until the full actuarial required contribution is met.

Recommended Employer Contribution Rates

As of June 30, 2018

County Employees Retirement System

CERS (Non-Hazardous Employers)

Valuation Date	Applicable Fiscal Year	Pension Fund Normal Cost	Pension Fund: Payment on Unfunded Liability	Pension Fund Contribution	Insurance Fund Contribution	Recommended Employer Contribution
6/30/2009	2010-2011	4.60%	5.43%	10.03%	9.78%	19.81%
6/30/2010	2011-2012	4.72%	6.98%	11.70%	9.59%	21.29%
6/30/2011	2012-2013	4.68%	7.94%	12.62%	8.59%	21.21%
6/30/2012	2013-2014	4.68%	9.06%	13.74%	5.84%	19.58%
6/30/2013	2014-2015	4.35%	8.40%	12.75%	5.35%	18.10%
6/30/2014	2015-2016	4.23%	8.19%	12.42%	4.88%	17.30%
6/30/2015	2016-2017	3.80%	10.15%	13.95%	4.93%	18.88%
6/30/2016	2017-2018	3.70%	10.78%	14.48%	4.70%	19.18%
6/30/2017	2018-2019	5.85%	15.99%	21.84%	6.21%	28.05%
6/30/2018	2019-2020	5.80%	16.72%	22.52%	4.76%	27.28%

CERS (Hazardous Employers)

Valuation Date	Applicable Fiscal Year	Pension Fund Normal Cost	Pension Fund: Payment on Unfunded Liability	Pension Fund Contribution	Insurance Fund Contribution	Recommended Employer Contribution
6/30/2009	2010-2011	7.56%	9.23%	16.79%	23.27%	40.06%
6/30/2010	2011-2012	7.31%	10.60%	17.91%	23.74%	41.65%
6/30/2011	2012-2013	7.40%	12.70%	20.10%	21.84%	41.94%
6/30/2012	2013-2014	6.44%	15.33%	21.77%	16.02%	37.79%
6/30/2013	2014-2015	6.35%	14.38%	20.73%	14.97%	35.70%
6/30/2014	2015-2016	6.21%	14.05%	20.26%	13.42%	33.68%
6/30/2015	2016-2017	4.52%	17.19%	21.71%	9.79%	31.50%
6/30/2016	2017-2018	4.40%	17.80%	22.20%	9.35%	31.55%
6/30/2017	2018-2019	6.78%	28.91%	35.69%	12.17%	47.86%
6/30/2018	2019-2020	6.35%	30.63%	36.98%	9.52%	46.50%

The Insurance Fund contribution rates and the employer contribution rates for CERS Non-Hazardous and CERS Hazardous shown in the above tables are the full funding rates presented by the actuary in the 2011 through 2017 annual valuations. However, in the case of CERS Non-Hazardous and CERS Hazardous, in 2006 the actuary recommended a five-year phase-in of the rate which requires the payment of the insurance benefit normal cost with a five-year phase-in of the unfunded accrued liability (UAL) associated with the insurance fund. In 2008 this recommendation was changed to a ten-year phase-in from the initial starting date. House Bill 362 passed during the 2018 legislative session which limited the CERS employer contribution rate increase to 12% per year over the prior fiscal year for the period of July 1, 2018 to June 30, 2028.

SPRS Funds

The contribution rates for SPRS shown in the below tables are the full funding rates presented by the actuary in the 2011 through 2017 annual valuations. However, the actual employer contribution rates have been less than those shown above. As a result of HB1 passed in 2008 the statute called for an employer contribution rate at an increasing percentage of the full funding rates. SB2 eliminated this phase-in beginning with the June 30, 2013 actuarial valuation.

Recommended Employer Contribution Rates

As of June 30, 2018

SPRS Employers

Valuation Date	Applicable Fiscal Year	Pension Fund Normal Cost	Pension Fund: Payment on Unfunded Liability	Pension Fund Contribution	Insurance Fund Contribution	Recommended Employer Contribution
6/30/2009	2010-2011	8.12%	27.62%	35.74%	49.89%	85.63%
6/30/2010	2011-2012	7.75%	32.05%	39.80%	54.83%	94.63%
6/30/2011	2012-2013	8.12%	39.36%	47.48%	55.93%	103.41%
6/30/2012	2013-2014	8.14%	45.21%	53.35%	43.17%	96.52%
6/30/2013	2014-2015	8.46%	45.44%	53.90%	21.86%	75.76%
6/30/2014	2015-2016	8.39%	50.05%	58.44%	19.17%	77.61%
6/30/2015	2016-2017	8.77%	57.70%	66.47%	18.87%	85.34%
6/30/2016	2017-2018	11.16%	60.41%	71.57%	18.10%	89.67%
6/30/2017	2018-2019	16.21%	102.84%	119.05%	27.23%	146.28%
6/30/2018	2019-2020	15.81%	104.73%	120.54%	19.50%	140.04%

(1) The contribution rates for SPRS shown in the above table are the full funding rates presented by the actuary in the 2011 through 2017 annual valuations. However, the actual employer contribution rates have been less than those shown above. As a result of HB 1 passed in 2008 the statute called for an employer contribution rate at an increasing percentage of the full funding rates. SB2 eliminate this phase-in beginning with the June 30, 2013 actuarial valuation.

Summary of Actuarial Unfunded Liabilities

As of June 30, 2018 (\$ in Thousands)

KERS (Non-Hazardous Pension Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Actuarial Liabilities		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$10,658,550	\$4,794,611	\$3,584,196	\$5,863,938	\$7,074,353	44.98%	33.63%
6/30/2010	11,004,795	4,210,216	3,503,007	6,794,580	6,794,580	38.26%	31.83%
6/30/2011	11,182,142	3,726,986	3,538,878	7,455,156	7,643,264	33.33%	31.70%
6/30/2012	11,361,048	3,101,317	2,980,402	8,259,731	8,380,647	27.30%	26.20%
6/30/2013	11,386,602	2,636,123	2,747,428	8,750,479	8,639,174	23.15%	24.10%
6/30/2014	11,550,110	2,423,957	2,560,420	9,126,154	8,989,691	20.99%	22.20%
6/30/2015	12,359,673	2,350,990	2,307,858	10,008,683	10,051,815	19.02%	18.70%
6/30/2016	13,224,698	2,112,286	1,953,422	11,112,412	11,271,276	15.97%	14.80%
6/30/2017	15,591,641	2,123,623	2,056,870	13,468,018	13,534,771	13.62%	13.20%
6/30/2018	\$15,675,232	\$2,019,278	\$2,004,446	\$13,655,954	\$13,670,786	12.88%	12.79%

KERS (Non-Hazardous Insurance Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Actuarial Liabilities		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$4,507,326	\$34,173	\$365,771	\$3,973,153	\$4,141,554	11.11%	10.58%
6/30/2010	4,466,136	471,342	371,002	3,994,794	4,095,134	10.55%	8.31%
6/30/2011	4,280,090	451,620	433,305	3,828,469	3,846,784	10.55%	10.12%
6/30/2012	3,125,330	446,081	430,806	2,679,250	2,694,524	14.27%	13.78%
6/30/2013	2,128,754	497,584	509,364	1,631,170	1,619,390	23.37%	23.93%
6/30/2014	2,226,760	621,237	664,776	1,605,523	1,561,984	27.90%	29.85%
6/30/2015	2,413,705	695,018	687,684	1,718,687	1,726,021	28.79%	28.49%
6/30/2016	2,456,678	743,270	695,189	1,713,408	1,761,489	30.26%	28.30%
6/30/2017	2,683,496	823,918	817,370	1,859,578	1,866,126	30.70%	30.46%
6/30/2018	2,435,506	887,121	891,205	1,548,385	1,544,301	36.42%	36.59%

KERS (Hazardous Pension Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$674,412	\$502,503	\$388,913	\$171,908	\$285,498	74.51%	57.67%
6/30/2010	688,149	502,729	443,512	185,420	244,638	73.06%	64.45%
6/30/2011	721,293	510,749	510,628	210,545	210,665	70.81%	70.79%
6/30/2012	752,699	497,226	478,104	255,473	274,596	66.06%	63.52%
6/30/2013	783,981	505,657	513,162	278,324	270,818	64.50%	65.46%
6/30/2014	816,850	527,897	559,504	288,953	257,346	64.63%	68.50%
6/30/2015	895,433	556,688	550,120	338,746	345,313	62.17%	61.44%
6/30/2016	936,706	559,487	524,679	377,219	412,027	59.73%	56.01%
6/30/2017	1,121,420	607,159	601,529	514,261	519,891	54.14%	53.64%
6/30/2018	\$1,151,923	\$639,262	\$645,485	\$512,661	\$506,438	55.50%	56.04%

KERS (Hazardous Insurance Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$491,132	\$301,635	\$219,537	\$189,498	\$271,595	61.42%	44.70%
6/30/2010	493,298	314,427	271,396	178,870	221,902	63.74%	55.02%
6/30/2011	507,059	329,962	321,072	177,097	185,987	65.07%	63.32%
6/30/2012	384,592	345,574	333,298	39,018	51,294	89.85%	86.66%
6/30/2013	385,518	370,774	374,310	14,743	11,208	96.18%	97.09%
6/30/2014	396,987	419,396	435,504	(22,409)	(38,517)	105.64%	109.70%
6/30/2015	374,904	451,514	441,626	(76,610)	(66,722)	120.43%	117.80%
6/30/2016	377,745	473,160	440,596	(95,415)	(62,851)	125.26%	116.64%
6/30/2017	419,440	493,458	488,838	(74,019)	(69,399)	117.65%	116.55%
6/30/2018	\$393,481	\$511,441	\$519,072	(117,960.70)	(125,591.72)	129.98%	131.92%

Summary of Actuarial Unfunded Liabilities

As of June 30, 2018 (\$ in Thousands)

CERS (Non-Hazardous Pension Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$7,912,914	\$5,650,790	\$4,330,594	\$2,262,124	\$3,582,320	71.41%	54.73%
6/30/2010	8,459,022	5,546,857	4,819,934	2,912,165	3,639,089	65.57%	56.98%
6/30/2011	8,918,085	5,629,611	5,577,252	3,288,474	3,340,833	63.13%	62.54%
6/30/2012	9,139,568	5,547,236	5,372,770	3,592,332	3,766,798	60.69%	58.79%
6/30/2013	9,378,876	5,637,094	5,780,830	3,741,782	3,598,046	60.10%	61.64%
6/30/2014	9,772,523	6,117,134	6,507,300	3,655,389	3,265,222	62.60%	66.59%
6/30/2015	10,740,325	6,474,849	6,416,854	4,265,477	4,323,472	60.29%	59.75%
6/30/2016	11,076,457	6,535,372	6,106,187	4,541,084	4,970,270	59.00%	55.13%
6/30/2017	12,803,509	6,764,873	6,687,237	6,038,636	6,116,272	52.84%	52.23%
6/30/2018	\$13,191,505	\$6,950,225	\$7,018,963	\$6,241,280	\$6,172,542	52.69%	53.21%

CERS (Non-Hazardous Insurance Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$3,070,386	\$1,216,632	\$894,906	\$1,853,754	\$2,175,480	39.62%	29.15%
6/30/2010	3,158,340	1,293,039	1,096,582	1,865,302	2,061,758	40.94%	34.72%
6/30/2011	3,073,973	1,433,451	1,451,984	1,640,522	1,621,989	46.63%	47.23%
6/30/2012	2,370,771	1,512,854	1,439,226	857,917	931,545	63.81%	60.71%
6/30/2013	2,443,894	1,628,244	1,633,697	815,650	810,197	66.62%	66.85%
6/30/2014	2,616,915	1,831,199	1,899,557	785,715	717,357	69.98%	72.59%
6/30/2015	2,907,827	1,997,456	1,948,454	910,371	959,373	68.69%	67.01%
6/30/2016	2,988,121	2,079,811	1,943,757	908,310	1,044,364	69.60%	65.05%
6/30/2017	3,355,151	2,227,401	2,212,536	1,127,750	1,142,616	66.39%	65.94%
6/30/2018	\$3,092,623	\$2,371,430	\$2,414,126	\$721,193	\$678,497	76.68%	78.06%

CERS (Hazardous Pension Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
		6/30/2009	\$2,578,445	\$1,751,488	\$1,320,523	\$826,957	\$1,257,922
6/30/2010	2,672,152	1,749,464	1,506,787	922,688	1,165,364	65.47%	56.39%
6/30/2011	2,859,041	1,779,545	1,760,603	1,079,496	1,098,438	62.24%	61.58%
6/30/2012	3,009,992	1,747,379	1,677,940	1,262,613	1,332,052	58.05%	55.75%
6/30/2013	3,124,206	1,801,691	1,830,658	1,322,514	1,293,548	57.67%	58.60%
6/30/2014	3,288,826	1,967,640	2,082,998	1,321,186	1,205,827	59.83%	63.34%
6/30/2015	3,613,308	2,096,783	2,073,397	1,516,525	1,539,911	58.03%	57.38%
6/30/2016	3,704,456	2,139,119	2,003,669	1,565,337	1,700,787	57.74%	54.09%
6/30/2017	4,649,047	2,238,320	2,217,996	2,410,726	2,431,051	48.15%	47.71%
6/30/2018	\$4,792,548	\$2,321,721	\$2,348,337	\$2,470,827	\$2,444,211	48.44%	49.00%

CERS (Hazardous Insurance Fund)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
		6/30/2009	\$1,593,548	\$651,131	\$483,270	\$942,417	\$1,110,278
6/30/2010	1,674,703	692,770	586,827	981,933	1,087,876	41.37%	35.04%
6/30/2011	1,647,703	770,790	774,509	876,912	873,194	46.78%	47.01%
6/30/2012	1,364,843	829,041	788,071	535,802	576,772	60.74%	57.74%
6/30/2013	1,437,333	892,774	894,232	544,558	543,101	62.11%	62.21%
6/30/2014	1,493,864	997,733	1,034,308	496,131	459,557	66.79%	69.24%
6/30/2015	1,504,015	1,087,707	1,061,561	416,308	442,454	72.32%	70.58%
6/30/2016	1,558,818	1,135,784	1,062,602	423,034	496,216	72.86%	68.17%
6/30/2017	1,788,433	1,196,780	1,189,001	591,653	599,431	66.92%	66.48%
6/30/2018	\$1,684,028	\$1,256,306	\$1,280,982	\$427,722	\$403,046	74.60%	79.07%

**Summary of Actuarial Unfunded Liabilities
As of June 30, 2018 (\$ in Thousands)**

SPRS (Pension)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$602,329	\$329,967	\$256,571	\$272,362	\$345,758	54.78%	42.60%
6/30/2010	612,445	304,577	264,944	307,868	347,501	49.73%	43.26%
6/30/2011	634,379	285,581	279,934	348,799	354,445	45.02%	44.13%
6/30/2012	647,689	259,792	252,897	387,897	394,792	40.11%	39.05%
6/30/2013	651,581	241,800	248,559	409,780	403,022	37.11%	38.15%
6/30/2014	681,118	242,742	260,763	438,377	420,355	35.64%	38.28%
6/30/2015	734,156	248,388	246,968	485,769	487,188	33.83%	33.64%
6/30/2016	775,160	234,568	217,594	540,593	557,566	30.26%	28.07%
6/30/2017	967,145	261,320	255,737	705,824	711,408	27.02%	26.44%
6/30/2018	\$989,528	\$268,259	\$267,572	\$721,269	\$721,956	27.11%	27.04%

SPRS (Insurance)

Valuation Date	Actuarial Liability	Value of Assets		Unfunded Liability		Funding Level	
		Actuarial	Market	Actuarial	Market	Actuarial	Market
6/30/2009	\$364,031	\$123,527	\$93,687	\$240,504	\$270,344	33.93%	25.74%
6/30/2010	434,960	121,175	104,527	313,785	330,434	27.86%	24.03%
6/30/2011	438,428	123,687	127,368	314,740	311,060	28.21%	29.05%
6/30/2012	333,904	124,372	125,568	209,532	208,336	37.25%	37.61%
6/30/2013	222,327	136,321	142,831	86,006	79,496	61.32%	64.24%
6/30/2014	234,271	155,595	165,168	78,676	69,103	66.42%	70.50%
6/30/2015	254,839	167,775	165,018	87,064	89,821	65.84%	64.75%
6/30/2016	257,197	172,704	161,366	84,494	95,831	67.15%	62.74%
6/30/2017	276,641	180,464	178,838	96,178	97,803	65.23%	64.65%
6/30/2018	\$262,088	\$187,535	\$190,847	\$74,553	\$71,242	71.55%	72.82%

(1) Valuation Balance Sheets give the basis for determining the percentage rates for contributions to be made by employers.

Solvency Test

As of June 30, 2018 (\$ in Thousands)

KERS (Non-Hazardous Pension Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$793,575	\$8,205,156	\$1,659,819	\$4,794,611	100.00%	48.80%	0.00%	
6/30/2010	869,484	8,329,758	1,805,553	4,210,216	100.00%	40.10%	0.00%	
6/30/2011	916,569	8,482,714	1,782,859	3,726,986	100.00%	33.10%	0.00%	
6/30/2012	885,137	8,708,536	1,767,375	3,101,317	100.00%	25.40%	0.00%	
6/30/2013	922,928	8,709,324	1,754,351	2,636,123	100.00%	19.70%	0.00%	
6/30/2014	928,558	8,870,693	1,750,860	2,423,957	100.00%	16.90%	0.00%	
6/30/2015	925,934	9,437,468	1,996,271	2,350,990	100.00%	15.10%	0.00%	
6/30/2016	920,120	10,010,168	2,294,410	2,112,286	100.00%	11.90%	0.00%	
6/30/2017	934,559	11,608,346	3,048,736	2,123,623	100.00%	10.20%	0.00%	
6/30/2018	\$892,033	\$11,929,018	\$2,854,180	\$2,019,278	100.00%	9.40%	0.00%	

KERS (Non-Hazardous Insurance Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$-	\$2,861,867	\$1,645,458	\$534,173	100.00%	18.70%	0.00%	
6/30/2010	-	2,744,534	1,721,602	471,342	100.00%	17.20%	0.00%	
6/30/2011	-	2,568,003	1,712,087	451,620	100.00%	17.60%	0.00%	
6/30/2012	-	1,924,069	1,201,262	446,081	100.00%	23.20%	0.00%	
6/30/2013	-	1,338,773	789,981	497,584	100.00%	37.20%	0.00%	
6/30/2014	-	1,425,605	801,155	621,237	100.00%	43.60%	0.00%	
6/30/2015	-	1,428,350	985,355	695,018	100.00%	48.70%	0.00%	
6/30/2016	-	1,483,636	973,042	743,270	100.00%	50.10%	0.00%	
6/30/2017	-	1,575,294	1,108,202	823,918	100.00%	52.30%	0.00%	
6/30/2018	\$-	\$1,475,954	\$959,552	\$887,121	100.00%	60.10%	0.00%	

KERS (Hazardous Pension Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$87,780	\$413,972	\$172,659	\$502,503	100.00%	100.00%	0.40%	
6/30/2010	88,511	441,657	157,981	502,729	100.00%	93.80%	0.00%	
6/30/2011	86,614	490,395	144,284	510,749	100.00%	86.50%	0.00%	
6/30/2012	82,101	521,689	148,910	497,226	100.00%	79.60%	0.00%	
6/30/2013	82,146	545,597	156,238	505,657	100.00%	77.60%	0.00%	
6/30/2014	83,664	581,231	151,955	527,897	100.00%	76.40%	0.00%	
6/30/2015	83,606	633,189	178,638	556,688	100.00%	74.70%	0.00%	
6/30/2016	86,705	648,482	201,519	559,487	100.00%	72.90%	0.00%	
6/30/2017	93,350	746,350	281,720	607,159	100.00%	68.80%	0.00%	
6/30/2018	\$89,106	\$810,311	\$252,506	\$639,262	100.00%	67.90%	0.00%	

KERS (Hazardous Insurance Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$-	\$242,123	\$249,009	\$301,635	100.00%	100.00%	23.90%	
6/30/2010	-	268,511	224,787	314,427	100.00%	100.00%	20.40%	
6/30/2011	-	285,540	221,519	329,962	100.00%	100.00%	20.10%	
6/30/2012	-	196,579	188,013	345,574	100.00%	100.00%	79.20%	
6/30/2013	-	202,032	183,486	370,774	100.00%	100.00%	92.00%	
6/30/2014	-	206,477	190,509	419,396	100.00%	100.00%	100.00%	
6/30/2015	-	221,115	153,789	451,514	100.00%	100.00%	100.00%	
6/30/2016	-	228,361	149,384	473,160	100.00%	100.00%	100.00%	
6/30/2017	-	243,816	175,623	493,458	100.00%	100.00%	100.00%	
6/30/2018	\$-	\$248,775	\$144,706	\$511,441	100.00%	100.00%	100.00%	

Solvency Test**As of June 30, 2018 (\$ in Thousands)****CERS (Non-Hazardous Pension Fund)**

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$991,629	\$4,542,483	\$2,378,802	\$5,650,790	100.00%	100.00%	4.90%	
6/30/2010	1,063,747	4,890,659	2,504,616	5,546,857	100.00%	91.70%	0.00%	
6/30/2011	1,110,967	5,209,784	2,597,334	5,629,611	100.00%	86.70%	0.00%	
6/30/2012	1,117,549	5,416,933	2,605,085	5,547,236	100.00%	81.80%	0.00%	
6/30/2013	1,149,611	5,638,371	2,590,894	5,637,094	100.00%	79.60%	0.00%	
6/30/2014	1,204,383	5,873,279	2,694,860	6,117,134	100.00%	83.60%	0.00%	
6/30/2015	1,216,585	6,489,863	3,033,878	6,474,849	100.00%	81.00%	0.00%	
6/30/2016	1,231,027	6,785,530	3,059,900	6,535,372	100.00%	78.20%	0.00%	
6/30/2017	1,277,432	7,731,682	3,794,396	6,764,873	100.00%	71.00%	0.00%	
6/30/2018	\$1,269,287	\$8,196,719	\$3,725,500	\$6,950,225	100.00%	69.30%	0.00%	

CERS (Non-Hazardous Insurance Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$-	\$1,478,783	\$1,591,603	\$1,216,632	100.00%	82.30%	0.00%	
6/30/2010	-	1,526,533	1,631,807	1,293,039	100.00%	84.70%	0.00%	
6/30/2011	-	1,460,808	1,613,165	1,433,451	100.00%	98.10%	0.00%	
6/30/2012	-	1,146,908	1,223,864	1,512,854	100.00%	100.00%	29.90%	
6/30/2013	-	1,205,599	1,238,295	1,628,244	100.00%	100.00%	34.10%	
6/30/2014	-	1,318,183	1,298,732	1,831,199	100.00%	100.00%	39.50%	
6/30/2015	-	1,372,597	1,535,231	1,997,456	100.00%	100.00%	40.70%	
6/30/2016	-	1,484,937	1,503,184	2,079,811	100.00%	100.00%	39.60%	
6/30/2017	-	1,603,438	1,751,713	2,227,401	100.00%	100.00%	35.60%	
6/30/2018	\$-	\$1,525,322	\$1,567,301	\$2,371,430	100.00%	100.00%	54.00%	

CERS (Hazardous Pension Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$350,309	\$1,540,263	\$687,873	\$1,751,488	100.00%	91.00%	0.00%	
6/30/2010	369,613	1,622,684	679,855	1,749,464	100.00%	85.00%	0.00%	
6/30/2011	382,072	1,768,512	708,457	1,779,545	100.00%	79.00%	0.00%	
6/30/2012	381,672	1,889,884	738,435	1,747,379	100.00%	72.30%	0.00%	
6/30/2013	390,471	1,988,030	745,705	1,801,691	100.00%	71.00%	0.00%	
6/30/2014	415,070	2,077,517	796,239	1,967,640	100.00%	74.70%	0.00%	
6/30/2015	422,359	2,297,703	893,246	2,096,783	100.00%	72.90%	0.00%	
6/30/2016	428,713	2,388,712	887,031	2,139,119	100.00%	71.60%	0.00%	
6/30/2017	458,808	2,910,601	1,279,638	2,238,320	100.00%	61.10%	0.00%	
6/30/2018	\$442,637	\$3,151,057	\$1,198,853	\$2,321,721	100.00%	59.60%	0.00%	

CERS (Hazardous Insurance Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$-	\$725,900	\$867,648	\$651,131	100.00%	89.70%	0.00%	
6/30/2010	-	814,300	860,403	692,770	100.00%	85.10%	0.00%	
6/30/2011	-	771,631	876,071	770,790	100.00%	99.90%	0.00%	
6/30/2012	-	575,099	789,744	829,041	100.00%	100.00%	32.20%	
6/30/2013	-	660,955	776,377	892,774	100.00%	100.00%	29.90%	
6/30/2014	-	700,312	793,553	997,733	100.00%	100.00%	37.50%	
6/30/2015	-	790,714	713,301	1,087,707	100.00%	100.00%	41.60%	
6/30/2016	-	879,360	679,458	1,135,784	100.00%	100.00%	37.70%	
6/30/2017	-	994,764	793,669	1,196,780	100.00%	100.00%	25.50%	
6/30/2018	\$-	\$1,001,717	\$682,311	\$1,256,306	100.00%	100.00%	37.30%	

Solvency Test

As of June 30, 2018 (\$ in Thousands)

SPRS (Pension Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$41,664	\$459,585	\$101,079	\$329,967	100.00%	62.70%	0.00%	
6/30/2010	42,012	475,893	94,541	304,577	100.00%	55.20%	0.00%	
6/30/2011	43,574	499,194	91,611	285,581	100.00%	48.50%	0.00%	
6/30/2012	41,139	523,017	83,533	259,792	100.00%	41.80%	0.00%	
6/30/2013	39,788	535,720	76,072	241,800	100.00%	37.70%	0.00%	
6/30/2014	41,831	563,011	76,276	242,742	100.00%	35.70%	0.00%	
6/30/2015	41,567	605,855	86,734	248,388	100.00%	34.10%	0.00%	
6/30/2016	41,871	636,499	96,791	234,568	100.00%	30.30%	0.00%	
6/30/2017	44,798	773,982	148,365	261,320	100.00%	28.00%	0.00%	
6/30/2018	\$43,835	\$800,788	\$144,905	\$268,259	100.00%	28.00%	0.00%	

SPRS (Insurance Fund)

Actuarial Liabilities								
Valuation Date	(1)	(2)	(3)	Actuarial Value of Assets	% of Actuarial Liabilities Covered by Actuarial Assets for			
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Portion)		(1)	(2)	(3)	
6/30/2009	\$-	\$167,091	\$196,940	\$123,527	100.00%	73.90%	0.00%	
6/30/2010	-	253,440	181,380	121,175	100.00%	47.80%	0.00%	
6/30/2011	-	252,440	185,988	123,687	100.00%	49.00%	0.00%	
6/30/2012	-	190,259	143,645	124,372	100.00%	65.40%	0.00%	
6/30/2013	-	139,509	82,818	136,321	100.00%	97.70%	0.00%	
6/30/2014	-	143,402	90,869	155,595	100.00%	100.00%	13.40%	
6/30/2015	-	170,447	84,392	167,775	100.00%	98.40%	0.00%	
6/30/2016	-	177,094	80,103	172,704	100.00%	97.50%	0.00%	
6/30/2017	-	186,390	90,251	180,464	100.00%	96.80%	0.00%	
6/30/2018	\$-	\$183,151	\$78,937	\$187,535	100.00%	100.00%	5.60%	

Active Member Valuation

Methodology The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the investment return assumption. The amount recognized each year is 20% of the difference between market value and expected market value. The Asset Valuation Method was adopted in 2006.

Summary of Active Member Valuation Data

As of June 30, 2018 (in Whole \$)

KERS Non-Hazardous Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Total Active Members	Annual Covered Payroll ¹	Annual Average Pay	% Increase In Average Pay	Average Age	Average Years of Service Credit
6/30/2009	334	46,060	\$1,754,413	\$38,090	(0.30)%	43.00	8.70
6/30/2010	334	47,090	1,815,146	38,546	1.20%	43.40	9.00
6/30/2011	427	46,617	1,731,633	37,146	(3.60)%	43.80	9.40
6/30/2012	286	42,196	1,644,897	38,982	4.90%	44.30	9.80
6/30/2013	285	42,226	1,644,409	38,943	(0.10)%	44.50	10.10
6/30/2014	353	40,365	1,577,496	39,081	0.40%	44.80	10.50
6/30/2015	348	39,056	1,544,234	39,539	1.20%	45.00	10.60
6/30/2016	349	37,779	1,529,249	40,479	2.40%	45.10	10.70
6/30/2017	342	37,234	1,531,535	41,133	1.62%	45.40	10.90
6/30/2018	338	35,139	\$1,471,477	\$41,876	1.81%	45.20	10.80

KERS Hazardous Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Total Active Members	Annual Covered Payroll ¹	Annual Average Pay	% Increase In Average Pay	Average Age	Average Years of Service Credit
6/30/2009	20	4,334	\$146,044	\$33,697	(0.50)%	41.40	7.00
6/30/2010	18	4,291	143,558	33,456	(0.70)%	41.40	7.00
6/30/2011	16	4,291	133,054	31,008	(7.30)%	41.30	6.90
6/30/2012	14	4,086	131,977	32,300	4.20%	41.10	7.30
6/30/2013	14	4,127	132,015	31,988	(1.00)%	40.60	7.20
6/30/2014	18	4,024	129,076	32,077	0.30%	40.60	7.40
6/30/2015	17	3,886	128,680	33,114	3.20%	40.70	7.50
6/30/2016	17	3,959	147,563	37,273	12.60%	40.40	7.50
6/30/2017	18	4,047	162,418	40,133	7.67%	40.30	7.60
6/30/2018	18	3,929	\$158,213	\$40,268	0.34%	39.80	7.30

(1) The Annualized Retirement Allowance is the annualized value of the monthly retirement allowance for retired members and beneficiaries as of the valuation date. Consequently, the values will not match the fiscal year total benefit payments recorded in the financial section.

Member data in actuarial section will differ from reported data in other CAFR sections. For this section, the data is reported by account instead of by person (ex: a member could have vested service in KERS, but is currently active in a CERS and is reported in two membership categories).

CERS Non-Hazardous Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Total Active Members	Annual Covered Payroll ¹	Annual Average Pay	% Increase In Average Pay	Average Age	Average Years of Service Credit
6/30/2009	1,108	83,724	\$2,183,612	\$26,081	2.60%	46.20	8.60
6/30/2010	1,102	84,681	2,236,855	26,415	1.30%	46.60	8.80
6/30/2011	1,102	85,285	2,276,596	26,694	1.10%	46.80	9.00
6/30/2012	1,080	83,052	2,236,546	26,929	0.90%	47.50	9.10
6/30/2013	1,081	81,815	2,236,277	27,333	1.50%	47.80	9.30
6/30/2014	1,101	81,115	2,272,270	28,013	2.50%	48.10	9.60
6/30/2015	1,092	80,852	2,296,716	28,406	1.40%	48.00	9.50
6/30/2016	1,095	80,664	2,352,762	29,167	2.70%	47.90	9.40
6/30/2017	1,096	82,198	2,452,407	29,835	2.29%	47.90	9.40
6/30/2018	1,092	81,818	\$2,466,801	\$30,150	1.06%	47.70	9.20

CERS Hazardous Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Total Active Members	Annual Covered Payroll ¹	Annual Average Pay	% Increase In Average Pay	Average Age	Average Years of Service Credit
6/30/2009	290	9,757	\$469,315	\$48,100	3.20%	38.40	8.80
6/30/2010	282	9,562	466,549	48,792	1.40%	38.80	9.20
6/30/2011	281	9,407	466,964	49,640	1.70%	39.10	9.50
6/30/2012	254	9,130	464,229	50,847	2.40%	39.30	10.30
6/30/2013	248	9,123	461,673	50,605	(0.50)%	39.10	10.30
6/30/2014	254	9,194	479,164	52,117	3.00%	39.20	10.60
6/30/2015	246	9,172	483,641	52,730	1.20%	39.10	10.60
6/30/2016	246	9,084	492,851	54,255	2.90%	39.10	10.60
6/30/2017	250	9,495	541,633	57,044	5.14%	39.20	10.50
6/30/2018	247	9,263	\$533,618	\$57,607	0.99%	38.50	10.20

SPRS Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Total Active Members	Annual Covered Payroll ¹	Annual Average Pay	% Increase In Average Pay	Average Age	Average Years of Service Credit
6/30/2009	1	946	\$51,660	\$54,609	1.80%	37.30	11.00
6/30/2010	1	961	51,507	53,597	(1.90)%	37.20	10.60
6/30/2011	1	965	48,693	50,459	(5.90)%	37.70	10.60
6/30/2012	1	907	48,373	53,332	5.70%	37.30	10.40
6/30/2013	1	902	45,256	50,173	(5.90)%	37.00	10.00
6/30/2014	1	855	44,616	52,182	4.00%	37.80	10.90
6/30/2015	1	937	45,765	48,842	(6.40)%	36.80	9.80
6/30/2016	1	908	45,551	50,167	2.71%	37.00	10.00
6/30/2017	1	903	48,598	53,819	7.28%	37.50	10.60
6/30/2018	1	886	\$48,808	\$55,088	2.36%	37.30	10.50

(1) The Annualized Retirement Allowance is the annualized value of the monthly retirement allowance for retired members and beneficiaries as of the valuation date. Consequently, the values will not match the fiscal year total benefit payments recorded in the financial section.

Member data in actuarial section will differ from reported data in other CAFR sections. For this section, the data is reported by account instead of by person (ex: a member could have vested service in KERS, but is currently active in a CERS and is reported in two membership categories).

**Summary of Retired Member Valuation Data
As of June 30, 2018 (in Whole \$)**

KERS (Non-Hazardous)

Valuation Date	Number Added	Number Removed	Total Retirees & Beneficiaries	Annualized Retirement Allowances ¹	% Increase In Allowances	Average Annual Allowance
6/30/2009	3,465	889	37,883	\$812,559	14.36%	\$21,449
6/30/2010	1,162	1,100	37,945	801,882	(1.31)%	21,133
6/30/2011	1,592	940	38,597	821,197	2.41%	21,276
6/30/2012	1,707	1,078	39,226	844,881	2.88%	21,539
6/30/2013	1,982	1,014	40,194	872,140	3.23%	21,698
6/30/2014	2,067	1,038	41,223	866,047	(0.70)%	21,009
6/30/2015	2,140	1,094	42,269	883,578	2.02%	20,904
6/30/2016	2,441	706	44,004	934,930	5.81%	21,246
6/30/2017	2,181	1,269	44,916	921,302	(1.46)%	20,512
6/30/2018	2,853	1,243	46,526	\$952,951	3.44%	\$20,482

KERS (Hazardous)

Valuation Date	Number Added	Number Removed	Total Retirees & Beneficiaries	Annualized Retirement Allowances ¹	% Increase In Allowances	Average Annual Allowance
6/30/2009	339	95	2,648	\$38,696	15.20%	\$14,613
6/30/2010	282	95	2,835	41,115	6.25%	14,503
6/30/2011	288	59	3,064	45,609	10.93%	14,886
6/30/2012	243	54	3,253	49,231	7.94%	15,134
6/30/2013	229	52	3,430	51,122	3.84%	14,905
6/30/2014	256	66	3,620	54,272	6.16%	14,992
6/30/2015	203	65	3,758	56,431	3.98%	15,016
6/30/2016	237	29	3,966	59,001	4.55%	14,877
6/30/2017	206	79	4,093	59,162	0.27%	14,455
6/30/2018	321	44	4,370	\$64,050	8.26%	\$14,657

(1) The Annualized Retirement Allowance is the annualized value of the monthly retirement allowance for retired members and beneficiaries as of the valuation date. Consequently, the values will not match the fiscal year total benefit payments recorded in the financial section.

(2) Member data in actuarial section will differ from reported data in other CAFR sections. For this section, the data is reported by account instead of by person (ex: a member could have vested service in KERS, but is currently active in a CERS and is reported in two membership categories).

CERS (Non-Hazardous)

Valuation Date	Number Added	Number Removed	Total Retirees & Beneficiaries	Annualized Retirement Allowances ¹	% Increase In Allowances	Average Annual Allowance
6/30/2009	3,060	883	39,756	\$440,061	11.76%	\$11,069
6/30/2010	2,565	1,283	41,038	452,614	2.85%	11,029
6/30/2011	3,250	1,077	43,211	483,594	6.84%	11,191
6/30/2012	3,300	1,207	45,304	515,008	6.50%	11,368
6/30/2013	3,570	1,198	47,676	557,979	8.34%	11,704
6/30/2014	3,480	1,221	49,935	582,958	4.48%	11,674
6/30/2015	4,020	1,304	52,651	617,551	5.93%	11,729
6/30/2016	4,409	721	56,339	661,217	7.07%	11,736
6/30/2017	4,141	1,467	59,013	667,468	0.95%	11,311
6/30/2018	4,650	1,725	61,938	\$710,374	6.43%	\$11,469

CERS (Hazardous)

Valuation Date	Number Added	Number Removed	Total Retirees & Beneficiaries	Annualized Retirement Allowances ¹	% Increase In Allowances	Average Annual Allowance
6/30/2009	650	264	5,808	\$139,887	9.73%	\$24,085
6/30/2010	423	163	6,068	146,917	5.03%	24,212
6/30/2011	502	102	6,468	160,259	9.08%	24,777
6/30/2012	483	73	6,878	173,221	8.09%	25,185
6/30/2013	519	104	7,293	182,635	5.43%	25,042
6/30/2014	469	116	7,646	191,008	4.58%	24,981
6/30/2015	526	138	8,034	202,153	5.84%	25,162
6/30/2016	604	75	8,563	215,302	6.50%	25,143
6/30/2017	576	141	8,998	226,680	5.28%	\$25,192
6/30/2018	779	190	9,587	\$245,675	8.38%	\$25,626

SPRS State Police Retirement System

Valuation Date	Number Added	Number Removed	Total Retirees & Beneficiaries	Annualized Retirement Allowances ¹	% Increase In Allowances	Average Annual Allowance
6/30/2009	75	26	1,184	\$44,274	7.22%	\$37,394
6/30/2010	54	15	1,223	45,516	2.80%	37,217
6/30/2011	52	12	1,263	47,467	4.29%	37,583
6/30/2012	52	16	1,299	49,887	5.10%	38,404
6/30/2013	63	16	1,346	50,906	2.04%	37,820
6/30/2014	95	28	1,413	53,432	4.96%	37,815
6/30/2015	62	15	1,460	54,930	2.80%	37,624
6/30/2016	65	10	1,515	56,650	3.13%	37,393
6/30/2017	30	9	1,536	57,253	1.06%	37,274
6/30/2018	81	17	1,600	\$59,626	4.14%	\$37,266

(1) The Annualized Retirement Allowance is the annualized value of the monthly retirement allowance for retired members and beneficiaries as of the valuation date. Consequently, the values will not match the fiscal year total benefit payments recorded in the financial section.

(2) Member data in actuarial section will differ from reported data in other CAFR sections. For this section, the data is reported by account instead of by person (ex: a member could have vested service in KERS, but is currently active in a CERS and is reported in two membership categories).

Summary of Benefit Provisions KERS & CERS Non-Hazardous Plans

Plan Funding

State statute requires active members to contribute 5% of creditable compensation. For members participating on or after September 1, 2008, an additional 1% of creditable compensation is required. This amount is credited to the Insurance Fund and is non-refundable to the member. Employers contribute at the rate determined by the Board to be necessary for the actuarial soundness of the systems, as required by KRS 61.565 and KRS 61.702. KERS rates are subject to state budget approval.

Membership Eligibility

For non-school board employers, all regular full-time positions that average 100 or more hours of work per month over a fiscal or calendar year. For school board employers, all regular full-time positions that average 80 hours of work per month over the actual days worked during the school year.

Retirement Eligibility for Non-Hazardous Employees

Age	Years of Service	Allowance Reduction
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Tier 1 Members Whose Participation Began Before 9/1/2008

65	1 month	None
Any	27	None
55	5	6.5% per year for first five years, and 4.5% for next five years before age 65 or 27 years of service.
Any	25	6.5% per year for first five years, and 4.5% for next five years before age 65 or 27 years of service.

Tier 2 Members Whose Participation Began On or After 9/1/2008 but before 1/1/2014

65	5	None
57	Rule of 87	None
60	10	6.5% per year for first five years, and 4.5% for next five years before age 65 or Rule of 87 (age plus years of service)

Tier 3 Members Whose Participation Began On or After 1/1/2014

65	5	None
57	Rule of 87	None

Benefit Formula

Tier 1: Members whose participation began before 9/1/2008

Final Compensation	Benefit Factor	Years of Service
Average of the five highest years of compensation.	KERS 1.97% if:	Member does not have 13 months of service credit for 1/1/1998-1/1/1999.
	KERS 2.00% if:	Member has 13 months of service credit from 1/1/1998-1/1/1999.
	KERS 2.20% if:	Member has 20 or more years of service, including 13 months from 1/1/1998-1/1/1999 and retires by 1/1/2009.
	CERS 2.20% if:	Member begins participating prior to 8/1/2004.
	CERS 2.00% if:	Member begins participating on or after 8/1/2004 but before 9/1/2008.
		Includes earned service, purchased service, prior service, and sick leave service (if the member's employer participates in an approved sick leave program).

If a member retires with less than four years of service credit, the member's benefit is equal to the actuarially equivalent of two times their member contribution balance with interest.

Tier 2: Members whose participation began on or after 9/1/2008 but before 1/1/2014

Average of the last five years of compensation	KERS & CERS increasing percent based on service at retirement up to 30 years*		Member begins participating on or after 9/1/2008 but before 1/1/2014.	Includes earned service, purchased service, prior service, and sick leave service (if the member's employer participates in an approved sick leave program)
	plus 2.00% for each year of service over 30 years			
	*Service	Multiplier		
	10 years or less	1.10%		
	10-20 years	1.30%		
	20-26 years	1.50%		
	26-30 years	1.75%		

Tier 3: Members whose participation began on or after 1/1/2014

$$(A - B) = C \times 75\% = D \text{ then } B + D = \text{Interest (\$ in Thousands)}$$

	A	B	C	D		
	5 Year	Less	Upside	Upside Sharing	Interest	Total Interest
	Geometric	Guarantee	Sharing	Interest X 75% =	Rate Earned	Credited
	Average	Rate of 4%	Interest	Upside Gain	(4% + Upside)	to Member
System	Return					Accounts
KERS Non-Hazardous	6.66%	4.00%	2.66%	2.00%	6.00%	\$2,379
KERS Hazardous	7.53%	4.00%	3.53%	2.65%	6.65%	771
CERS Non-Hazardous	7.39%	4.00%	3.39%	2.54%	6.54%	4,786
CERS Hazardous	7.66%	4.00%	3.66%	2.75%	6.75%	1,284
SPRS	6.95%	4.00%	2.95%	2.21%	6.21%	\$92

Summary of Benefit Provisions KERS & CERS Non-Hazardous Plan

Post-Retirement Death Benefits

The choice of payment option selected by the member at the time of retirement will determine the monthly benefits provided to the beneficiary upon the retired member's death.

If the member is receiving a monthly benefit based on at least four (4) years of creditable service, the retirement system will pay a \$5,000 death benefit payment to the beneficiary named by the member specifically for this benefit.

Disability Benefits

Members participating before August 1, 2004, may retire on account of disability provided the member has at least 60 months of service credit and is not eligible for an unreduced benefit. Additional service credit may be added for computation of benefits under the benefit formula.

Members participating on or after August 1, 2004, but before January 1, 2014, may retire on account of disability provided the member has at least 60 months of service credit. Benefits are computed as the greater of 20% of member's monthly final rate of pay or the amount calculated under the Benefit Formula based upon actual service.

Members participating on or after January 1, 2014, may retire on account of disability provided the member has at least 60 months of service credit. 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 greater of 20% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

Members disabled as a result of a single duty-related injury or act of violence related to their job may be eligible for special benefits.

Pre-Retirement Death Benefits

The beneficiary of a deceased active member is eligible for a monthly benefit if the member died while in the line of duty. The beneficiary of a deceased active member who did not die in the line of duty is eligible for a monthly benefit if the member was: (1) eligible for retirement at the time of death or, (2) under the age of 55 with at least 60 months of service credit and currently working for a participating agency at the time of death or (3) no longer working for a participating agency but at the time of death had at least 144 months of service credit. If the beneficiary of a deceased active member is not eligible for a monthly benefit, the beneficiary will receive a lump-sum payment of the member's contributions and any accumulated interest.

Cost of Living Adjustment

SB2 of 2013 eliminated all future COLAs unless the State Legislature so authorizes on a biennial basis and either (i) the system is over 100% funded or (ii) the Legislature appropriates sufficient funds to pay the increased liability for the COLA.

Insurance Benefits

For members participating prior to July 1, 2003, KRS pays a percentage of the monthly premium for single coverage based upon the service credit accrued at retirement. Members participating on or after July 1, 2003, and before September 1, 2008 are required to earn at least 10 years of service credit in order to be eligible for insurance benefits at retirement. Members participating on or after September 1, 2008, are required to earn at least 15 years of service credit in order to be eligible for insurance benefits at retirement. The monthly health insurance contribution will be \$10 for each year of earned service increased by the CPI prior to July 1, 2009, and by 1.5% annually from July 1, 2009.

Refunds

Upon termination of employment, a refund of member contributions and accumulated interest is available to the member.

Interest on Accounts

For employees participating prior to September 1, 2008, the interest paid is set by the Board of Trustees and will not be less than 2.0%, for employees participating on or after September 1, 2008, but before January 1, 2014, interest will be credited at a rate of 2.5%. For employees participating on or after January 1, 2014, interest will be credited at a minimum rate of 4.0%.

Benefit Changes since the Prior Valuation

During the 2018 legislative session, House Bill 185 was enacted, which provided increased pension and insurance benefits for the beneficiaries of active members who die in the line of duty.

Summary of Benefit Provisions KERS Hazardous, CERS Hazardous & SPRS Plans

Plan Funding

State statute requires active members to contribute 8% of creditable compensation. For members participating on or after September 1, 2008, an additional 1% of creditable compensation is required. This amount is credited to the Insurance Fund and is non-refundable to the member. Employers contribute at the rate determined by the Board to be necessary for the actuarial soundness of the systems, as required by KRS 61.565 and KRS 61.702. KERS rates are subject to state budget approval.

Membership Eligibility

All regular full-time hazardous duty positions approved by the Board that average 100 or more hours of work per month over a fiscal or calendar year.

Retirement Eligibility for Hazardous

Age	Years of Service	Allowance Reduction
Tier 1 Members Whose Participation Began Before 9/1/2008		
55	1 month	None
Any	20	None
50	15	6.5% per year for first five years, and 4.5% for next five years before age 55 or 20 years of service.
Tier 2 Members Whose Participation Began On or After 9/1/2008 but before 1/1/2014		
60	5	None
Any	25	None
50	15	6.5% per year for first five years, and 4.5% for next five years before age 60 or 25 years of service.
Tier 3 Members Whose Participation Began On or After 1/1/2014		
60	5	None
Any	25	None

Benefit Formula for Hazardous for Tier 1: Members whose participation began before 9/1/2008

Final Compensation	Benefit Factor	Years of Service
Average of the three highest years of compensation.	KERS 2.49% if:	Includes earned service, purchased service, prior service, and sick leave service (if the member's employer participates in an approved sick leave program).
	CERS 2.50% if:	
	SPRS 2.50% if:	
	Member begins participating before 9/1/2008.	

If a member retires with less than four years of service, the member's benefit is equal to the actuarially equivalent of two times their member contribution balance with interest.

Benefit Formula for Hazardous for Tier 2: Members whose participation began on or after 9/1/2008 but before 1/1/2014

Final Compensation	Benefit Factor	Years of Service
Average of the three highest complete years of compensation.	KERS & CERS & SPRS increasing percent based on service at retirement*	
	*Service	Multiplier
	10 years or less	1.30%
	10-20 years	1.50%
	20-25 years	2.25%
	25+ years	2.50%
	Member begins participating on or after 9/1/2008 but before 1/1/2014.	Includes earned service, purchased service, prior service, and sick leave service (if the member's employer participates in an approved sick leave program).

Benefit Formula for Hazardous for Tier 3: Members whose participation began on or after 1/1/2014

No benefit factor for Tier 3. A life annuity can be calculated in accordance with actuarial assumptions and methods adopted by the board based on the member's accumulated account balance in the hybrid cash balance plan.

Summary of Benefit Provisions KERS Hazardous, CERS Hazardous & SPRS Plans

Post-Retirement Death Benefits

The choice of payment option selected by the member at the time of retirement will determine the monthly benefits provided to the beneficiary upon the retired member's death.

If the member is receiving a monthly benefit based on at least four (4) years of creditable service, the retirement system will pay a \$5,000 death benefit payment to the beneficiary named by the member specifically for this benefit.

Disability Benefits

Members participating before August 1, 2004, may retire on account of disability provided the member has at least 60 months of service credit and is not eligible for an unreduced benefit. Additional service credit may be added for computation of benefits under the benefit formula.

Members participating on or after August 1, 2004, but before January 1, 2014, may retire on account of disability provided the member has at least 60 months of service credit. Benefits are computed as the greater of 25% of the member's monthly final rate of pay or the amount calculated under the Benefit Formula based upon actual service.

Members participating on or after January 1, 2014, may retire on account of disability provided the member has at least 60 months of service credit. 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 greater of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

Members disabled as a result of a single duty-related injury or act of violence related to their job may be eligible for special benefits.

Pre-Retirement Death Benefits

The beneficiary of a deceased active member is eligible for a monthly benefit if the member died while in the line of duty. The beneficiary of a deceased active member who did not die in the line of duty is eligible for a monthly benefit if the member was: (1) eligible for retirement at the time of death or, (2) under the age of 55 with at least 60 months of service credit and currently working for a participating agency at the time of death or (3) no longer working for a participating agency but at the time of death had at least 144 months of service credit. If the beneficiary of a deceased active member is not eligible for a monthly benefit, the beneficiary will receive a lump sum payment of the member's contributions and any accumulated interest.

Cost of Living Adjustment

SB2 of 2013 eliminated all future COLAs unless the State Legislature so authorizes on a biennial basis and either (i) the system is over 100% funded or (ii) the Legislature appropriates sufficient funds to pay the increased liability for the COLA.

Insurance Benefits

For members participating prior to July 1, 2003, KRS pays a percentage of the monthly premium for single coverage based upon the service credit accrued at retirement. Members participating on or after July 1, 2003, and before September 1, 2008, are required to earn at least 10 years of service credit in order to be eligible for insurance benefits at retirement. Members participating on or after September 1, 2008 are required to earn at least 15 years of service credit in order to be eligible for insurance benefits at retirement. The monthly health insurance contribution will be \$15 for each year of earned service increased by the CPI prior to July 1, 2009, and by 1.5% annually from July 1, 2009.

Refunds

Upon termination of employment, a refund of member contributions and accumulated interest is available to the member.

Interest on Accounts

For employees participating prior to September 1, 2008, the interest paid is set by the Board of Trustees and will not be less than 2.0%, for employees participating on or after September 1, 2008, but before January 1, 2014, interest will be credited at a rate of 2.5%. For employees participating on or after January 1, 2014, interest will be credited at a minimum rate of 4.0%.

Benefit Changes since the Prior Valuation

During the 2018 legislative session, House Bill 185 was enacted, which provided increased pension and insurance benefits for active members who die in the line of duty.

Membership Eligibility

All regular full-time hazardous duty positions approved by the Board that average 100 or more hours of work per month over a fiscal or calendar year.

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FUND Statistics

DEFINITIONS

Active members are those members who are currently employed by a participating agency and contributing to the Systems as a condition of employment.

Inactive members are those members who are no longer employed with a participating agency but have not yet retired or taken a refund of contributions.

Retired members include both members and beneficiaries who are receiving a monthly benefit from the Systems.

A single member may have multiple accounts, which contribute to one pension. Each person is only counted once in the Membership by System report. A member who has both a membership account and a retired account is included in the retired count. Members who have multiple membership accounts are included under the system where they most recently contributed. Members who have more than one retirement account are included in the system with the greatest service credit. If the retired accounts have equal service credit, they are counted first in SPRS, CERS Hazardous, KERS Hazardous, CERS Non-Hazardous, then KERS Non-Hazardous. These tables do not include individuals receiving payments under dependent child accounts, Qualified Domestic Relations Orders, or multiple beneficiary accounts.

KERS Non-Hazardous Membership As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	40,710	40,375	37,240	118,325
2014	40,500	41,213	38,022	119,735
2015	39,289	42,479	38,827	120,595
2016	38,121	43,926	40,099	122,146
2017	36,725	44,848	40,813	122,386
2018	34,845	45,768	42,175	122,788

KERS Hazardous Membership As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	4,057	2,882	2,312	9,251
2014	4,094	3,318	2,467	9,879
2015	3,932	3,761	2,575	10,268
2016	3,987	4,067	2,739	10,793
2017	4,061	4,363	2,823	11,247
2018	3,963	4,716	3,010	11,689

CERS Non-Hazardous Membership As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	82,631	67,013	44,164	193,808
2014	82,494	70,231	46,112	198,837
2015	82,969	72,965	48,515	204,449
2016	83,346	75,904	51,673	210,923
2017	84,401	78,940	54,018	217,359
2018	84,435	81,608	56,629	222,672

CERS Hazardous Membership As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	9,069	1,956	5,840	16,865
2014	9,189	2,038	6,066	17,293
2015	9,188	2,142	6,389	17,719
2016	9,139	2,309	6,834	18,282
2017	9,321	2,442	7,186	18,949
2018	9,285	2,581	7,647	19,513

SPRS Membership As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	901	236	1,240	2,377
2014	861	239	1,279	2,379
2015	940	257	1,324	2,521
2016	924	262	1,379	2,565
2017	910	278	1,393	2,581
2018	891	290	1,445	2,626

Kentucky Retirement Systems Membership Totals As of June 30, 2018

Fiscal Year	Active	Inactive	Retired	Total
2013	137,368	112,462	90,796	340,626
2014	137,138	117,039	93,946	348,123
2015	136,318	121,604	97,630	355,552
2016	135,517	126,468	102,725	364,710
2017	135,418	130,871	106,234	372,523
2018	133,419	134,963	110,906	379,288

Principal Participating Employers in KERS As of June 30, 2018

Participating Employer	Rank	Covered Employees	% of Total System
Department for Community Based Services	1	4,572	11.54%
Department of Corrections	2	3,798	9.59%
Department of Highways	3	3,710	9.37%
Judicial Department Administrative Office of the Courts	4	1,393	3.52%
Department of Juvenile Justice	5	1,195	3.02%
Bluegrass.org	6	940	2.37%
Kentucky State Police	7	904	2.28%
Unified Prosecutorial System	8	862	2.18%
Department of Veterans Affairs	9	847	2.14%
Department of Revenue	10	809	2.04%
All Others		20,577	51.95%
Total		39,607	100.00%

Schedule of Participating Employers in KERS As of June 30, 2018

Agency Classification	Number of Agencies	Number of Employees
County Attorneys	61	297
Health Departments	60	2,474
Master Commissioner	34	72
Non-P1 State Agencies	36	896
Other Retirement Systems	1	27
P1 State Agencies	137	30,136
Regional Mental Health Units	12	2,371
Universities	7	3,334
Total	348	39,607

Total Employees By Tier Levels

Tier 1	20,811
Tier 2	7,791
Tier 3	11,005

Principal Participating Employers in CERS As of June 30, 2018

Participating Employer	Rank	Covered Employees	% of Total System
Jefferson County Board of Education	1	6,447	6.82%
Louisville Jefferson County Metro Government	2	5,098	5.39%
Fayette County Board of Education	3	1,918	2.03%
Lexington Fayette Urban County Government	4	1,728	1.83%
Judicial Department Administrative Office of the Courts	5	1,658	1.75%
Boone County Board of Education	6	1,155	1.22%
Bullitt County Board of Education	7	1,137	1.20%
Hardin County Board of Education	8	1,105	1.17%
Pike County Board of Education	9	974	1.03%
Warren County Board of Education	10	958	1.01%
All Others		72,407	76.55%
Total		94,585	100.00%

Schedule of Participating Employers in CERS As of June 30, 2018

Agency Classification	Number of Agencies	Number of Employees
Airport Boards	5	524
Ambulance Services	19	408
Area Development Districts	14	666
Boards of Education	173	48,739
Cities	221	10,343
Community Action Agencies	21	2,884
Conservation Districts	49	58
County Attorneys	77	645
County Clerks	16	598
Development Authorities	6	9
Fire Departments	38	817
Fiscal Courts	118	11,133
Health Departments	1	353
Housing Authorities	42	430
Jailers	2	78
Libraries	85	1,280
Other Retirement Systems	2	3
P1 State Agencies	4	1,658
Parks and Recreation	7	65
Planning Commissions	16	213
Police Departments	2	15
Riverport Authorities	5	72
Sanitation Districts	9	336
Sheriff Departments	12	755
Special Districts & Boards	49	1,462
Tourist Commissions	23	190
Urban Government Agencies	2	6,826
Utility Boards	120	4,025
Total	1,138	94,585

Total Employees By Tier Levels

Tier 1	43,496
Tier 2	18,766
Tier 3	32,323

Schedule of Participating Employers in SPRS As of June 30, 2018

Kentucky State Police - Uniformed Police Officers	1	917
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Total Employees By Tier Levels

Tier 1	524
Tier 2	215
Tier 3	178

Average Monthly Benefit by Length of Service in KERS As of June 30, 2018 (in Whole \$)

Service Credit Range	KERS Non-Hazardous		KERS Hazardous	
	Number of Accounts	Average Monthly Benefit	Number of Accounts	Average Monthly Benefit
Under 5 years	5,990	\$175	811	\$200
5 or more but less than 10	6,020	430	841	571
10 or more but less than 15	5,476	716	761	1,016
15 or more but less than 20	4,648	1,049	675	1,532
20 or more but less than 25	5,018	1,396	1,053	2,012
25 or more but less than 30	12,587	2,291	189	2,821
30 or more but less than 35	6,685	3,236	61	3,564
35 or more	2,561	4,563	6	4,231
Total	48,985	\$1,666	4,397	\$1,215

Average Monthly Benefit by Length of Service in CERS As of June 30, 2018 (in Whole \$)

Service Credit Range	CERS Non-Hazardous		CERS Hazardous	
	Number of Accounts	Average Monthly Benefit	Number of Accounts	Average Monthly Benefit
Under 5 years	8,707	\$163	1,102	\$380
5 or more but less than 10	11,171	339	1,077	694
10 or more but less than 15	10,975	535	976	1,235
15 or more but less than 20	9,051	795	951	1,769
20 or more but less than 25	10,129	999	3,658	2,517
25 or more but less than 30	11,777	1,918	1,419	3,511
30 or more but less than 35	2,851	2,696	421	4,232
35 or more	754	3,675	94	5,269
Total	65,415	\$939	9,698	\$2,116

Average Monthly Benefit by Length of Service in SPRS As of June 30, 2018 (in Whole \$)

Service Credit Range	Number of Accounts	Average Monthly Benefit
Under 5 years	135	\$546
5 or more but less than 10	55	929
10 or more but less than 15	58	1,367
15 or more but less than 20	109	2,020
20 or more but less than 25	481	2,671
25 or more but less than 30	485	3,634
30 or more but less than 35	239	4,750
35 or more	61	6,053
Total	1,623	\$3,066

Note: These tables reflect the Average Monthly Pension Benefit. A single member may have multiple accounts, which contribute to one pension. These tables do not reflect dependent child accounts, Qualified Domestic Relations Order (QDRO) accounts or multiple beneficiary accounts.

Fiduciary Net Position - KERS**As of June 30, 2018 (\$ in Thousands)**

Fiscal Year	Non-Hazardous			Hazardous		
	Pension	Insurance	Total	Pension	Insurance	Total
2012	\$2,977,935	\$418,490	\$3,396,425	\$476,589	\$330,730	\$807,319
2013	2,760,753	496,040	3,256,793	514,592	372,883	887,475
2014	2,578,290	646,905	3,225,195	561,484	433,525	995,009
2015	2,327,782	665,639	2,993,421	552,468	439,113	991,581
2016	1,980,292	668,318	2,648,610	527,880	437,880	965,277
2017	2,092,781	781,406	2,874,187	605,921	484,442	1,090,363
2018	\$2,048,890	\$846,762	\$2,895,652	\$651,173	\$513,384	\$1,164,557

Fiduciary Net Position - CERS**As of June 30, 2018 (\$ in Thousands)**

Fiscal Year	Non-Hazardous			Hazardous		
	Pension	Insurance	Total	Pension	Insurance	Total
2012	\$5,381,602	\$1,428,821	\$6,810,423	\$1,672,970	\$785,874	\$2,458,844
2013	5,795,568	1,618,960	7,414,528	1,833,571	891,320	2,724,891
2014	6,528,147	1,878,711	8,406,858	2,087,002	1,030,303	3,117,305
2015	6,440,800	1,920,946	8,361,746	2,078,202	1,056,480	3,134,682
2016	6,141,396	1,908,550	8,049,946	2,010,177	1,056,097	3,066,274
2017	6,739,142	2,160,553	8,899,695	2,227,679	1,179,313	3,406,992
2018	\$7,086,322	\$2,346,767	\$9,433,089	\$2,361,047	\$1,268,272	\$3,629,319

Fiduciary Net Position - SPRS**As of June 30, 2018 (\$ in Thousands)**

Fiscal Year	Pension	Insurance	Total
2012	\$250,476	\$125,398	\$375,874
2013	248,698	142,691	391,389
2014	260,974	164,958	425,932
2015	247,229	164,714	411,943
2016	218,013	160,949	378,962
2017	256,383	178,191	434,574
2018	\$268,425	\$189,994	\$458,419

For additional historical data for all charts presented, please visit our website for previous annual reports at <https://kyret.ky.gov/Publications/Pages/Comprehensive-Annual-Financial-Reports.aspx>

Fiduciary Net Position - KRS**As of June 30, 2018 (\$ in Thousands)**

Fiscal Year	Pension	Insurance	Total
2012	\$10,758,706	\$3,089,313	\$13,848,019
2013	11,153,182	3,521,894	14,675,076
2014	12,015,897	4,154,402	16,170,299
2015	11,646,481	4,246,892	15,893,373
2016	10,877,757	4,231,311	15,109,068
2017	11,921,906	4,783,905	16,705,811
2018	\$12,415,857	\$5,165,179	\$17,581,036

Note: For additional historical data for all charts presented, please visit our website for previous annual reports at <https://kyret.ky.gov/Publications/Pages/Comprehensive-Annual-Financial-Reports.aspx>

Changes in Fiduciary Net Position - KERS Non-Hazardous Pension Fund

As of June 30, 2018 (\$ in Thousands)

Additions	2012	2013	2014	2015	2016	2017	2018
Members' Contributions	\$96,418	\$96,744	\$92,941	\$100,424	\$101,677	\$100,544	\$104,972
Employers' Contributions	211,071	280,874	296,836	520,949	512,670	644,803	619,988
General Fund Appropriations						58,193	67,574
Health Insurance Contributions (HB1)	5,337	3,344	4,546	4,181	4,817	5,156	5,786
Employer Cessation						53,215	17
Net Investment Income (Loss)	9,789	303,011	337,174	44,094	(20,662)	220,985	147,577
Bank of America Settlement				8,442			-
Northern Trust Settlement							301
Pension Spiking				743	414	909	1,564
Total Additions	322,615	683,973	732,246	679,308	598,916	1,083,805	947,779
Deductions							
Benefit Payments	858,151	873,906	889,937	905,790	923,288	948,489	967,374
Refunds	12,004	12,907	13,627	13,552	12,130	11,819	13,603
Administrative Expenses	8,776	10,719	11,145	10,474	10,807	10,974	10,692
Capital Project Expenses	8				181	34	-
Total Deductions	878,939	897,532	914,709	929,816	946,406	971,316	991,669
Net Increase (Decrease in Plan Net Position)	\$(556,324)	\$(213,559)	\$(182,463)	\$(250,508)	\$(347,490)	\$112,489	\$(43,890)

KERS Non-Hazardous Insurance Fund							
Additions	2012	2013	2014	2015	2016	2017	2018
Employers' Contributions	\$146,844	\$162,191	\$164,176	\$132,208	\$131,935	\$133,024	\$132,364
Net Investment Income (Loss)	(4,803)	40,661	96,578	8,690	(3,904)	90,915	61,331
Retired Re-employed (HB1)				3,732	3,880	3,765	4,055
Member Drug Reimbursement	7,865	4,846	8			1	5
Premiums Received from Retirees	15,666	14,294	918	272	240	248	216
Employer Cessations						15,567	-
Northern Trust Settlement							32
Total Additions	165,563	221,992	264,273	144,902	132,151	243,520	198,003
Deductions							
Health Insurance Premiums	163,841	140,157	112,671	125,272	126,550	127,648	130,069
Administrative Expenses	5,203	4,285	736	893	818	861	760
Self-Funded Healthcare Costs						1,920	1,819
Excise Tax Insurance						3	3
Total Deductions	169,044	144,442	113,407	126,168	129,469	130,432	132,651
Net Increase (Decrease) in Plan Net Position	\$169,044	\$77,550	\$150,865	\$18,734	\$2,679	\$113,088	\$65,352

Changes in Fiduciary Net Position - KERS Hazardous Pension Fund

As of June 30, 2018 (\$ in Thousands)

Additions	2012	2013	2014	2015	2016	2017	2018
Members' Contributions	\$11,602	\$11,467	\$11,995	\$12,670	\$15,055	\$17,523	\$17,891
Employers' Contributions	17,367	27,334	11,670	28,374	23,690	37,630	32,790
General Fund Appropriations						15,000	10,000
Health Insurance Contributions (HB1)	629	402	551	537	684	811	909
Net Investment Income (Loss)	(10,286)	51,497	80,549	8,572	(1,652)	70,893	51,848
Bank of America Settlement				767			-
Northern Trust Settlement							33
Pension Spiking				162	70	344	871
Total Additions	19,312	90,700	104,941	51,211	37,847	142,301	114,342
Deductions							
Benefit Payments	48,424	48,855	54,320	56,774	59,306	61,231	65,616
Refunds	2,543	2,762	2,830	2,609	2,211	2,106	2,501
Administrative Expenses	877	733	897	844	903	919	975
Capital Project Expenses					15	4	-
Total Deductions	51,844	52,350	58,048	60,277	62,435	64,260	69,092
Net Increase (Decrease) in Plan Net Position	\$(32,532)	\$38,350	\$46,892	\$(9,016)	\$(24,588)	\$78,041	\$45,250

KERS Hazardous Insurance Fund							
Additions	2012	2013	2014	2015	2016	2017	2018
Employers' Contributions	\$23,984	\$25,144	\$23,336	\$14,173	\$15,929	\$4,688	\$4,302
Net Investment Income (Loss)	60	32,887	52,082	7,793	(882)	59,188	42,567
Retired Re-employed (HB1)	-	-	-	709	837	932	986
Member Drug Reimbursement	351	243	-	-	-	-	-
Premiums Received from Retirees	876	895	37	14	(13)	(51)	(50)
Northern Trust Settlement							18
Total Additions	25,271	59,169	76,126	22,689	15,871	64,757	47,823
Deductions							
Health Insurance Premiums	13,941	16,837	15,405	17,000	17,490	17,562	18,697
Administrative Expenses	335	179	78	101	97	105	104
Self-Funded Healthcare Costs						45	79
Excise Tax Insurance							-
Total Deductions	14,276	17,016	15,482	17,101	17,587	17,712	18,880
Net Increase (Decrease) in Plan Net Position	\$10,995	\$42,153	\$60,642	\$5,588	\$(1,716)	\$47,045	\$28,943

Changes in Fiduciary Net Position - CERS Non-Hazardous Pension Fund

As of June 30, 2018 (\$ in Thousands)

Additions	2012	2013	2014	2015	2016	2017	2018
Members' Contributions	\$119,123	\$120,777	\$122,459	\$133,637	\$133,987	\$150,714	\$160,370
Employers' Contributions	270,664	294,914	324,231	297,714	282,767	331,493	355,473
Health Insurance Contributions (HB1)	5,101	4,659	6,109	6,674	7,687	9,158	10,826
Net Investment Income (Loss)	(3,349)	579,161	893,386	110,569	(40,799)	825,901	578,377
Bank of America Settlement				10,280			-
Northern Trust Settlement							361
Pension Spiking				850	1,339	2,061	2,544
Total Additions	391,539	999,511	1,348,330	559,724	384,981	1,319,327	1,107,951
Deductions							
Benefit Payments	524,385	553,204	582,850	615,335	651,247	687,460	726,568
Refunds	-	13,306	14,286	13,524	13,754	14,430	14,608
Administrative Expenses	16,740	17,743	18,615	18,212	19,078	19,614	19,592
Capital Project Expenses	9				307	77	-
Total Deductions	553,899	584,253	615,751	647,071	684,385	721,581	760,768
Net Increase (Decrease) in Plan Net Position	\$(162,360)	\$415,258	\$732,579	\$(87,347)	\$(299,404)	\$597,746	\$347,183

CERS Non-Hazardous Insurance Fund							
Additions	2012	2013	2014	2015	2016	2017	2018
Employers' Contributions	\$164,297	\$158,212	\$121,161	\$115,836	\$108,269	\$117,310	\$120,798
Net Investment Income (Loss)	(32,992)	147,194	231,743	36,731	(1,422)	259,586	197,520
Retired Re-employed (HB1)				3,608	3,567	3,402	3,821
Member Drug Reimbursement	8,443	5,360	6			1	11
Northern Trust Settlement							75
Premiums Received from Retirees	17,493	16,293	1,449	582	629	707	637
Total Additions	157,241	327,059	357,064	156,757	111,043	121,420	322,862
Deductions							
Health Insurance Premiums	141,694	132,489	96,804	113,734	122,713	124,573	131,631
Administrative Expenses	5,545	4,431	508	782	726	789	761
Self-Funded Healthcare Costs						3,635	4,248
Excise Tax Insurance						6	6
Total Deductions	147,239	136,920	97,312	114,522	123,439	129,003	136,646
Net Increase (Decrease) in Plan Net Position	\$10,002	\$190,139	\$259,751	\$42,235	\$(12,396)	\$252,003	\$186,216

Changes in Fiduciary Net Position - CERS Hazardous Pension Fund

As of June 30, 2018 (\$ in Thousands)

Additions	2012	2013	2014	2015	2016	2017	2018
Members' Contributions	\$41,797	\$42,863	\$42,631	\$46,609	\$51,554	\$60,102	\$61,089
Employers' Contributions	77,311	120,140	115,240	107,515	104,952	114,315	124,953
Health Insurance Contributions (HB1)	811	734	1,091	1,084	1,418	1,708	2,173
Net Investment Income (Loss)	(24,724)	181,171	287,816	37,104	(9,021)	270,473	192,174
Bank of America Settlement				2,865			-
Northern Trust Settlement							111
Pension Spiking				557	762	1,632	2,707
Total Additions	95,195	344,908	447,452	195,734	149,665	177,757	383,207
Deductions							
Benefit Payments	169,352	179,696	189,635	200,134	213,448	226,985	244,119
Refunds	3,516	3,158	2,664	3,111	2,879	2,315	4,214
Administrative Expenses	1,319	1,202	1,721	1,289	1,337	1,421	1,504
Capital Project Expenses	-				26	7	-
Total Deductions	174,187	184,056	194,020	204,534	217,690	230,728	249,837
Net Increase (Decrease) in Plan Net Position	\$(79,992)	\$160,852	\$253,431	\$(8,800)	\$(68,025)	\$217,502	\$133,370
CERS Hazardous Insurance Fund							
Additions	2012	2013	2014	2015	2016	2017	2018
Employers' Contributions	\$90,204	\$84,962	\$74,265	\$71,008	\$66,575	\$50,743	\$55,027
Net Investment Income (Loss)	(16,127)	79,885	124,952	20,283	1,102	142,744	109,004
Retired Re-employed (HB1)				770	862	794	975
Member Drug Reimbursement	871	562					-
Northern Trust Settlement							40
Premiums Received from Retirees	695	657	32	10	(106)	(301)	(265)
Total Additions	75,643	166,066	200,101	92,071	68,615	51,236	164,781
Deductions							
Health Insurance Premiums	50,155	59,941	60,843	65,553	68,518	70,407	74,844
Administrative Expenses	688	679	275	339	480	381	376
Self-Funded Healthcare Costs						160	603
Excise Tax Insurance							-
Total Deductions	50,843	60,620	61,117	65,894	68,998	70,948	75,823
Net Increase (Decrease) in Plan Net Position	\$24,800	\$105,446	\$138,983	\$26,177	\$(383)	\$123,216	\$88,958

Changes in Fiduciary Net Position - SPRS Pension Fund

As of June 30, 2018 (\$ in Thousands)

Additions	2012	2013	2014	2015	2016	2017	2018
Members' Contributions	\$5,154	\$4,495	\$5,005	\$5,150	\$5,149	\$5,349	\$5,522
Employers' Contributions	15,040	18,501	20,279	31,444	25,723	38,028	36,486
General Fund Appropriations							10,000
Health Insurance Contributions (HB1)	46	48	70	94	113	131	155
Net Investment Income (Loss)	43	25,954	40,291	3,427	(3,841)	26,756	18,487
Bank of America Settlement				646			-
Northern Trust Settlement							21
Pension Spiking				546	99	210	392
Total Additions	20,283	48,998	65,729	41,307	27,243	68,718	71,063
Deductions							
Benefit Payments	48,867	50,559	53,026	54,766	56,268	56,935	58,805
Refunds	149	31	214	85	11	26	22
Administrative Expenses	73	184	215	201	176	181	194
Capital Project Expenses					4	1	-
Total Deductions	49,089	50,774	53,454	55,052	56,459	57,143	59,021
Net Increase (Decrease in Plan Net Position)	\$(28,806)	\$(1,776)	\$12,276	\$(13,745)	\$(29,216)	\$38,370	\$12,042
SPRS Insurance Fund							
Additions	2012	2013	2014	2015	2016	2017	2018
Employers' Contributions	\$10,810	\$16,829	\$14,498	\$10,379	\$10,228	\$9,222	\$9,397
Net Investment Income (Loss)	(1,458)	12,993	20,458	2,921	(48)	21,570	16,420
Retired Re-employed (HB1)				3	9		-
Member Drug Reimbursement	279	178					-
Northern Trust Settlement							8
Premiums Received from Retirees	20	23	11	1	(29)	(55)	(41)
Total Additions	9,651	30,023	35,012	13,304	10,160	9,167	25,784
Deductions							
Health Insurance Premiums	10,791	12,546	12,688	13,483	13,836	13,405	13,881
Administrative Expenses	201	184	58	65	89	66	62
Self-Funded Healthcare Costs						24	38
Excise Tax Insurance							-
Total Deductions	10,992	12,730	12,745	13,548	13,925	13,495	13,981
Net Increase (Decrease) in Plan Net Position	\$(1,341)	\$17,293	\$22,267	\$(244)	\$(3,765)	\$17,242	\$11,803

Schedule of Benefit Expenses As of June 30, 2018 (in Whole \$)

KERS Non-Hazardous

	Normal Retirement	Early Retirement	Disability Retirement	Beneficiary Payments
Fiscal Year 2013				
Average Benefit	\$1,003	\$1,915	\$1,020	\$889
Number of Accounts	6,441	32,310	2,687	962
Total Monthly Benefits	\$6,459,840	\$61,882,399	\$2,740,491	\$855,033
% of Total Monthly Benefits	8.98%	86.02%	3.81%	1.19%
Fiscal Year 2014				
Average Benefit	\$992	\$1,911	\$987	\$886
Number of Accounts	6,678	33,106	2,706	954
Total Monthly Benefits	\$6,624,472	\$63,255,779	\$2,671,749	\$845,468
% of Total Monthly Benefits	9.03%	86.18%	3.64%	1.15%
Fiscal Year 2015				
Average Benefit	\$992	\$1,901	\$996	\$909
Number of Accounts	6,896	33,940	2,696	983
Total Monthly Benefits	\$6,843,193	\$64,503,048	\$2,684,720	\$893,407
% of Total Monthly Benefits	9.13%	86.09%	3.58%	1.19%
Fiscal Year 2016				
Average Benefit	\$989	\$1,886	\$1,005	\$902
Number of Accounts	7,390	35,192	2,770	1,014
Total Monthly Benefits	\$7,312,293	\$66,383,638	\$2,784,928	\$914,804
% of Total Monthly Benefits	9.45%	85.77%	3.60%	1.18%
Fiscal Year 2017				
Average Benefit	\$992	\$1,883	\$1,013	\$924
Number of Accounts	7,628	35,890	2,772	1,028
Total Monthly Benefits	\$7,565,780	\$67,591,003	\$2,807,938	\$950,318
% of Total Monthly Benefits	9.59%	85.65%	3.56%	1.20%
Fiscal Year 2018				
Average Benefit	\$998	\$1,879	\$1,019	\$940
Number of Accounts	8,070	37,141	2,767	1,007
Total Monthly Benefits	\$8,049,794	\$69,780,011	\$2,818,593	\$946,466
% of Total Monthly Benefits	9.87%	85.52%	3.45%	1.16%

Note: This table includes individuals receiving a monthly benefit as of June 30 in the indicated fiscal year. A single member may have multiple accounts which contribute to one pension. This table represents all individuals receiving a benefit including dependent children, Qualified Domestic Relations Order (QDRO) accounts and multiple beneficiary accounts. If a member has died or a disability decision is pending, the monthly benefit amount is reflected as zero until the account status changes.

Schedule of Benefit Expenses - KERS Hazardous

As of June 30, 2018 (in Whole \$)

	Normal Retirement	Early Retirement	Disability Retirement	Beneficiary Payments
Fiscal Year 2013				
Average Benefit	\$961	\$1,543	\$662	\$725
Number of Accounts	1,751	1,417	190	93
Total Monthly Benefits	\$1,682,541	\$2,186,334	\$125,704	\$67,440
% of Total Monthly Benefits	41.42%	53.82%	3.10%	1.66%
Fiscal Year 2014				
Average Benefit	\$971	\$1,560	\$649	\$749
Number of Accounts	1,851	1,497	191	89
Total Monthly Benefits	\$1,797,900	\$2,335,190	\$123,867	\$66,679
% of Total Monthly Benefits	41.58%	54.01%	2.86%	1.54%
Fiscal Year 2015				
Average Benefit	\$986	\$1,556	\$661	\$714
Number of Accounts	1,912	1,566	193	90
Total Monthly Benefits	\$1,884,477	\$2,436,923	\$127,477	\$64,250
% of Total Monthly Benefits	41.76%	54.00%	2.82%	1.42%
Fiscal Year 2016				
Average Benefit	\$984	\$1,542	\$663	\$730
Number of Accounts	2,046	1,658	194	94
Total Monthly Benefits	\$2,011,530	\$2,557,114	\$128,663	\$68,605
% of Total Monthly Benefits	42.21%	53.65%	2.70%	1.44%
Fiscal Year 2017				
Average Benefit	\$993	\$1,541	\$662	\$721
Number of Accounts	2,101	1,719	205	96
Total Monthly Benefits	\$2,086,732	\$2,648,685	\$135,625	\$69,255
% of Total Monthly Benefits	42.24%	53.61%	2.75%	1.40%
Fiscal Year 2018				
Average Benefit	\$1,002	\$1,551	\$684	\$737
Number of Accounts	2,215	1,877	205	100
Total Monthly Benefits	\$2,218,520	\$2,911,409	\$140,174	\$73,704
% of Total Monthly Benefits	41.52%	54.48%	2.62%	1.38%

This table includes individuals receiving a monthly benefit as of June 30 in the indicated fiscal year. A single member may have multiple accounts which contribute to one pension. This table represents all individuals receiving a benefit including dependent children, Qualified Domestic Relations Order (QDRO) accounts and multiple beneficiary accounts. If a member has died or a disability decision is pending, the monthly benefit amount is reflected as zero until the account status changes.

**Schedule of Benefit Expenses CERS Non-Hazardous
As of June 30, 2018 (in Whole \$)**

	Normal Retirement	Early Retirement	Disability Retirement	Beneficiary Payments
Fiscal Year 2013				
Average Benefit	\$591	\$1,042	\$878	\$625
Number of Accounts	11,266	33,393	4,537	1,075
Total Monthly Benefits	\$6,661,524	\$34,797,169	\$3,982,213	\$672,310
% of Total Monthly Benefits	14.45%	75.46%	8.64%	1.45%
Fiscal Year 2014				
Average Benefit	\$596	\$1,042	\$856	\$613
Number of Accounts	11,885	34,911	4,729	1,110
Total Monthly Benefits	\$7,081,048	\$36,375,607	\$4,047,035	\$680,784
% of Total Monthly Benefits	14.70%	75.49%	8.40%	1.41%
Fiscal Year 2015				
Average Benefit	\$612	\$1,044	\$862	\$616
Number of Accounts	12,749	36,746	4,854	1,161
Total Monthly Benefits	\$7,801,662	\$38,375,001	\$4,186,130	\$715,032
% of Total Monthly Benefits	15.27%	75.13%	8.20%	1.40%
Fiscal Year 2016				
Average Benefit	\$623	\$1,045	\$874	\$626
Number of Accounts	14,014	39,066	5,118	1,268
Total Monthly Benefits	\$8,724,563	\$40,823,334	\$4,472,723	\$793,726
% of Total Monthly Benefits	15.92%	74.48%	8.16%	1.45%
Fiscal Year 2017				
Average Benefit	\$634	\$1,050	\$883	\$616
Number of Accounts	14,792	40,873	5,280	1,318
Total Monthly Benefits	\$9,374,583	\$42,912,604	\$4,661,375	\$811,542
% of Total Monthly Benefits	16.23%	74.29%	8.07%	1.41%
Fiscal Year 2018				
Average Benefit	\$647	\$1,062	\$892	\$645
Number of Accounts	15,713	42,918	5,425	1,359
Total Monthly Benefits	\$10,169,605	\$45,560,863	\$4,838,284	\$875,980
% of Total Monthly Benefits	16.55%	74.15%	7.87%	1.43%

Note: This table includes individuals receiving a monthly benefit as of June 30 in the indicated fiscal year. A single member may have multiple accounts which contribute to one pension. This table represents all individuals receiving a benefit including dependent children, Qualified Domestic Relations Order(QDRO) accounts and multiple beneficiary accounts. If a member has died or a disability decision is pending, the monthly benefit amount is reflected as zero until the account status changes.

Schedule of Benefit Expenses - CERS
Hazardous As of June 30, 2018 (in Whole \$)

	Normal Retirement	Early Retirement	Disability Retirement	Beneficiary Payments
Fiscal Year 2013				
Average Benefit	\$1,433	\$2,429	\$1,121	\$1,073
Number of Accounts	1,883	4,683	681	119
Total Monthly Benefits	\$2,699,176	\$11,374,811	\$763,700	\$127,689
% of Total Monthly Benefits	18.04%	76.01%	5.10%	0.85%
Fiscal Year 2014				
Average Benefit	\$1,467	\$2,437	\$1,125	\$1,008
Number of Accounts	1,974	4,873	695	119
Total Monthly Benefits	\$2,895,353	\$11,876,578	\$781,685	\$119,935
% of Total Monthly Benefits	18.47%	75.77%	4.99%	0.77%
Fiscal Year 2015				
Average Benefit	\$1,480	\$2,448	\$1,145	\$954
Number of Accounts	2,097	5,139	688	127
Total Monthly Benefits	\$3,103,613	\$12,581,191	\$787,549	\$121,103
% of Total Monthly Benefits	18.70%	75.82%	4.75%	0.73%
Fiscal Year 2016				
Average Benefit	\$1,494	\$2,453	\$1,137	\$975
Number of Accounts	2,269	5,485	742	143
Total Monthly Benefits	\$3,388,890	\$13,452,235	\$843,463	\$139,353
% of Total Monthly Benefits	19.01%	75.47%	4.73%	0.78%
Fiscal Year 2017				
Average Benefit	\$1,509	\$2,473	\$1,138	\$997
Number of Accounts	2,394	5,764	794	149
Total Monthly Benefits	\$3,612,099	\$14,255,349	\$903,238	\$148,515
% of Total Monthly Benefits	19.09%	75.35%	4.77%	0.78%
Fiscal Year 2018				
Average Benefit	\$1,542	\$2,505	\$1,141	\$1,110
Number of Accounts	2,540	6,189	811	158
Total Monthly Benefits	\$3,917,668	\$15,503,185	\$925,221	\$175,316
% of Total Monthly Benefits	19.09%	75.55%	4.51%	0.85%

Note: This table includes individuals receiving a monthly benefit as of June 30 in the indicated fiscal year. A single member may have multiple accounts which contribute to one pension. This table represents all individuals receiving a benefit including dependent children, Qualified Domestic Relations Order (QDRO) accounts and multiple beneficiary accounts. If a member has died or a disability decision is pending, the monthly benefit amount is reflected as zero until the account status changes.

Schedule of Benefit Expenses - SPRS

As of June 30, 2018 (in Whole \$)

	Normal Retirement	Early Retirement	Disability Retirement	Beneficiary Payments
Fiscal Year 2013				
Average Benefit	\$3,601	\$3,130	\$1,320	\$2,198
Number of Accounts	149	1,126	74	23
Total Monthly Benefits	\$536,481	\$3,524,248	\$97,681	\$50,563
% of Total Monthly Benefits	12.75%	83.73%	2.32%	1.20%
Fiscal Year 2014				
Average Benefit	\$3,621	\$3,197	\$1,346	\$2,196
Number of Accounts	146	1,172	75	23
Total Monthly Benefits	\$528,611	\$3,747,012	\$100,974	\$49,197
% of Total Monthly Benefits	11.94%	84.66%	2.28%	1.11%
Fiscal Year 2015				
Average Benefit	\$3,578	\$3,189	\$1,347	\$2,153
Number of Accounts	150	1,213	75	23
Total Monthly Benefits	\$536,649	\$3,867,971	\$101,018	\$49,524
% of Total Monthly Benefits	11.78%	84.91%	2.22%	1.09%
Fiscal Year 2016				
Average Benefit	\$3,579	\$3,135	\$1,269	\$2,008
Number of Accounts	155	1,277	82	25
Total Monthly Benefits	\$554,743	\$4,002,993	\$104,056	\$50,196
% of Total Monthly Benefits	11.77%	84.95%	2.21%	1.07%
Fiscal Year 2017				
Average Benefit	\$3,611	\$3,135	\$1,278	\$2,008
Number of Accounts	149	1,303	82	25
Total Monthly Benefits	\$538,032	\$4,084,771	\$104,788	\$50,196
% of Total Monthly Benefits	11.26%	85.50%	2.19%	1.05%
Fiscal Year 2018				
Average Benefit	\$3,642	\$3,128	\$1,289	\$2,082
Number of Accounts	153	1,361	83	26
Total Monthly Benefits	\$557,249	\$4,257,579	\$107,019	\$54,127
% of Total Monthly Benefits	11.20%	85.56%	2.15%	1.09%

Note: This table includes individuals receiving a monthly benefit as of June 30 in the indicated fiscal year. A single member may have multiple accounts which contribute to one pension. This table represents all individuals receiving a benefit including dependent children, Qualified Domestic Relations Order (QDRO) accounts and multiple beneficiary accounts. If a member has died or a disability decision is pending, the monthly benefit amount is reflected as zero until the account status changes.

Analysis of Initial Retirees As of June 30, 2018 (in Whole \$)

	KERS Non- Hazardous	KERS Hazardous	CERS Non- Hazardous	CERS Hazardous	SPRS
Fiscal Year 2013					
Number of Accounts	1,810	205	3,303	443	59
Average Service Credit (months)	199	157	189	202	234
Average Final Compensation	\$47,168	\$46,456	\$34,292	\$58,516	\$69,325
Average Monthly Benefit	\$1,275	\$1,250	\$938	\$2,196	\$2,893
Average System Payment for Health Insurance	\$303	\$433	\$259	\$853	\$994
Fiscal Year 2014					
Number of Accounts	2,037	245	3,529	430	77
Average Service Credit (months)	202	165	182	194	260
Average Final Compensation	\$46,480	\$46,595	\$33,816	\$57,718	\$70,009
Average Monthly Benefit	\$1,278	\$1,296	\$879	\$2,021	\$3,322
Average System Payment for Health Insurance	\$534	\$937	\$486	\$1,279	\$1,378
Fiscal Year 2015					
Number of Accounts	2,078	191	4,084	496	55
Average Service Credit (months)	204	164	188	204	251
Average Final Compensation	\$47,187	\$47,148	\$34,561	\$59,589	\$67,862
Average Monthly Benefit	\$1,308	\$1,280	\$913	\$2,178	\$3,009
Average System Payment for Health Insurance	\$549	\$906	\$489	\$1,254	\$1,376
Fiscal Year 2016					
Number of Accounts	2,043	205	4,151	522	57
Average Service Credit (months)	207	160	190	212	234
Average Final Compensation	\$47,429	\$44,494	\$34,632	\$58,977	\$65,535
Average Monthly Benefit	\$1,351	\$1,225	\$932	\$2,303	\$2,953
Average System Payment for Health Insurance	\$558	\$870	\$501	\$1,277	\$1,425
Fiscal Year 2017					
Number of Accounts	2,094	191	4,151	544	30
Average Service Credit (months)	208	146	191	203	241
Average Final Compensation	\$46,753	\$47,604	\$34,779	\$58,384	\$68,401
Average Monthly Benefit	\$1,339	\$1,150	\$940	\$2,236	\$2,935
Average System Payment for Health Insurance	\$558	\$872	\$510	\$1,247	\$1,192
Fiscal Year 2018					
Number of Accounts	2,682	328	4,570	696	68
Average Service Credit (months)	223	167	195	211	241
Average Final Compensation	\$48,552	\$51,219	\$37,683	\$65,407	\$71,132
Average Monthly Benefit	\$1,481	\$1,392	\$1,027	\$2,528	\$3,035
Average System Payment for Health Insurance	\$578	\$1,033	\$531	\$1,300	\$1,365

Note: This table represents all individuals who had an initial retirement date within the fiscal year.

Payment Options Selected by Retired Members As of June 30, 2018 (in Whole \$)

	Basic	Lump Sum	Other	Period Certain	Pop Up	Social Security Adjustment	Survivorship
KERS Non-Hazardous							
Number of Accounts	17,025	2,107	13	6,127	9,448	3,350	10,915
Monthly Benefits	\$25,948,003	\$2,472,354	\$24,758	\$9,541,939	\$19,398,243	\$5,780,252	\$18,429,314
KERS Hazardous							
Number of Accounts	1,165	247	3	489	1,212	286	995
Monthly Benefits	\$1,295,079	\$253,014	\$3,428	\$549,810	\$1,760,450	\$331,748	\$1,150,278
CERS Non-Hazardous							
Number of Accounts	26,818	3,172	16	9,241	10,470	2,135	13,563
Monthly Benefits	\$21,780,547	\$2,135,202	\$19,096	\$7,957,221	\$12,901,637	\$2,787,153	\$13,863,875
CERS Hazardous							
Number of Accounts	1,566	460	33	865	3,837	548	2,389
Monthly Benefits	\$3,009,980	\$739,847	\$40,565	\$1,501,148	\$9,430,349	\$852,169	\$4,947,331
SPRS							
Number of Accounts	176	22	1	132	666	199	427
Monthly Benefits	\$496,824	\$51,466	\$3,084	\$350,336	\$2,306,780	\$406,571	\$1,360,913
KRS Total							
Number of Accounts	46,750	6,008	66	16,854	25,633	6,518	28,289
Monthly Benefits	\$52,530,433	\$5,651,883	\$90,931	\$19,900,454	\$45,797,459	\$10,157,893	\$39,751,711

The information in this table represents accounts administered by KRS. A single member may have multiple accounts, which contribute to one pension.

EMPLOYER CONTRIBUTION RATES

In KERS, CERS, and SPRS both the employee and the employer contribute a percentage of creditable compensation to KRS.

The employee contribution rate is set by state statute. Non-Hazardous employees contribute 5% while Hazardous duty members contribute 8%. Employees hired on or after September 1, 2008, contribute an additional 1% to health insurance.

Under Kentucky Revised Statute 61.565, KERS and SPRS employer contribution rates are set by the KRS Board of Trustees based on an annual actuarial valuation. However, KERS and SPRS employer rates are subject to approval by the Kentucky General Assembly through the adoption of the biennial Executive Branch Budget. For fiscal years 2004 through 2014, the Kentucky General Assembly suspended Kentucky Revised Statute 61.565 in the budget in order to provide an employer contribution rate that is less than the amount recommended by the Board's consulting actuary. The table in the Actuarial Section shows the KERS and SPRS employer contribution rates that were actuarially recommended in the annual valuation without any adjustments.

The CERS employer contribution rates are also set by the KRS Board under Kentucky Revised Statute 61.565 based on an annual actuarial valuation, unless altered by legislation enacted by the Kentucky General Assembly. The CERS employer contribution rates for fiscal year 2008 through 2009 were reduced from the actuarially recommended rate as a result of the passage of House Bill (HB) 1 during the 2008 Extraordinary Session of the Kentucky General Assembly. Also, during its 2009 Regular Session, the Kentucky General Assembly enacted HB 117, which mandated an extension of the phase-in of insurance contribution rates that had been previously approved by the KRS Board in 2006 from five years to 10 years to further mitigate the impact of the application of GASB Statements 43 and 45 on CERS employer contribution rates for health insurance. The actual pension and insurance employer contribution rates that were paid are shown below.

Employer Contribution Rates (%) As of June 30, 2018						
	2013	2014	2015	2016	2017	2018
KERS Non-Hazardous						
Actual Rate	23.61%	26.79%	38.77%	38.77%	48.59%	49.47%
KERS Hazardous						
Actual Rate	29.79%	32.21%	26.34%	26.34%	23.82%	23.70%
CERS Non-Hazardous						
Actual Rate	19.55%	18.89%	17.67%	17.06%	18.68%	19.18%
CERS Hazardous						
Actual Rate	37.60%	35.70%	34.31%	32.95%	31.06%	31.55%
SPRS						
Actual Rate	63.67%	71.15%	75.76%	75.76%	89.21%	91.24%

INSURANCE CONTRACTS

KRS provides medical insurance and other managed care coverage for eligible retired members.

Participation in the insurance program is optional and requires the completion of the proper forms at the time of retirement in order to obtain the insurance coverage. KRS provides access to health insurance coverage through the Kentucky Employees' Health Plan (KEHP) for recipients until they reach age 65 and/or become Medicare eligible. After a retired member becomes eligible for Medicare, coverage is available through a Medicare eligible plan offered by KRS. A retired member's spouse and/or dependents may also be covered on health insurance through KRS.

Insurance Benefits Paid to Retirees & Beneficiaries Participating in a KRS Health Insurance Plan As of June 30, 2018 (in Whole \$)					
	KERS Non - Hazardous	KERS Hazardous	CERS Non - Hazardous	CERS Hazardous	SPRS
Number	32,090	2,828	37,408	8,212	1,715
Average Service Credit (Months)	311	264	262	280	324
Average Monthly System Payment for Health Insurance	\$371	\$690	\$326	\$962	\$880
Average Monthly Member Payment for Health Insurance	\$61	\$46	\$61	\$34	\$20
Total Monthly Payment for Health Insurance	\$12,917,792	\$1,716,464	\$13,612,464	\$6,700,951	\$1,187,168

Insurance Contracts by Type As of June 30, 2018

KERS Non-Hazardous	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	618	506	452	441	411	460
KEHP Couple/Family	1,276	797	714	656	663	696
KEHP Single	9,364	9,491	9,251	8,876	8,627	8,638
Medicare without Prescription	1,474	1,370	1,303	19,447	1,229	1,179
Medicare with Prescription	16,834	17,738	18,577	1,286	20,215	21,117
KERS Hazardous	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	106	110	110	97	88	96
KEHP Couple/Family	451	448	448	439	432	478
KEHP Single	625	647	656	663	667	686
Medicare without Prescription	60	56	62	1,302	72	73
Medicare with Prescription	985	1,104	1,177	66	1,401	1,495
CERS Non-Hazardous	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	340	278	242	235	222	231
KEHP Couple/Family	857	546	473	465	462	510
KEHP Single	7,652	7,843	8,098	8,164	8,313	8,802
Medicare without Prescription	2,707	2,583	2,531	23,007	2,462	2,389
Medicare with Prescription	18,824	20,200	21,520	2,499	24,247	25,476
CERS Hazardous	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	400	432	456	378	395	422
KEHP Couple/Family	2,155	2,184	2,255	2,321	2,387	2,571
KEHP Single	1,425	1,447	1,500	1,595	1,645	1,712
Medicare without Prescription	79	89	107	2,969	125	119
Medicare with Prescription	2,324	2,510	2,697	114	3,205	3,388
SPRS	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	76	78	81	77	79	74
KEHP Couple/Family	421	444	441	355	420	426
KEHP Single	283	263	265	246	251	253
Medicare without Prescription	20	20	16	850	17	21
Medicare with Prescription	682	712	777	18	897	941
KRS Total	2013	2014	2015	2016	2017	2018
KEHP Parent Plus	1,540	1,404	1,341	1,228	1,195	1,283
KEHP Couple/Family	5,160	4,419	4,331	4,328	4,364	4,681
KEHP Single	19,349	19,691	19,770	19,544	19,503	20,091
Medicare without Prescription	4,340	4,118	4,019	3,983	3,905	3,781
Medicare with Prescription	39,649	42,264	44,748	47,575	49,965	52,417



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