EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

COMPREHENSIVE ANNUAL FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2017

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Prepared by the Staff of the:
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THOMAS WILLIAMS, Executive Director
KANOE MARGOL, Deputy Executive Director
HOWARD HODEL, Acting Chief Investment Officer

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Employees' Retirement System

of the State of Hawaii

INTRODUCTORY SECTION

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Letter of Transmittal

DAVID Y. IGE
GOVERNOR

THOMAS WILLIAMS
EXECUTIVE DIRECTOR

KANOE MARGOL
DEPUTY EXECUTIVE DIRECTOR

STATE OF HAWAII
EMPLOYEES' RETIREMENT SYSTEM

November 16, 2018

Board of Trustees
Employees' Retirement System of the State of Hawaii

Dear Board Members:

We present the Comprehensive Annual Financial Report (CAFR) of the Employees' Retirement System for the fiscal year ended June 30, 2017. Responsibility for both the accuracy of the data, as well as the completeness and fairness of the presentation, rests with the management of the ERS. We trust that you and the members of the ERS will find this report useful in understanding your retirement system.

BACKGROUND

The ERS was established by the Legislature in 1925 to administer a retirement, disability, and survivor benefits program for State and county employees including teachers, professors, police officers, firefighters, judiciary employees, judges, and elected officials. The ERS is a qualified defined benefit public pension plan covered under Section 401(a) of the Internal Revenue Code. Hawaii Revised Statutes Chapter 88 and Hawaii Administrative Rules Title 6, Chapters 20 – 29 contain the language governing the pension trust. The ERS covers all eligible full-time and part-time State and county employees in the State of Hawaii. The ERS uses the entry age normal funding method to determine its current and future costs and appropriateness of its funding requirements. Funding for benefit payments comes from employer and member contributions, and investments.

Members of the Pension Trust belong to either the Contributory, Hybrid (a contributory class), or Noncontributory Class. Contributory and Hybrid Members make employee contributions to the Pension Trust and employers make contributions for employees of all three classes. Since 2006 most new employees of participating employers in the Pension Trust are required to join the Hybrid Class, except for certain employee groups that are required to be members of the Contributory Class. New benefit structures were established in 2011 for new members hired after June 30, 2012.

On March 31, 2017 the ERS' total membership of 138,561 was comprised of 65,911 active members, 46,927 retirees and beneficiaries 9,241 inactive vested members and 16,482 inactive non-vested members. This compares to 122,079 under historical methodology used in the actuarial valuation that excludes inactive non vested members. Participating employers include the State of Hawaii, City and County of Honolulu, and the counties of Hawaii, Maui, and Kauai.

Employees' Retirement System
of the State of Hawaii

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The ERS is also responsible for the custody of the Social Security Contribution Fund for the State of Hawaii. The Social Security contributions withheld from employees are remitted directly to the Internal Revenue Service by the State. As an agency type fund that is custodial in nature, the ERS has limited discretion in the management of this fund.

MAJOR ACCOMPLISHMENTS AND INITIATIVES IN FY 2017

During FY 2017, the ERS continued to focus on reforms to better structure the pension plan to meet its long-term pension obligations for current and future members, retirees and beneficiaries. The ERS worked with our investment consultant to transition the portfolio to the new risk-based methodology adopted by the Board in October 2014. This included launching the Crisis Risk Offset program in spring 2017 to improve ERS's ability to react to world events that affect the investment portfolio. This also included transitioning assets to global strategies, building out the private growth portfolio and implementing a risk management system to help measure and report on risks of the entire portfolio. The new long-term asset allocation policy will be implemented through fiscal year 2020 to help position the portfolio over the long-term to weather any potential economic downturns, achieve higher returns, and overall help improve the pension plan's sustainability. The ERS ended the fiscal year with net assets at $15.7 billion based on ERS' investment portfolio returns (gross of fees, time weighted rate of return) 13.7% for the fiscal year.

The ERS was active during the 2017 legislation session that included four laws that affect the ERS.

- Act 17 (SB936), the 2017 State Legislature approved a four-year phase in of employer contribution rate increase effective July 1, 2017 that will increase the rate for Police and Fire from current of 25% to 41% as of July 1, 2020, and the rate for All Other Employees from the current rate of 18% to 24 % as of July 1, 2020, as a result of the ERS's funded position from the 2016 actuary valuation. This Act also contains several "housekeeping measures to adjust the interest rate paid on underpayments if retiree benefits are not finalized with the six month time requirement; extend the due date for employer required payments for additional retirement contributions due to their employees retired with significant non-base pay increases; and to improve service provided to members and beneficiaries applying for disability retirement and accidental death benefits.
- Act 18 (SB207): Relating to Employees of Hawaii Health Systems Corporation (HHSC) Maui. This Act repeals chapter 89E, HRS, and Act 1, Second Special Session, Laws of Hawaii 2016 (S.B. 2077, H.D. 2) with a retroactive effective date of July 20, 2016 because the ERS' tax exempt status was challenged with the passage of Act 1 since the United States Internal Revenue Code does not permit governmental defined benefit pension plans like the ERS to offer employees a choice between a "cash or deferred arrangement". Instead this Act appropriates funds directly to the Department of Budget and Finance for collective bargaining cost items related to the transition of affected Maui region hospital employees to Maui Health System, a Kaiser Foundation Hospitals, LLC effective July 1, 2017.
- Act 85 (HB1182): Relating to the Employees' Retirement System requires the ERS actuary to conduct annual "stress tests" of the System, primarily the impact of specified investment return and valuation scenarios on the ERS funding level, contribution requirements and unfunded liability. Annual reports of these tests will be provided to the Legislature effective July 1, 2017.
- Act 93 (SB133): Relating to Public Employees' Fringe Benefits reduces the maximum period between experience studies of the ERS from five years to three years. The purpose of experience studies is to periodically review the actuarial assumptions on which the funding of the System is based, including investment returns, membership life expectancy, payroll growth, salary increases and retirement behavior. Effective July 5, 2017.

Letter of Transmittal (continued)

ACCOUNTING SYSTEM AND REPORTS

The accrual basis of accounting is used to record financial transactions. Expenses are recorded when the liability is incurred, and revenues are recorded in the accounting period in which they are earned and become measurable. Interest earned is accrued on a monthly basis. Accounts receivable at year end, in addition to accrued interest receivable, reflect accrued employer charges and investment proceeds due on sales that have not yet settled. Investments are recorded at fair value. Fixed assets are recorded at cost less accumulated depreciation.

The *Notes to the Financial Statements (Notes)* contain additional detailed information on the statutory provisions under which the ERS operates. In addition, the Notes include a summary of significant accounting policies, and provide explanatory information to help readers better understand the data contained in the financial statements.

The management of the ERS is responsible for and has implemented systems of internal accounting controls designed to provide reasonable assurances for the safeguarding of assets and the reliability of financial records. We believe that the internal accounting controls currently in place are adequate to meet the purpose for which they were intended. To the best of our knowledge and belief, the enclosed data, including the financial statements, supporting schedules and statistical tables is accurate in all material respects and is reported in a manner that fairly presents the financial position and results of the ERS' operations.

INVESTMENTS

The primary goal of the ERS investment strategy is the preservation of capital. The Board of Trustees seeks preservation of capital with a consistent, positive return for the investment portfolio. As discussed above, the ERS adopted a risk-based, functional framework for allocating capital within the investment portfolio. This framework makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies will be implemented in several phases through June 30, 2020. A summary of the ERS' long-term asset allocation strategy for the fiscal year may be found in the Investment Section of this report. The full Investment Policies, Guidelines, and Procedures Manual is available on the ERS website at http://ers.ehawaii.gov.

Professional investment managers have been retained to execute the Board's investment strategies and have full discretion within statutory provisions, Board policies and their respective guidelines. The investment managers retained by the Board as of June 30, 2017 are listed in the Investment Section.

Net investment income, including dividends, interest, other investment earnings, and gains/losses on the sale of investments resulted in a gain of $1,934.5 million in FY2017. This translates to an investment return of approximately 13.7% for the year, using rate of return methodologies that are generally accepted by the Global Investment Performance Standards (GIPS).

FUNDING AND ACTUARIAL OVERVIEW

In the June 30, 2017 report of the Fund's valuation our actuaries, Gabriel Roeder Smith & Company noted that that our unfunded actuarial accrued liability (UAAL) increased to $12.9 billion from $12.4 billion on June 30, 2016 based on the previous GASB reporting standards. Under the current market-based GASB standards effective in FY 2015, the Net Pension Liability decreased to $13.0 billion on June 30, 2017 from $13.4 billion as of June 30, 2016. On the market basis, this represents a decrease in funded position to 54.8% for FY 2017 from 51.3% for FY 2016. The ERS full funding period decreased to 26 at June 30, 2017 from 66 years at June 30, 2016, primarily from the FY 2017 investment returns exceeding the 7% benchmark and increased future employer contribution rates.

PROFESSIONAL SERVICES

Professional consultants are appointed by the Board of Trustees to perform professional services that are essential to the effective and efficient operation of the ERS. Opinions from KPMG LLP, the auditors for the ERS, and the actuary, Gabriel, Roeder, Smith & Company, are included in this report. Pension Consulting Alliance, LLC is the ERS' investment consultant, and their report on the ERS' investment program and performance results is also included in this report.

ACKNOWLEDGEMENTS

This report is from the collaborative efforts of the ERS staff and consultants to provide extensive and reliable information as a basis for making management decisions, determining compliance with legal provisions, and for determining responsible stewardship of the assets contributed by the ERS' members and their employers. This report will be provided to the Governor, legislators, State and county departments and other interested parties.

Aloha,

Thomas Williams

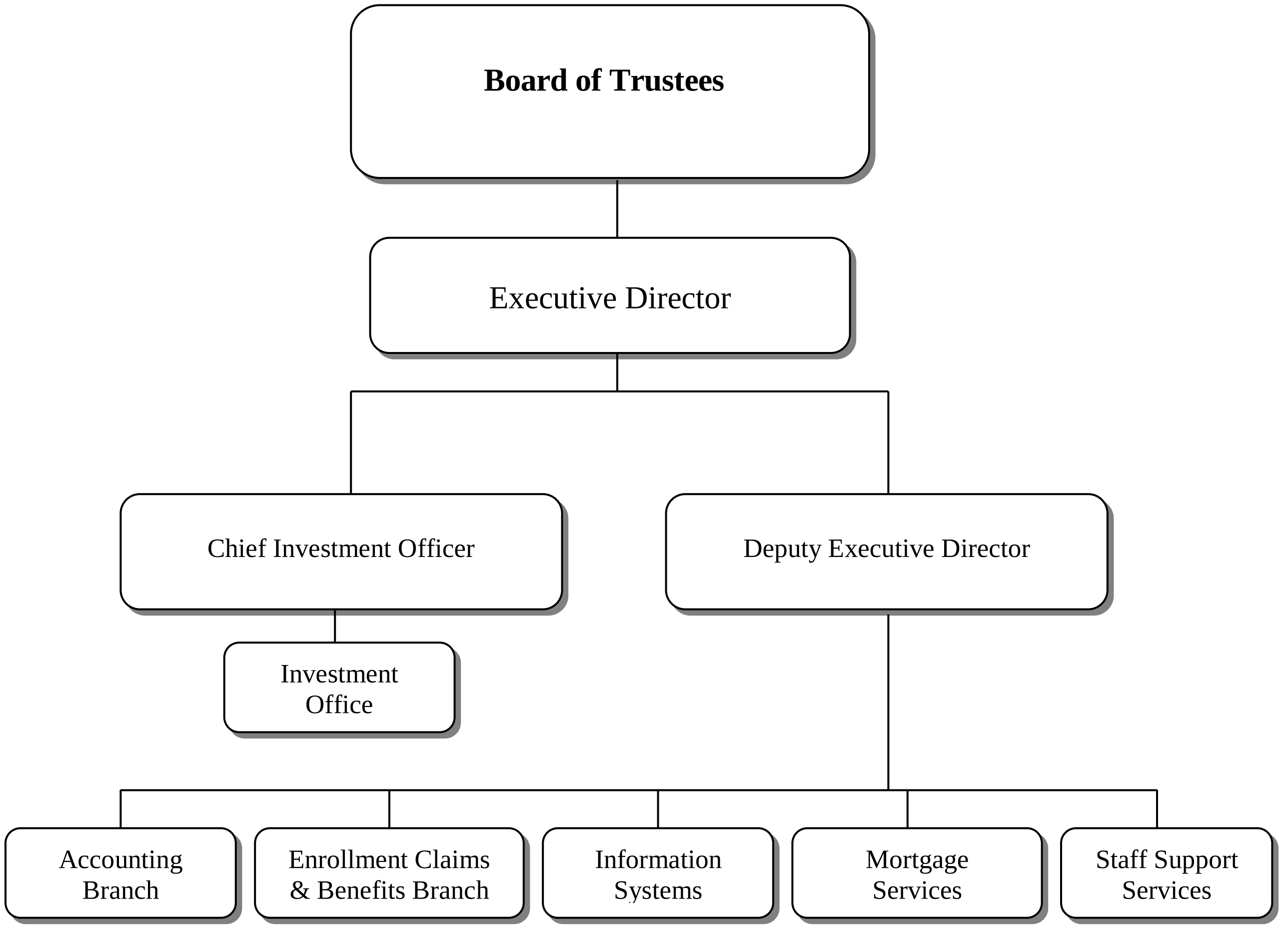
Thomas Williams
Executive Director

Board of Trustees

The Board of Trustees is the governing body of the Employees' Retirement System of the State of Hawaii, with certain areas of administrative control vested in the State Department of Budget and Finance.

Four of the eight members on the Board are elected by the membership: two general employees, a teacher and a retiree. Three members are citizens of the State, one of whom is an officer of a bank authorized to do business in the State or a person of similar experience, who are not employees and are appointed by the Governor. The State Director of Finance is an ex-officio member by statute.

Organizational Structure



Executive Director	Thomas Williams
Deputy Executive Director	Kanoe Margol
Chief Investment Officer	Howard Hodel, Acting

Actuary
Gabriel, Roeder, Smith and Company

Auditors
State of Hawaii, Office of the Auditor
KPMG LLP

Legal Advisor
Attorney General of the State of Hawaii

Medical Board
Dr. Patricia L. Chinn, Chair
Dr. Howman Lam, Member
Dr. Gerald J. McKenna, Member

** A list of investment professionals is located in the *Investment Section* of this CAFR.

Plan Summary

The Employees' Retirement System (ERS) of the State of Hawaii was established by the Legislature in 1925 to provide retirement, disability and survivor benefits for State employees, teachers, professors, county employees, police officers, firefighters, judges and elected officials.

The ERS is a qualified defined benefit pension plan under Section 401(a) of the Internal Revenue Code. As such, the ERS is exempt from federal income taxation on its investment earnings. Since January 1, 1988, member contributions have been tax deferred under Section 414(h) of the Internal Revenue Code.

Members are covered by the provisions of the Contributory, Hybrid or Noncontributory retirement class. Except for employees in certain positions who are required to be Contributory members, most new employees from July 1, 2006 are enrolled as Hybrid Members.

Those in the Contributory Class are required to make contributions to the ERS and may also be covered by Social Security. Employees in the following occupational groups are required to be members of the Contributory Class: police officers, firefighters, judges, elected officials, legislative officers, attorney general investigators, narcotics enforcement investigators, and public safety investigations staff investigators. As of March 31, 2017, 5,859 active employees were enrolled in the Contributory Class, or about 8.8% of our active members.

On July 1, 2006, the Hybrid Class became effective pursuant to Act 179/2004. Members in the Hybrid Class (a contributory benefit structure) must also contribute to the ERS and are generally covered by Social Security. The Hybrid Class covers most employees hired from July 1, 2006, as well as certain employees hired before July 1, 2006 who elected to change to Hybrid Membership. The Hybrid membership will continue to increase going forward as most new employees hired from July 1, 2006 will be required to become a Hybrid member. As of March 31, 2017, the Hybrid Class had 46,309 members or about 70.3% of the ERS' active membership.

Noncontributory Members do not make contributions to the ERS and are covered by Social Security. The Noncontributory Class covers employees hired from July 1, 1984 to June 30, 2006, as well as employees hired before July 1, 1984 who elected to join the Noncontributory Class. As of March 31, 2017, there were 13,743 active employees in the Noncontributory Class, which represents over 20.9% of all active members on this date.

Most employees hired after June 30, 2012 fall under the new tier of benefits, contributions and vesting requirements as a result of legislation passed in 2011.

A summary of the general retirement benefits, including retirement options, for Contributory, Hybrid and Noncontributory members are on the following pages. For more detailed and current information on the contributions, benefits, eligibility and other plan details please visit the ERS website at http://ers.ehawaii.gov/.

Summary of Retirement Benefit Plan Provisions

Membership for employees hired prior to July 1, 2012 [a]

	Noncontributory	Contributory	Hybrid
Employee Contributions	No employee contributions	7.8% of salary	6.0% of salary
Normal Retirement			
Eligibility	Age 62 and 10 years credited service; ***or*** Age 55 and 30 years credited service	Age 55 and 5 years credited service	Age 62 and 5 years credited service; ***or*** Age 55 and 30 years credited service
Benefit	1-1/4% of average final compensation* times years of credited service	2% of average final compensation* times years of credited service	2% of average final compensation* times years of credited service, with a split formula for Noncontributory service at 1-1/4%

* Average final compensation (AFC) is an average of the highest salaries during any three years of credited service, excluding any salary paid in lieu of vacation or if ERS membership occurred prior to 1/1/71, AFC may be an average of the highest salaries during any five years of credited service including any salary paid in lieu of vacation.

	Noncontributory	Contributory	Hybrid
Early Retirement			
Eligibility	Age 55 and 20 years credited service	Any age and 25 years credited service	Age 55 with 20 years credited service
Benefit	Maximum allowance reduced 6% per year under age 62	Maximum allowance reduced 5% per year under age 55 plus 4% per year under age 50	Maximum allowance reduced 5% per year under age 62
Deferred Vesting			
Eligibility	10 years credited service	5 years credited service and contributions left in the ERS	5 years credited service and contributions left in the ERS
Benefit	Accrued maximum allowance payable as early as age 55 or at age 65 with 10 but less than 20 years of credited service	Accrued maximum allowance payable at age 55	Accrued maximum allowance payable as early as age 55 or at age 62 with 5 but less than 20 years of credited service

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [a]

	Noncontributory	Contributory	Hybrid
Annuity Savings Account			
Interest	Not applicable	4.5% per annum on employee contributions and accrued interest, ***or*** If hired after June 30, 2011, 2.0% per annum on employee contributions and accrued interest	4.5% per annum on employee contributions and accrued interest, ***or*** If hired after June 30, 2011, 2.0% per annum on employee contributions and accrued interest
Refund Eligibility	Not applicable	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited
Refund Benefit			
- Terminates with less than 5 years credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest
- Terminates with 5 or more years of credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's Hybrid contributions and accrued interest, times 150%; plus any non-Hybrid contributions and accrued interest
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1-1/4% of AFC times years of credited service, unreduced for age (Minimum is 12.5% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	2% of AFC times years of credited service, unreduced for age; split formula for Noncontributory service at 1-1/4% (Minimum is 25% of AFC)

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [a]

	Noncontributory	Contributory	Hybrid
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Lifetime pension of 35% of AFC ** For accidents occurring before July 1, 2004, accrued maximum allowance, but not less than 15% of AFC	Lifetime pension of 50% of AFC plus refund of member's contributions and accrued interest ** For accidents occurring before July 7, 1998, a different benefit is used	Lifetime pension of 35% of AFC plus refund of member's contributions and accrued interest
Ordinary Death			
Eligibility	Active employee at time of death with at least 10 years of credited service	Active employee at time of death with at least 1 year of service	Active employee at time of death with at least 5 years of service
Benefit	Surviving spouse/reciprocal beneficiary (until remarriage or reentry into a new reciprocal beneficiary relationship) and dependent children (up to age 18) receive a benefit equal to a percentage of member's accrued maximum allowance unreduced for age; ***or*** Option B (100% Joint and Survivor) lifetime pension for surviving spouse/reciprocal beneficiary if member was eligible for retirement at time of death.	Lump sum payment of member's contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; ***or*** Option 3 (50% Joint and Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service, and one beneficiary designated; ***or*** Option 2 (100% Joint and Survivor) lifetime pension if member was eligible for retirement at the time of death and one beneficiary designated; ***or*** If less than 1 year of service, return of member's contributions and accrued interest.	Lump sum payment of member's Hybrid contributions and accrued interest (times 150%) plus return of non-Hybrid contributions and accrued interest; ***or*** Option 3 (50% Joint Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service and one beneficiary designated; ***or*** Option 2 (100% Joint Survivor) lifetime pension if member was eligible for retirement at the time of death, and one beneficiary designated; ***or*** If less than 5 years of service, return of member's contributions and accrued interest.

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [a]

	Noncontributory	Contributory	Hybrid
Service-Connected Death			
Eligibility	Any age or service	Any age or service	Any age or service
Benefit	Surviving spouse/reciprocal beneficiary receives monthly benefit equal to 30% of AFC (until remarriage or re-entry into a new reciprocal beneficiary relationship); additional benefits payable to surviving dependent children (up to age 18). If there is no spouse/reciprocal beneficiary or dependent children, no benefit is payable.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.
Post Retirement Benefit - For all types of retirements (service, disability or death)	Each retiree's original retirement allowance is increased by 2.5% on each July 1 beginning the calendar year after retirement. This cumulative benefit is not compounded and increases each year by another 2.5% of the original retirement allowance without a ceiling (i.e., 2.5% of the original retirement allowance the first year, 5% the second year, 7.5% the third year, etc.).		

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Membership for employees hired prior to July 1, 2012 (continued) [(a)]

The plan provisions summarized in the preceding pages apply to teachers and most State and County employees, hired before July 1, 2012. Special provisions applicable to other groups of employees, hired by July 1, 2012, are summarized in Item A to D below:

A) Police officers, firefighters, investigators of the Department of the Attorney General, narcotic enforcement investigators, and public safety investigations staff investigators contribute 12.2% of their monthly salary to the ERS instead of 7.8%. These members may retire at age 55 with 5 years of credited service or at any age with 25 years of credited service and receive a retirement benefit of 2-1/2% of average final compensation (AFC) for each year of such service up to a maximum of 80% AFC, provided the last 5 years is credited service in any of these occupations.

B) Judges, elected officials, and legislative officers may retire at age 55 with at least 5 years of credited service, or at any age with at least 10 years of credited service and receive a pension of 3-1/2% of AFC for each year of such service plus an annuity from their contributions allocable to the period of such service. This benefit cannot exceed 75% of the AFC. Judges hired after June 30, 1999 need 25 years of credited service in order to retire before age 55.

C) Sewer workers in specified classifications and water safety officers may retire at any age if they are credited with 25 years of such service with the last 5 or more years in these occupations. Hybrid members in this job category are required to contribute 9.75% of their salary to the ERS.

D) Emergency medical technicians (EMT) may retire at any age if they are credited with 30 years of such service with the last 5 or more years in these occupations effective June 30, 2003. The years of service to qualify for early retirement is gradually being reduced through June 30, 2008 when 25 years of EMT service will qualify these members for early retirement. Hybrid members in this job category are required to contribute 9.75% of their salary to the ERS.

[(a)] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 [(b)]

	Noncontributory	**Contributory**	**Hybrid**
Employee Contributions	No employee contributions	9.8% of salary	8.0% of salary
Normal Retirement			
Eligibility	Age 62 and 10 years credited service; ***or*** Age 55 and 30 years credited service	Age 60 and 10 years credited service	Age 65 and 10 years credited service; ***or*** Age 60 and 30 years credited service
Benefit	1-1/4% of average final compensation* times years of credited service	1.75% of average final compensation* times years of credited service	1.75% of average final compensation* times years of credited service, with a split formula for Noncontributory service at 1-1/4%

* Average final compensation (AFC) is an average of the highest salaries (limited to base pay and shortage differentials) during any five years of credited service, excluding any salary paid in lieu of vacation.

	Noncontributory	**Contributory**	**Hybrid**
Early Retirement			
Eligibility	Age 55 and 20 years credited service	Age 55 with 25 years credited service	Age 55 with 20 years credited service
Benefit	Maximum allowance reduced 6% per year under age 62	Maximum allowance reduced 5% per year under age 60 plus 4% per year under age 55	Maximum allowance reduced 5% per year under age 65
Deferred Vesting			
Eligibility	10 years credited service	10 years credited service and contributions left in the ERS	10 years credited service and contributions left in the ERS
Benefit	Accrued maximum allowance payable as early as age 55 or at age 65 with 10 but less than 20 years of credited service	Accrued maximum allowance payable at age 60, or at age 55 with 25 years of service with age reduction	Accrued maximum allowance payable as early at age 65 or at age 60 with 30 years of service, or at age 55 with 20-29 years of credited service with age reduction

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [b]

	Noncontributory	Contributory	Hybrid
Annuity Savings Account			
Interest	Not applicable	2.0% per annum on employee contributions and accrued interest	2.0% per annum on employee contributions and accrued interest
Refund Eligibility	Not applicable	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited
Refund Benefit			
- Terminates with less than 10 years credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest
- Terminates with 10 or more years of credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's Hybrid contributions and accrued interest, times 120%; plus any non-Hybrid contributions and accrued interest
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1-1/4% of AFC times years of credited service, unreduced for age (Minimum is 12.5% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 25% of AFC)

[b] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [b]

	Noncontributory	**Contributory**	**Hybrid**
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Lifetime pension of 35% of AFC	Lifetime pension of 50% of AFC plus refund of member's contributions and accrued interest	Lifetime pension of 35% of AFC plus refund of member's contributions and accrued interest
Ordinary Death			
Eligibility	Active employee at time of death with at least 10 years of credited service	Active employee at time of death with at least 1 year of service	Active employee at time of death with at least 10 years of service
Benefit	Surviving spouse/reciprocal beneficiary (until remarriage or reentry into a new reciprocal beneficiary relationship) and dependent children (up to age 18) receive a benefit equal to a percentage of member's accrued maximum allowance unreduced for age; ***or*** Option B (100% Joint and Survivor) lifetime pension for surviving spouse/reciprocal beneficiary if member was eligible for retirement at time of death.	Lump sum payment of member's contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; ***or*** Option 3 (50% Joint and Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service, and one beneficiary designated; ***or*** Option 2 (100% Joint and Survivor) lifetime pension if member was eligible for retirement at the time of death and one beneficiary designated; ***or*** If less than 1 year of service, return of member's contributions and accrued interest.	Lump sum payment of member's Hybrid contributions and accrued interest (times 120%) plus return of non-Hybrid contributions and accrued interest; ***or*** Option 3 (50% Joint Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service and one beneficiary designated; ***or*** Option 2 (100% Joint Survivor) lifetime pension if member was eligible for retirement at the time of death, and one beneficiary designated; ***or*** If less than 10 years of service, return of member's contributions and accrued interest.

[b] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [b]

	Noncontributory	Contributory	Hybrid
Service-Connected Death			
Eligibility	Any age or service	Any age or service	Any age or service
Benefit	Surviving spouse/reciprocal beneficiary receives monthly benefit equal to 30% of AFC (until remarriage or re-entry into a new reciprocal beneficiary relationship); additional benefits payable to surviving dependent children (up to age 18). If there is no spouse/reciprocal beneficiary or dependent children, no benefit is payable.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.

Post Retirement Benefit - For all types of retirements (service, disability or death)

Each retiree's original retirement allowance is increased by 1.5% on each July 1 beginning the calendar year after retirement. This cumulative benefit is not compounded and increases each year by another 1.5% of the original retirement allowance without a ceiling (i.e., 1.5% of the original retirement allowance the first year, 3% the second year, 4.5% the third year, etc.).

[b] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [b]

The plan provisions summarized in the preceding pages apply to teachers and most State and County employees, hired after June 30, 2012. Special provisions applicable to other groups of employees, hired after June 30, 2012, are summarized in Item A to D below:

A) Police officers, firefighters, investigators of the Department of the Attorney General, narcotic enforcement investigators, and public safety investigations staff investigators contribute 14.2 % of their monthly salary to the ERS instead of 9.8%. These members may retire at age 60 with 10 years of credited service or at age 55 with 25 years of credited service and receive a retirement benefit of 2-1/4% of average final compensation (AFC) for each year of such service up to a maximum of 80% AFC, provided the last 5 years is credited service in any of these occupations.

B) Judges may retire at age 60 with at least 10 years of credited service, or at age 55 with at least 25 years of credited service and receive a pension of 3% of AFC for each year of such service plus an annuity from their contributions allocable to the period of such service. Similarly, elected officials and legislative officers may retire at any age with 10 years of elected, legislative or mixed service and receive a pension of 3% of AFC for each year of service plus an annuity from their contributions allocable to the period of such service. These benefits cannot exceed 75% of the AFC.

C) Contributory Class sewer workers in specified classifications, water safety officers and emergency medical technicians may retire at age 60 with 10 years of credited service or at age 55 with 25 years of such service with the last 5 or more years in these occupations.

D) Hybrid Class sewer workers in specified classifications, water safety officers and emergency medical technicians may retire at age 65 with 10 years of credited service or at age 55 with 25 years of such service with the last 5 or more years in these occupations. They are required to contribute 11.75% instead of 8% of their salary to the ERS.

[b] **M**embership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Taxation of Benefits

All retirement benefits are subject to Federal income tax but are exempt from Hawaii State income tax. Certain occupational (work related) disability benefits are exempt from Federal income tax. Arrangements to initiate voluntary withholding of Federal income tax can be made at any time. The ERS provides retirees with a 1099-R tax form on or before January 31 of each year.

Additional Benefits

Retirees, their spouses and dependent children under age 19 are eligible to receive life insurance, medical, dental, vision, and prescription drug coverage from the Employer-Union Health Benefits Trust Fund (EUTF) if they were hired before July 1, 1996, and retire with at least 10 years of continuous credited service. If they were first hired after June 30, 1996, health benefits are available on a cost-sharing basis as long as the member retires with at least 10 years of continuous service. A dependent of a retiree who is a full-time student at an accredited college, university or technical school and who is 19 through 26 years old is also eligible for coverage. A retiree with a hire date after July 1, 2001 will only receive coverage for him or herself on a cost sharing basis.

Unused sick leave is excluded from credited service in determining health benefit coverage.

Retirees are responsible for premiums in excess of the amount of employer contributions. Retirees and their spouses are eligible to receive a reimbursement of the Medicare Part B medical insurance premium. More information is available on the EUTF's website at www.eutf.hawaii.gov.

Applying for Retirement

A service retirement application can be filed with the ERS 150 days but no less than 30 days prior to the effective date of retirement. Once the application has been filed, cancellation prior to the effective date of retirement is permitted; however, the law requires mandatory retirement upon the third application. Members may obtain retirement information and application forms at the following locations:

Oahu Office
City Financial Tower
201 Merchant Street, Suite 1400
Honolulu, HI 96813
Phone: (808) 586-1735
Fax: (808) 587-5766

Kauai Office
3060 Eiwa Street, Room 302
Lihue, Hawaii 96766
Phone: (808) 274-3010
Fax: (808) 241-3193

Hawaii Office
101 Aupuni Street, Suite 208
Hilo, Hawaii 96720
Phone: (808) 974-4076
Fax: (808) 974-4078

Maui Office
54 S. High Street, Room 218
Wailuku, Hawaii 96793
Phone: (808) 984-8181
Fax: (808) 984-8183

Molokai and Lanai
Toll-free to Oahu:
1-800-468-4644, ext 61735

Continental U.S. only
Toll free to Oahu
1-888-659-0708

Counseling Service

It is the policy of the ERS to render every possible service to its members; however, as thousands of inquiries are received and answered annually, in addition to the actual processing of claims and benefits, present staff and appropriations restrict this service to those members whose immediate welfare is dependent upon the prompt settlement of benefits. Members who are definite about retirement should contact the ERS to request formal retirement estimates. For members who are not planning immediate retirement and interested in their benefit status a retirement benefit calculator and other retirement information are available on the ERS' website at http://ers.ehawaii.gov/.

Retirement Options

CONTRIBUTORY AND HYBRID MEMBERS

Maximum Allowance: The member receives a lifetime maximum allowance; at death, the difference between the value of the member's contributions at the time of retirement and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Option One: The member receives a reduced lifetime allowance based on age; at death, the difference between the initial insurance reserve and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate. In lieu of the lump-sum balance, the beneficiary may elect to receive an allowance for life based on the value of the balance; provided that the allowance is not less than $100 per month.

Option Two (100% Joint and Survivor): The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary and at death; the same allowance is paid to the designated beneficiary for life. Should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree’s reduced pension “pops up” or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Three (50% Joint and Survivor): This option is similar to Option Two. The member receives a reduced lifetime allowance which is higher than Option Two and is based on ages of both the member and the sole beneficiary; however, at death one-half of the allowance is paid to the designated beneficiary for life. Like Option Two, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree’s reduced pension “pops up” or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Four: This option allows the member to devise a plan that will provide a benefit according to the member's specifications. It requires certification by the Actuary and approval of the Board of Trustees. The following Option Four plans have been approved:

Combination of Options Five and Maximum Allowance: The member receives a reduced lifetime allowance and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the difference between the value of the member's contributions at the time of retirement and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Combination of Options Five and One: The member receives a reduced lifetime allowance and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the difference between the initial insurance reserve and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Combination of Options Five and Two: The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary, and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the same allowance is paid to the designated beneficiary for life. As in the case of Option Two, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree’s reduced pension “pops up” or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Retirement Options (continued)

CONTRIBUTORY AND HYBRID MEMBERS (continued)

Combination of Options Five and Three: The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary, and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, one-half of the allowance is paid to the designated beneficiary for life. As in the case of Option Three, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Five: The member receives a reduced lifetime allowance and is allowed to withdraw all accumulated contributions; at death, there is no further benefits payable.

Option Four and Option Five are restricted to those members with at least ten years of credited service excluding unused sick leave credit.

Regardless of the option selected, should death of the Contributory or Hybrid member occur during the first year of retirement, the designated beneficiary may elect to receive benefits as if death had occurred immediately prior to retirement in lieu of the death benefits described above.

NONCONTRIBUTORY MEMBERS

Maximum Allowance: The member receives a lifetime pension and at death, there is no further benefit payable.

Option A (50% Joint and Survivor): The member receives a reduced lifetime pension and at death, one-half of the pension is paid to the sole designated beneficiary for life. Should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease upon the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option B (100% Joint and Survivor): The member receives a reduced lifetime pension and at death, the same pension is paid to the sole designated beneficiary for life. Like Option A, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease upon the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option C (Ten-Year Guarantee): The member receives a reduced lifetime pension. Should death occur within ten years of retirement, the same pension will be paid to the designated beneficiary, or otherwise to the retiree's estate for the balance of the ten-year period. Should the designated beneficiary predecease the retiree, another beneficiary can be named.

Regardless of the option selected, should death occur during the first year of retirement, the designated beneficiary may elect to receive benefits under Option B in lieu of the death benefits described above, provided that if the retiree would not have been permitted by applicable law or the rules of the Board to name the designated beneficiary under Option B, the designated beneficiary may elect to receive the death benefit under Option A.

Legislative Highlights 2017

The following Acts were passed by the 2017 Legislature and approved by the Governor. For more information on these and other legislation, you may visit the website at www.capitol.hawaii.gov.

Act 17 (SB936): Relating to the Employees' Retirement System

This Act helps improve the cash flow of ERS if employers pay contributions at the beginning of the fiscal year by allowing the funds to be invested which may reduce future employer contributions required if increased investment earnings are realized.

- Approved a four-year phase in of employer contribution rate increase effective July 1, 2017 that will increase the rate for Police and Fire from current of 25% to 41% as of July 1, 2020, and the rate for All Other Employees from the current rate of 18% to 24 % as of July 1, 2020, as a result of the ERS's funded position from the 2016 actuary valuation.
- Extends the due date for employer required payments for additional retirement contributions due to their employees retired with significant non-base pay increases to two years.
- This Act also contains several "housekeeping measures to adjust the interest rate paid on underpayments if retiree benefits are not finalized with the six month time requirement;; and to improve service provided to members and beneficiaries applying for disability retirement and accidental death benefits.
- Effective: July 1, 2017

Act 18 (SB207): Relating to Employees of Hawaii Health Systems Corporation (HHSC) Maui

This Act repeals and provides alternative benefits to Act 1, 2016:

- Appropriates funds to the Department of Budget and Finance for collective bargaining cost items related to the transition of affected Maui region hospital employees to Maui Health System, a Kaiser Foundation Hospitals, LLC. Effective: July 1, 2017
- Repeals chapter 89E, HRS, and Act 1, Second Special Session, Laws of Hawaii 2016 (S.B. 2077, H.D. 2). Effective: Retroactive to July 20, 2016

Act 85 (HB1182): Relating to the Employees' Retirement System

This Act requires the ERS actuary to conduct annual "stress tests" of the System, primarily the impact of specified investment return and valuation scenarios on the ERS funding level, contribution requirements and unfunded liability. Annual reports of these tests will be provided to the Legislature. Effective: July 1, 2017

Act 93 (SB133): Relating to Public Employees' Fringe Benefits

This Act reduces the maximum period between experience studies of the ERS from five years to three years. The purpose of experience studies is to periodically review the actuarial assumptions on which the funding of the System is based, including investment returns, membership life expectancy, payroll growth, salary increases and retirement behavior.
Effective: July 5, 2017

Employees' Retirement System

of the State of Hawaii

Submitted by

THE AUDITOR
STATE OF HAWAII

FINANCIAL SECTION

Independent Auditors' Report

KPMG LLP
Suite 2100
1003 Bishop Street
Honolulu, HI 96813-6400

The Auditor
State of Hawaii:

Report on the Financial Statements

We have audited the accompanying financial statements of the Employees' Retirement System of the State of Hawaii (the ERS) as of and for the year ended June 30, 2017 and the related notes to the financial statements, which collectively comprise the ERS' basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal controls relevant to the preparation and fair presentation of 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 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 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 financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the 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 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 principles used and the reasonableness of significant estimates made by management, as well as evaluating the overall presentation of the financial statements.

The Auditor
State of Hawaii:

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the Employees' Retirement System of the State of Hawaii as of June 30, 2017, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 31 through 37 and required supplementary information including the schedule of changes in the employers' net pension liability and related ratios, employers' net pension liability, employer contributions and investment returns on pages 75 through 84 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, 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 inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary and Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the ERS' basic financial statements. The supplementary information including the combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, schedules of

The Auditor
State of Hawaii

administrative expenses and investment expenses, and the Introductory, Investment, Actuarial and Statistical sections are presented for purposes of additional analysis and are not a required part of the basic financial statements. The combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, and schedules of administrative expenses and investment expenses are the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic 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 financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, and the schedules of administrative expenses and investment expenses and fairly stated in all material respects in relation to the basic financial statements taken as a whole.

The information contained in the Introductory, Investment, Actuarial, and Statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

Other Reporting Required by *Government Auditing Standards*

In accordance with Government Auditing Standards, we have also issued our report dated November 16, 2018 on our consideration of the ERS' internal control over financial reporting and on our tests 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 the 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 ERS' internal control over financial reporting and compliance.

KPMG LLP

Honolulu, Hawaii
November 16, 2018

Management's Discussion and Analysis (Unaudited)

This Management's Discussion and Analysis (MD&A) of the Employees' Retirement System of the State of Hawaii (the ERS) provides highlights and comparisons of the financial position and performance of the ERS as of and for the year ended June 30, 2017. The MD&A is presented as a narrative overview and analysis in conjunction with the Letter of Transmittal, which is included in the Introductory Section of the ERS Comprehensive Annual Financial Report (CAFR). For more detailed information pertaining to the ERS' financial activities, the reader should also review the actual financial statements, including the notes and supplementary schedules.

Overview of the Financial Statements

The ERS is responsible for administering a defined-benefit pension plan for state government, local government, and public education employees in the State of Hawaii (the State). The ERS also oversees the short-term investments of the federal Social Security employer contributions for the State in the Social Security Contribution Fund (Contribution Fund).

The ERS' financial statements include fiduciary type funds that are used to account for resources held for the benefit of parties outside of the ERS. The primary fund is defined as a Pension Trust Fund as these assets are held for the benefit of its members and their beneficiaries for the payment of pension benefits, while the Contribution Fund is an agency type fund that is custodial in nature. Throughout this discussion and analysis, units of measure (i.e., billions, millions, and thousands) are approximate, being rounded up or down to the nearest tenth of the respective unit value.

This discussion and analysis is intended to serve as an introduction to the ERS' financial reporting, which comprises the following components:

- The two main basic financial statements include the statement of fiduciary net position as of June 30, 2017, and the related statement of changes in fiduciary net position during the fiscal year from July 1, 2016 to June 30, 2017 (FY 2017). These provide a snapshot of the resources available at the end of the fiscal year and a summary of changes in resources available to pay pension benefits to members, retirees, and beneficiaries.
- The related notes to financial statements are an integral part of the basic financial statements and include detailed information that is essential to a full understanding of the data provided in the basic financial statements.
- The Required Supplementary Schedules of Changes in the Employers' Net Pension Liability and Related Ratios, Employers' Net Pension Liability, Employer Contributions and Investment Returns, and the related Notes to Required Supplementary Information, are required to be presented to supplement the basic financial statements for placing the financial statements in an appropriate operational, economic, or historical context.

- The remaining supplementary information are derived from and relate directly to the underlying accounting and other records used to prepare the financial statements, and provides additional detailed information concerning the changes in operating reserves established by legislation, and the operating and investment related expenses of the ERS.

Financial Highlights

- The fiduciary net position restricted for pension benefits (or net assets) increased during FY 2017 to $15.7 billion resulting in an increase of the funded status of ERS to 54.8% as of June 30, 2017. This represents an increase of $1.6 billion, 11.6%, from the fiduciary net position restricted for pension benefits of $14.1 billion as of June 30, 2016.

- The ERS investment return (gross of fees) was 13.7% for the 2017 fiscal year compared to a loss of -0.8% return during the 2016 fiscal year, using the time-weighted rate of return methodologies that are generally accepted by the Global Investment Performance Standards (GIPS) (that is shown in the *Investment Section* of this CAFR). The investment program outperformed its actuarial and investment goal of 7.00% that was effective June 30, 2016. Under GASB Statement No. 67, Financial Reporting for Pension Plans – an amendment of GASB Statement No. 25, pension reporting standards, the annual money-weighted return on ERS' pension plan investments, net of pension plan investment expense, was 13.7% and -1.2% for FY 2017 and FY 2016, respectively.

  Effective October 1, 2014, the Board of Trustees of the System approved the adoption of a change in its asset allocation policy from the asset-class policy to a new risk-based asset allocation framework within the categories of Broad Growth, Principal Protection, Real Estate and Real Return, that is expected to be implemented through 2020. This is the first year that the results of operations for these FY 2017 financial statements are prepared on the risk-based investment strategy since the portfolio was transitioned to the new policy during the fiscal year. Please refer to Note F1 later in Notes to Financial Statements and the Investment Section of this CAFR for more detailed information on the asset allocation policy.

- During 2017, legislation was implemented related to significant increases in employer contribution rates as a result of the funded status as of June 30, 2016. (The new rates that are effective starting July 1, 2017 are discussed below.) There was no significant change to benefits.

- Total pension liability as of June 30, 2017 increased to $28.6 billion from June 30, 2016 that was $27.4 billion, while the corresponding net pension liability was $13.0 billion and $13.4 billion for June 30, 2017 and 2016, respectively. Covered payroll for the ERS increased in FY 2017 to $4.2 billion from FY 2016 total of $4.1 billion, for 3.2% increase.

- The fiduciary net position as a percentage of total pension liability was 54.8% and 51.3% as of June 30, 2017 and June 30, 2016, respectively, while the funded ratio on an actuarial basis increased to 54.9% from 54.7%, respectively. The main difference between the two methods is under GASB Statement No. 67 for financial reporting purposes the fiduciary net position is based only on the market value of assets while under actuarial value for the net assets for funding purposes allows for a four-year market smoothing of assets of net appreciation.
- Contributions from members and employers increased by a total of $38.5 million during FY 2017, or 3.9%. The increases from member pay increases, more active members being required to contribute, and new employees contributing at higher contribution rates was partially offset by a decrease in the number of active members. The historical summary of legislation impacting the ERS actuarial valuations is discussed in more detail in the "Summary of Plan Changes" in the Actuarial Section.
- Total retirement benefit payments increased by $74.2 million, or 6.0%, to $1,306.8 million in FY 2017 from $1,232.6 million in FY 2016. Pension benefits continues to increase due to 3.1% more retirees and beneficiaries (46,927 in 2017 compared to 45,506 in 2016), an increase in the average pension benefit for new retirees, and the annual 2.5% postretirement increase.
- Administrative expenses increased by $1.0 million to $15.0 million in FY 2017 from $14.0 million in FY 2016. Increases in payroll, repairs and maintenance, audit, and legal service costs were offset by a reduction in depreciation. Administrative expenses for all years were within the ERS' budgeted amounts.

Analysis of Fiduciary Net Position Restricted for Pension Trust

Summary of Fiduciary Net Position
June 30, 2017 and 2016
(Dollars in millions)

	2017	2016	FY 2017 % change
Assets:			
Cash and cash equivalents and short-term investments	$ 2,390.1	$ 524.1	356.0 %
Receivables	287.8	331.7	(13.2)
Investments	13,492.5	13,636.5	(1.1)
Invested securities lending collateral	1,039.9	1,268.7	(18.0)
Equipment	5.2	6.3	(17.5)
Total assets	17,215.5	15,767.3	9.2
Liabilities			
Securities lending liability	1,039.9	1,268.7	(18.0)
Investment accounts and other payables	477.3	428.6	11.4
Total liabilities	1,517.2	1,697.3	(10.6)
Fiduciary net position restricted for pensions	$ 15,698.3	$ 14,070.0	11.6

Summary of Changes in Fiduciary Net Position
June 30, 2017 and 2016
(Dollars in millions)

	2017	2016	FY 2017 % change
Additions:			
Contributions	$ 1,031.9	$ 993.4	3.9 %
Net investment income (loss)	1,934.5	(169.4)	1,242.0
Total additions	2,966.4	824.0	260.0
Deductions:			
Retirement benefit payments	1,306.8	1,232.6	6.0
Refund of contributions	16.3	12.9	26.4
Administrative expenses	15.0	14.0	7.1
Total deductions	1,338.1	1,259.5	6.2
Increase (decrease) in fiduciary net position	$ 1,628.3	$ (435.5)	473.9

Investments, Investment Income, and Investment Expense

The ERS is a long-term investor and manages its pension assets with long-term objectives in mind. A primary element of the ERS' investment philosophy is diversification among various asset classes. The ERS makes estimates of long-term market returns and establishes an asset allocation strategy taking into account the risks associated with each asset class.

The rate of return (gross of fees time-weighted rate of returns) on the ERS investment portfolio during FY 2017 was 13.7% resulting from superior returns in equity markets while there was underperformance of fixed income investments, compared to (0.8%) in FY 2016. Total net investment income was $1,934.5 million in FY 2017 compared to total net investment loss of $169.4 million in FY 2016.

The exceptional performance for the fiscal year was led by strong appreciation of broad growth class (up 17.4%), which includes traditional growth strategies (up 22.0%), private growth strategies (up 18.6%), and stabilized growth strategies (up 10.9%) with all three components beating their benchmarks. Performance for principal protection was 1.9%, exceeding its benchmark by 1.9% during a difficult year for global government bonds, while real return posted a return of 2.6% trailing its CPI+3% benchmark for the fiscal year by 2.1%. A summary of investment returns (by sub-component of the risk-based allocation) is included within the *Report on Investment Activity by Investment Consultant* that is located in Investment Section of this CAFR.

The ERS participates in a securities lending program through its global custodian as a way to earn incremental income to enhance the investment portfolio yield.

The asset distribution of the ERS' investment securities for the pension trust, excluding pending trade settlements and securities lending collateral, at June 30, 2017 and 2016 is presented below at fair value. Investment balances between the asset classes will change over time based on market sectors' performance and our rebalancing efforts to maintain asset allocation targets. Changes will also occur for financial reporting since certain real estate and alternative investments are reported on the consolidated method of accounting using the value of the underlying investments since ERS is the majority owner of the business organization. Please refer to the Investment Section of the CAFR for a discussion on asset allocation plan targets and investments by investment strategy.

Investments in short-term securities and cash significantly increased in spring 2017 with the funding of the Crisis Risk Offset (CRO) program for the risk-based allocation policy approved in 2015. These amounts reported on the financial statements also include cash requirements used by ERS to fund pension benefits and transition amounts between individual investments. Fluctuations will occur based on the trading activity and timing of the settlements.

Asset Class
June 30, 2017 and 2016
(Dollars in millions)

	2017	%	2016	%
Short term investments and cash	$ 2,390.1	15.0 %	$ 524.1	3.7 %
Equity securities	7,190.5	45.3	8,541.9	60.3
Fixed income	3,930.6	24.7	3,117.1	22.0
Real estate	1,112.4	7.0	967.1	6.8
Alternative investments	1,259.0	8.0	1,010.4	7.2
Total investment assets	15,882.6	100.0	14,160.6	100.0
Less loans on real estate and alternative investments	174.5		170.2	
	$ 15,708.1		$ 13,990.4	

Investment expenses includes (a) investment management fees paid to external investment advisor firms that oversee the ERS' investment portfolio and (b) operational activities of certain real estate and alternative investments since these assets are reported on the consolidated method of accounting using the activity of the underlying investments since ERS is the majority owner of the business organization.

Total investment management fees earned by external investment advisors decreased approximately -2.2% during FY 2017 compared to FY 2016 with the portfolio rebalancing in implementing the risk based allocation policy. Certain real estate investment managers may receive an incentive fee for superior investment returns by the manager above their corresponding benchmark, while maintaining an acceptable level of investment risk. Incentive fees are recognized on the accrual basis of accounting for the increase or decrease of the change in real estate values during the year, and are only paid upon the sale of the asset if the asset has "excess earnings" when the real estate asset is actually sold. The ERS requires external managers to provide the ERS with a "most favored nations" contract clause that guarantees the ERS with the lowest management fees the managers offer their clients for investment accounts with similar investment mandates and similar account size.

During FY 2017, the ERS was transitioning from a portfolio asset allocation return-based process to a risk-based process that makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies approved by the Board of Trustees in FY 2015. This framework shifts the portfolio asset allocation from a return-based process to a risk-based process that makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies. Each of these classes is designed to achieve a certain goal (e.g., Real Return class) and/or be exposed to a specific set of macroeconomic risks that are common among the different strategy types and/or assets within the class (e.g., Broad Growth class). As a result of this structure, each strategic class is expected to be exposed to a set of major and minor macroeconomic risks. The effect of the new risk-based methodology is discussed in the *Investment Section* of this CAFR.

Contributions

Contributions from employers and employees totaled $1,031.9 and $993.4 million in FY 2017 and FY 2016, respectively. During FY 2017, total contributions increased by $38.5 million, or 3.9%, mainly due to an increase in covered payroll and to a lesser extent an increase in the percentage of active members required to make during the year. Employer contribution rates will increase over the next three four years as a result of 2017 legislation discussed below. Please refer to the Financial Section in the ERS 2017 and 2016 CAFR for more information.

Pension Plan Benefits and Expenses

Pension benefit payments continue to be the primary expense of the ERS with payments increasing to $1,306.8 million in FY 2017 from $1,232.6 million in FY 2016. The pension benefits increase is attributed to the continued net increase in the number of retirees being paid, higher pension benefits for recent retirees, and the annual postretirement increase for ERS' retirees.

Refunds to terminating Hybrid and Contributory Class members increased during the year.

Administrative expenses increased to $15.0 million in FY 2017 from $14. million in FY 2016. Increases in computer system maintenance and personnel-related costs, were offset by a decrease in professional services.

Pension Plan Changes

There was no significant legislation passed in 2017 that affects pension plan provisions. Pension plan changes, including legislative and Board of Trustees' actions, are summarized in the Introductory Section and Actuarial Section of the CAFR.

Actuarial Valuations and Measurement of Net Pension Liability

The positive investment returns environments, compounded with new increased future contribution rates during FY2017 have significantly improved the outlook for ERS. After a poor investment year in FY 2016, the financial markets rebounded in FY 2017 resulting in a return of 13.7% on the market value of assets. This compares to rate of return for the actuarial value was 6.9%, which is less than the market return due to the smoothing methodology used in the determination of the actuarial value of assets.

The total pension liability for fiscal year ended June 30, 2017 is based on the actuarial valuation performed as of June 30, 2017 and a measurement date of June 30, 2017.

Per the valuation as of June 30, 2017, the ERS' total pension liability was $28.6 billion, covered payroll totaled $4.2 billion, and the ERS' fiduciary net position was $15.7 billion resulting in a net pension liability of $13.0 billion. The June 30, 2016 valuation results include the ERS' total pension liability of $27.4 billion, covered payroll at $4.1 billion, and the ERS' fiduciary net position of $14.1 billion resulting in a net pension liability of $13.4 billion. The ERS' fiduciary net position as a percentage of total pension liability was 54.8% and 51.3% on June 30, 2017 and 2016, resulting in the net pension liability as a percentage of covered payrolls of 305.2% and 325.1%, respectively. The increase in pension liabilities is overall payroll growth and individual salary increases.

Based on the results of the actuarial valuation as of June 30, 2017, including existing statutory employer contribution rates, the ERS actuary determined the funding period for paying off the unfunded actuarial accrued liability (UAAL) of the ERS Pension Trust is 26 years. Because this period is less than the 30 years, the objectives set in Hawaii Revised Statutes (HRS) are currently being realized. (HRS§88-122(e)(1) state that the employer contribution rates are subject to adjustment when the funding period is in excess of 30 years.)

Increase in Statutory Employer Contribution Rates – Future State and counties employer contributions are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. Per Act 17 (SLH 2017), the rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1, 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020. These employer contribution rates are applied to the total covered payroll in each respective category to determine the required employer contributions.

Requests for Information

This financial report is designed to provide a general overview of the Employees' Retirement System of the State of Hawaii's finances. For questions concerning any information in this report or for additional information, contact the Employees' Retirement System of the State of Hawaii, 201 Merchant Street, Suite 1400, Honolulu, Hawaii 96813.

Financial Statements

Combining Statement of Fiduciary Net Position

June 30, 2017

Assets		
Cash and cash equivalents and short-term investments		
Cash and cash equivalents	$	870,014,229
Short-term investments		1,520,093,846
		2,390,108,075
Receivables		
Accounts receivable and others		5,686,729
Investment sales proceeds		190,816,066
Accrued investment income		43,320,022
Employer and member contributions		47,967,178
		287,789,995
Investments, at fair value		
Equity securities		7,190,541,977
Fixed income securities		3,930,555,468
Real estate investments		1,112,391,820
Alternative investments		1,259,025,683
		13,492,514,948
Other		
Invested securities lending collateral		1,039,906,540
Equipment, at cost, net of depreciation		5,215,413
		1,045,121,953
Total assets		17,215,534,971
Liabilities		
Accounts and other payables		52,194,547
Payable for securities purchased		250,612,562
Securities lending collateral		1,039,906,540
Notes payable		174,497,016
Total liabilities		1,517,210,665
Commitments and contingencies		
Fiduciary net position restricted for pensions	$	15,698,324,306

See accompanying notes to financial statements

Financial Statements (continued)

Statement of Changes in Fiduciary Net Position

Year ended June 30, 2017

Additions		
Contributions		
Employers contributions	$	781,244,218
Members contributions		250,704,067
Total contributions		1,031,948,285
Investment income		
From investing activities:		
Net appreciation in fair value of investments		1,590,362,450
Interest on fixed income securities		121,452,763
Dividends on equity securities		123,625,607
Income on real estate investments		80,158,620
Interest on short-term investments		1,232,070
Alternative investment income		87,186,867
Miscellaneous		2,775,493
		2,006,793,870
Less investment expenses		79,477,962
Net investment income from investing activities		1,927,315,908
From securities lending activities:		
Securities lending income		13,085,807
Less: securities lending expenses, net		5,889,208
Net investment income from securities lending		7,196,599
Total net investment income		1,934,512,507
Total additions, net		2,966,460,792
Deductions		
Benefit payments		1,306,788,954
Refunds of member contributions		16,340,290
Administrative expenses		14,986,159
Total deductions		1,338,115,403
Net increase in fiduciary net position		1,628,345,389
Fiduciary net position restricted for pensions		
Beginning of year		14,069,978,917
End of year	$	15,698,324,306

See accompanying notes to financial statements.

June 30, 2017

Note A – Description of the ERS

1. General

The Employees' Retirement System of the State of Hawaii (the ERS) began operations on January 1, 1926, having been established by the Territorial Legislature in the preceding year. The provisions of the ERS are contained in Chapter 88 of the Hawaii Revised Statutes (HRS) and applicable provisions of the federal Internal Revenue Code. The ERS is a cost-sharing, multiple-employer public employee retirement system established as a defined benefit pension plan to administer a pension benefits program for all State and county employees, including teachers, professors, police officers, firefighters, correction officers, judges, and elected officials.

The ERS is a qualified defined-benefit pension plan under Section 401(a) of the Internal Revenue Code. The ERS' current favorable determination letter from the Internal Revenue Service expires on January 31, 2019. Since January 1, 1988, member contributions have been tax deferred under Section 414(h)(2) of the Internal Revenue Code, and Chapter 88 mandates that employers pick up the employee contributions. These contributions are classified as member contributions in the financial statements. As a public entity, the ERS is not required to file a federal income tax return with the Internal Revenue Service. As a defined-benefit pension plan, the ERS is required to withhold federal income tax from member and benefit recipient payments in accordance with the Internal Revenue Code.

The ERS Pension Trust is comprised of three pension classes for membership purposes and considered to be a single plan for accounting purposes because all assets of the ERS may legally be used to pay the benefits of any of the ERS members or beneficiaries, as defined by the terms of the ERS. The ERS provides retirement, survivor, and disability benefits for three membership classes known as the contributory, hybrid, and noncontributory members.

Generally, all full-time employees of State and counties of Hawaii are required to be members of the ERS. Some positions of the State and counties of Hawaii are not eligible for ERS membership and may be covered by another separate retirement program. Membership of the plan and the benefits provided are based on the individual's employment group and ERS membership date. A member may belong to only one class based on their latest employment. A member may change classes in certain situations due to a change in their employment date or job classification. If a member earns service in different classes or benefit structures, the member's retirement benefit is bifurcated based on the applicable membership service earned (such as service credits and benefit multiplier percentage of such service).

The two major employment groups applicable to employer and member contribution rates, vesting requirements, and benefit provisions are (a) Police and Firefighters and (b) All Other Employees. There are four major benefit structures for contributory class members based on employment group and membership date while there are two benefit structures for hybrid class members based on their membership date as discussed below. The noncontributory class has one benefit structure.

Note A – Description of the ERS (continued)

1. General (continued)

Employer, pensioner, and employee membership data as of March 31, 2017 are as follows:

Employers:	
State	1
County	4
Total employers	5
Pensioners and beneficiaries currently receiving benefits:	
Pensioners currently receiving benefits:	
Police and firefighters	3,563
All other employees	39,294
Total pensioners	42,857
Beneficiaries currently receiving benefits:	
Police and firefighters	304
All other employees	3,766
Total beneficiaries	4,070
Total pensioners and beneficiaries	46,927
Terminated vested members entitled to benefits but not yet receiving benefits:	
Police and firefighters	378
All other employees	8,863
Total terminated vested members	9,241
Inactive members	
Police and firefighters	641
All other employees	15,841
Total inactive members	16,482
Total terminated vested and inactive members	25,723
Active members:	
Vested:	
Police and firefighters	4,157
All other employees	43,945
Total vested members	48,102
Nonvested:	
Police and firefighters	852
All other employees	16,957
Total nonvested members	17,809
Total active members	65,911
Total membership	138,561

Note A – Description of the ERS (continued)

2. The Financial Reporting Entity

As required by U.S. generally accepted accounting principles, these financial statements present the ERS (the primary government) as a separate reporting entity from the State of Hawaii (the State). The ERS is not part of the State's financial reporting entity because it is a separate legal entity that is fiscally independent of the State. The ERS was established by Chapter 88 of the HRS and is governed by a Board of Trustees (the Board) as discussed below.

The Board administers the ERS on behalf of public employees of both the State and county governments. Except for limited administrative functions, the State does not have the power to supervise or control the Board in the exercise of its functions, duties, and powers. The Board consists of eight members. The State Director of Finance is a statutory member of the Board. Four members of the Board are elected by members and retirants of the ERS and the other three members of the Board are appointed by the Governor. Decisions are made with the concurring vote of five members of the Board. The Board appoints the Executive Director and Chief Investment Officer and engages actuarial and other services required to transact the business of the ERS.

3. Class Descriptions and Funding Policy

Members of the ERS are contributory, hybrid, or noncontributory members. All assets of the ERS (in the Pension Trust) may be used to pay benefits to any member of the ERS. Contribution rates are determined by state law as a percentage-of-payroll.

The statutory employer contribution rate includes the normal cost and accrued liability contribution and is determined separately for two groups of employees: (a) police officers and firefighters and (b) all other employees. Employer contribution rates are subject to adjustment in certain situations based on the plan's funded status or actuarial investigations. The ERS performs an actuarial investigation of the experience at least once every five years, plus an annual actuarial valuation of the assets and liabilities of the funds of the pension trust. The Board of Trustees adopts mortality, service, and other assumptions, factors, and tables as deemed appropriate and necessary, based on the actuarial investigation and actuary recommendation. Generally, actuarial assumptions and methods were adopted by Board of Trustees on December 12, 2016 as recommended by Gabriel, Roeder, Smith and Company (GRS) (from the 2015 Experience Study for the five-year period from June 30, 2010 through June 30, 2015) while the investment return assumption was adopted beginning with the 2016 valuation. See the Actuarial Section for all actuarial assumptions used.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Effective July 1, 2008, the statutory employer contribution rate for employees in the Police and Fire category increased from 15.75% to 19.70%, and the rate for employees in the All Other category increased from 13.75% to 15.00%. Per legislation passed in 2011, the rate for Police and Fire employees increased to 22.00% on July 1, 2012; 23.00% on July 1, 2013; 24.00% on July 1, 2014; and 25.00% on July 1, 2015 and the rate for All Other Employees increased to 15.50% effective July 1, 2012; 16.00% effective July 1 2013; 16.50% effective July 1, 2014; and 17.00% effective July 1, 2015. These employer contribution rates are applied to the total covered payroll in each respective category to determine the required employer contributions. Administration of the Pension Trust is financed through contributions from the employers and employees (if applicable) and investment earnings.

Per Act 17 (SLH 2017), employer contribution rates from State and counties are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. The rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1, 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Effective July 1, 2012, employers may be required to make additional employer contributions to the ERS in certain situations. This legislation requires employers to pay additional contributions if a retiring employee, who was first employed prior to July 1, 2012 and who was last employed by the employer, has significant non-base pay increases included in their average final compensation. The additional contribution is equal to the actuarial present value of the additional benefits earned due to the "excessive" non-base pay increases.

Until June 30, 1984, all employees were required to be contributory members. Employees covered by Social Security on June 30, 1984 were given the option of changing to a noncontributory member or remain a contributory member. All new employees hired after June 30, 1984 and before July 1, 2006, who are covered by Social Security, were generally required to be noncontributory members. Qualified employees that were contributory or noncontributory members were given the option to change to Hybrid Class benefits structure effective July 1, 2006, or remain in their existing class. Starting July 1, 2006, all new employees covered by Social Security are required to be Hybrid Members, unless they are required to be Contributory members. Most employees not covered by Social Security (primarily Police and Fire employees) are required to be Contributory members.

The three membership classes provide a monthly retirement allowance (maximum allowance) equal to the benefit multiplier % (generally 1.25% or 2%), multiplied by the average final compensation (AFC), multiplied by years of credited service. The benefit multiplier decreased by 0.25% for new hybrid and contributory members hired after June 30, 2012. If a member earns service in a different benefit structure, the member's retirement benefit is bifurcated based on the applicable membership service earned (such as service credits and benefit multiplier percentage of such service). In lieu of the maximum allowance, the member may elect to receive an actuarially equivalent alternate retirement option with a reduced lifetime allowance (such as survivor benefit).

The AFC is the average salary earned during the five highest paid years of service, including the payment of salary in lieu of vacation, or three highest paid years of service, excluding the payment of salary in lieu of vacation, if the employee became a member prior to January 1, 1971. The AFC for members hired on or after this date, and before July 1, 2012, is based on the three highest paid years of service excluding the payment of salary in lieu of vacation. For new members hired after June 30, 2012, the AFC is based on the five highest paid years of service excluding the payment of salary in lieu of vacation.

For postretirement increases, every retiree's original retirement allowance is increased by 2.5% on each July 1 following the calendar year of retirement, if the retiree became an ERS member prior to July 1, 2012. This cumulative benefit is not compounded and increases each year by 2.5% of the original retirement allowance without a ceiling (2.5% of the original retirement allowance the first year, 5.0% the second year, 7.5% the third year, etc.). For new members hired after June 30, 2012, the postretirement annuity increase was decreased to 1.5% per year of the original retirement allowance without a ceiling (1.5% of the original retirement allowance the first year, 3.0% the second year, 4.5% the third year, etc.).

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

The following summarizes the provisions relevant to the largest employee groups of the respective membership class. Retirement benefits for certain groups, such as sewer workers, judges, and elected officials, vary from general employees.

All contributions, benefits, and eligibility requirements are governed by Chapter 88 of the Hawaii Revised Statutes. For a more detailed summary of benefits for employees and a description of special provisions to groups of employees, refer to the Summary of Retirement Benefit Plan Provisions contained in the *Introductory Section* of this report. All of the statutory member contributions discussed in this section are classified as "member contributions" with the adoption of GASB Statement No. 82, Pension Issues – an amendment of GASB Statements No. 67, No. 68, and No. 73.

Contributory

Police officers, firefighters, and certain other members that are not covered by Social Security first hired prior to July 1, 2012 contribute 12.2% of their salary and receive a retirement benefit using the benefit multiplier of 2.5% for qualified service, up to a maximum of 80% of AFC. These members may retire at age 55 with 5 years of credited service or at any age with 25 years of credited service, provided the last 5 years of credited service is any of the qualified occupations.

Police officers, firefighters and certain other members that are not covered by Social Security first hired after June 30, 2012 contribute 14.2% of their salary and receive a retirement benefit using the benefit multiplier of 2.25% for qualified service, up to a maximum of 80% of AFC. These members may retire at age 60 with 10 years of credited service or at age 55 with 25 years of credited service, provided the last 5 years of credited service is any of the qualified occupations.

All other employees hired prior to July 1, 2012 are required to contribute 7.8% of their salary and are fully vested for benefits upon receiving 5 years of credited service. Contributory members may retire with full benefits at age 55 and 5 years of credited service. They may take early retirement at any age with at least 25 years of credited service and receive benefits reduced 5% per year under age 55 plus 4% per year under age 50. The benefit multiplier is 2% for employees covered by Social Security.

All other employees in the contributory class hired after June 30, 2012 are required to contribute 9.8% of their salary and are fully vested for benefits upon receiving 10 years of credited service. These members may retire with full benefits at age 60 and 10 years of credited service. Members may take early retirement at age 55 with 25 years of credited service and receive benefits reduced by 5% per year under age 60. The benefit multiplier is 1.75% for employees covered by Social Security.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Hybrid

All other employees hired before July 1, 2012 are required to contribute 6% of their salary and are fully vested for benefits upon receiving 5 years of credited service. Employees may retire with full benefits at age 62 and 5 years of credited service or at age 55 and 30 years of credited service. Early retirement benefits are available at age 55 and 20 years of credited service with benefits reduced by 5% per year under age 62. The benefit multiplier used to calculate retirement benefits is 2%. Hybrid members are covered by Social Security.

All other employees hired after June 30, 2012 are required to contribute 8% of their salary and are fully vested for benefits upon receiving 10 years of credited service. Employees may retire with full benefits at age 65 and 10 years of credited service or at age 60 and 30 years of credited service. Early retirement is available at age 55 and 20 years of credited service with benefits reduced 5% per year under age 65. The benefit multiplier used to calculate retirement benefits is 1.75%. Hybrid members are covered by Social Security.

Noncontributory

All other employees are fully vested upon receiving 10 years of credited service. The employer is required to make all contributions for these members. Employees may retire with full benefits at age 62 years and 10 years of credited service or age 55 and 30 years of credited services. Early retirement is available at age 55 years and 20 years of credited service with benefits reduced by 6% per year under age 62. The benefit multiplier used to calculate retirement benefits is 1.25%.

Ordinary disability retirement benefits require a minimum of 10 years of service, whereas service-connected disability resulting from a job-related accident does not have any service requirement. There is no age requirement to qualify for disability benefits.

Ordinary death benefits for contributory and noncontributory members require at least one year and ten years of service, respectively. Ordinary death benefits for hybrid members require five years of service if hired prior to July 1, 2012 or ten years of service if hired after June 30, 2012. There is no service requirement to qualify for service-connected death benefits.

4. The ERS as Employer

As an employer, the ERS participates in its pension benefits program, through the State. The ERS provides benefits for all of its full-time employees as contributory, hybrid, or noncontributory membership. Contributions are calculated as part of the State's total contribution requirements and are reimbursed to the State's General Fund as part of the fringe benefit rate on the ERS' employees' actual salaries.

Note A – Description of the ERS (continued)

5. Other Post Employment Benefits (OPEB)

In addition to the retirement benefits provided by the ERS Pension Trust, the participating employers, pursuant to HRS Chapter 87A, provide certain healthcare and life insurance benefits for State and county qualified employees and retirees. The Hawaii Employer-Union Health Benefits Trust Fund (EUTF) was established on July 1, 2003 to design, provide, and administer health benefits plans and a group life insurance benefits program for State and county employees and retirees.

Under Section 87A-33 of the HRS, the participating employers pay the EUTF a base monthly contribution for the health benefits plans of certain retired employees, including those who were hired before July 1, 1996 and retired after June 30, 1984, with ten or more years of credited service.

Under Section 87A-34 of the HRS, the participating employers pay the EUTF one-half of the base monthly contribution for the health benefits plans of retired employees who were hired before June 30, 1996, and retired after June 30, 1984, with fewer than ten years of credited service.

Under Sections 87A-35 and 87A-33(a)(6) of the HRS, the participating employers pay the EUTF for the health benefits plans of retired employees who were hired after June 30, 1996 but before July 1, 2001: (a) one-half of the base monthly contribution if the employee retired with between ten and fifteen years of credited service; (b) seventy-five percent of the base monthly contribution if the employee retired with between fifteen and twenty-five years of credited service; and (c) one hundred percent of the base monthly contribution if the employee retired with twenty-five or more years of credited service.

Under HRS § 87 A-36, the participating employers pay the EUTF for the health benefits plans of retired employees who were hired after June 30, 2001: (a) one-half of the base monthly contribution for a self-only plan if the employee retired with between ten and fifteen years of credited service; (b) seventy-five percent of the base monthly contribution for a self-only plan if the employee retired with between fifteen and twenty-five years of credited service; and (c) one hundred percent of the base monthly contribution for a self-only plan if the employee retired with twenty-five or more years of credited service.

Under Section 87A-37 of the HRS, the participating employers pay the EUTF a base monthly contribution (currently $4.16) for each retired employee enrolled in the EUTF group life insurance plan.

The net assets of the EUTF are not included in the ERS plan net assets. The EUTF issues a financial report that includes financial statements and required supplementary information.

Note B – Social Security Contribution Fund

The Social Security Contribution Fund (Contribution Fund) was established under Section 88-224 of the HRS for the following purposes:

1. To receive all federal Social Security employers' contributions from the State and interest and penalties on unpaid amounts;

2. To receive any appropriations to the Contribution Fund;

3. To pay amounts required to be paid to the Internal Revenue Service (IRS); and

4. To invest and collect income on resources held by the Contribution Fund.

All other non-State governmental agencies remit Social Security contributions directly to the IRS. Social Security contributions withheld from employees are remitted directly to the IRS by the employers. The Contribution Fund is considered an agency fund for financial reporting purpose. At June 30, 2017, the ERS held no amounts in the Contribution Fund as all amounts deposited into the Contribution Fund were paid directly to the IRS.

Note C – Summary of Significant Accounting Policies

A summary of the significant accounting policies consistently applied in the preparation of the accompanying financial statements follows:

1. Basis of Accounting

Fiduciary funds are used to account for assets held by the ERS in a trustee capacity or as an agent for individuals, private organizations, other governments, and/or other funds. The fiduciary fund types used by the ERS are a Pension Trust Fund and the Social Security Fund as an agency fund. Each of the fiduciary funds is considered a separate fiscal and accounting entity with a self-balancing set of accounts that comprise its assets, liabilities, equity, revenues and expenditures, or expenses, as appropriate. The accounting and reporting treatment applied to a fund is determined by its measurement focus. The Pension Trust Fund is accounted for on a flow of economic resources measurement focus. As an agency fund, the Contribution Fund is custodial in nature and does not measure results of operations.

The financial statements are prepared in conformity with U.S. generally accepted accounting principles (GAAP) using the accrual basis of accounting. Employer and member contributions are recognized in the period in which the contributions are legally due. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan. Investment purchases and sales are recorded as of their trade date. Administrative expenses are financed exclusively with investment income.

Note C – Summary of Accounting Policies (continued)

2. Method Used to Value Cash and Investments

The ERS' investment policy for cash and investments, including the legal authority, are discussed below in Note F. Notes C and F below include a comprehensive discussion on fair value including the disclosure requirements of fair value required by GASB Statement No. 72.

Cash, investments and notes payable in the Pension Trust are reported at fair value. The definition of 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. Unrealized gains and losses are included as investment income in the statement of changes in fiduciary net position. The investments of the Pension Trust Fund and Contribution Fund (the Retirement Funds) are valued on a monthly basis.

3. Revenue Recognition

Interest and dividend income is recognized when earned. Capital gains and losses are recognized on a trade-date basis. Purchases and sales of investments are also recorded on a trade-date basis.

Employers and members contributions are recognized in the period in which the contributions are legally due.

4. Payment of Benefits

Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

5. Securities Lending

The ERS records collateral received under securities lending agreements where the ERS has the ability to spend, pledge, or sell the collateral without borrower default. Liabilities resulting from these transactions are also recorded. Additionally, costs associated with securities transactions, broker commissions paid, and lending agent management fees are reported as investment expenses in the accompanying financial statements. The statement of fiduciary net position does not include detailed holdings of securities lending collateral by investment classification.

Note C – Summary of Accounting Policies (continued)

6. Interest and Earnings Allocation

Pursuant to Sections 88-21 and 88-107 of the HRS, the Board shall annually allocate interest and other earnings of the Pension Trust Fund to the funds of the Pension Trust Fund, as follows:

a. Annuity Savings Reserve – Fixed at 4-1/2% regular interest rate for employees hired before July 1, 2011 and 2% regular interest rate for employees hired after June 30, 2011.

b. Expense Reserve – To be credited with all money to pay the administrative expenses of the ERS.

c. Pension Accumulation Reserve – To be credited with any remaining investment earnings.

7. Risk Management

The ERS reports liabilities, as discussed in note H, related to certain types of losses (including torts, theft of, damage to, or destruction of assets, errors or omissions, natural disasters, and injuries to employees) when it is probable that the losses have occurred and the amount of those losses can be reasonably estimated.

8. Use of Estimates

In preparing financial statements in conformity with accounting principles generally accepted in the United States, management is required to make estimates and assumptions that affect certain reported amounts and disclosures. Actual results could differ from those estimates.

Investments in limited partnerships and other alternative investments tend to be illiquid and the underlying assets are generally not publicly traded companies. Because of the inherent uncertainty in valuing privately held securities, the fair value may differ from the values that would have been used had a ready market for such securities existed, and the difference can be material. Accordingly, the realized value received upon the sale of the asset may differ from the recorded fair value.

The total pension liability is based on calculations that incorporate various actuarial and other assumptions, including discount rate, mortality, investment rate of return, inflation and payroll growth. The actuarial assumptions were based on the results of an experience study for the period from July 1, 2010 through June 30, 2015.

9. Recently Issued Accounting Policies

In January 2017, GASB issued Statement No. 84, Fiduciary Activities. Statement No. 84 establishes criteria for identifying fiduciary activities and guidance on reporting those activities. This Statement provides guidance on four fiduciary funds that should be reported, if applicable: pension (and other employee benefit) trust funds, investment trust funds, private-purpose trust funds, and custodial funds. GASB Statement No. 84 will be effective for periods beginning after December 15, 2018. ERS has not yet determined the impact of this standard on its financial statements and disclosures.

Note D – Description of Reserves

Section 88-109 of the HRS requires the establishment and maintenance of specific reserves within the ERS. The reserves in the Pension Trust Fund and their purposes are described hereunder:

1. **Pension Accumulation Reserves**

   To accumulate contributions made by the State and counties (except member contributions "picked up" as employer contributions under pursuant to IRC Section 414(h)(2)), transfers of retired members' contributions plus related interest income from the Annuity Savings Reserve and income from investments. All pension benefits, including the pensioners' bonus, are paid through this reserve.

2. **Annuity Savings Reserves**

   To accumulate members' contributions (including member contributions "picked up" as employer contributions under pursuant to IRC Section 414(h)(2)) and related interest income. Upon a member's retirement, the accumulated contributions and related interest income are transferred to the Pension Accumulation Reserve or refunded to the member upon termination.

3. **Expense Reserves**

   To pay all the expenses necessary in connection with the administration and operation of the ERS, the Board estimates the amount of money necessary to be paid into the expense reserve for the ensuing biennium to provide for the expense of operation of the ERS, and pays that amount into the expense account from the investment earnings of the ERS, subject to review by the legislature and approval by the Governor.

Fiduciary net position restricted for pensions as of June 30, 2017 are as follows:

		2017
Pension Accumulation Reserve	$	13,047,857,718
Annuity Savings Reserve		2,635,523,547
Expense Reserve		14,943,041
Total fiduciary net position restricted for pensions	$	15,698,324,306

Note E – Contributions

The ERS' funding policy provides for periodic employer contributions expressed as a percentage of annual covered payrolls. The funding method used to calculate the total employer contribution required is the entry age normal actuarial cost method. Employer contributions are governed by Chapter 88 of the HRS. The actuarially determined contribution rates may differ from the statutory contribution rates.

Employer rates are set by statute based on the recommendation of the ERS actuary resulting from an experience study conducted every five years. Since July 1, 2005, employer contribution rates are a fixed percentage of compensation, including the normal cost plus amounts required to pay for the unfunded actuarial accrued liability. See note A.3 Class Descriptions and Funding Policy for the effective statutory employer contribution rates.

The employer normal cost is the level percentage of payroll contribution required to pay all benefits. Actuarial gains and losses resulting from differences between actual and assumed experience are reflected in the employer unfunded accrued liability.

Effective July 1, 2012, the last employer is required to make "additional contributions" to the ERS for employees that first became ERS members before July 1, 2012 and retire after June 30, 2012, if the member has "excessive" non-base pay during the last 10 years of employment. The additional contributions are based on the increased costs of the actuarial equivalent increase in pension benefits the member will be paid in retirement compared to the pension benefits that would be paid if the member did not have excess non-base pay in their Average Final Compensation amount.

Member contributions rates are statutorily established in accordance with Chapter 88 of the HRS, and are discussed in note A.3, Class Descriptions and Funding Policy above. Since 1989, participating employers "pick up" ERS member contributions made by payroll deduction as "employer contributions" for tax purposes under IRC section 414(h)(2). These contributions are classified as member contributions being paid by the member for ERS purposes.

Note F – Deposit and Investment Disclosures

1. Investment Policy

Investments are governed pursuant to Sections 88-119 and 88-119.5 of the HRS. The Pension Trust Fund may invest in real estate loans and mortgages; preferred and common stocks; government obligations; corporate obligations; certain other debt obligations (such as obligations secured by collateral of certain other authorized securities listed here, obligations issued or guaranteed by certain development banks, and insurance company obligations); real property; alternative investments; and other securities and futures contracts. Investments in the Securities Lending Collateral Pool and the Contribution Fund are limited to investment grade, short-term marketable securities.

The investment decision is further dictated by internal investment policies and asset allocation established by the Board. As a long-term investor, the ERS has established through its investment policy that preservation of capital is the primary goal of the ERS. Preservation of capital is to be attained with a consistent, positive return for the fund by diversifying the investment portfolio. The ERS recognizes risk associated for individual securities or asset classes may be reduced through diversification. Investments will be prudent and consistent with the best investment practices, in accordance with the Board's asset allocation strategy, assigned investment mandate, and in compliance with Chapter 88, HRS, as amended.

Use of leverage is restricted to certain asset classes in order to enhance yields of approved investments and/or to facilitate diversification of the portfolio. The use of debt must result in positive leverage where cash flow is in excess of debt service. Plan assets are managed on a total return with the long-term objective of achieving and maintaining a fully funded status basis (when combined with receiving the required employer and member contribution requirements) for the benefits provided through the Pension Trust. As part of the investment policy, the Board reviews the asset allocation annually and should perform a formal asset allocation study at least every three years to verify or amend the targets.

The ERS will strategically invest in the following classes:

Strategic Allocation (risk-based classes)	Strategic Class Weights	Expected Long-term Geometric Average Return	Expected Long-term Real Return[1]	Expected Annual Standard Deviation
Broad Growth	63%	8.05%	5.80%	15.35%
Principal Protection	7%	2.45%	0.20%	3.50%
Real Return	10%	5.80%	3.55%	9.80%
Crisis Risk Offset	20%	5.35%	3.10%	10.90%
Total Portfolio	**100%**			

[1] Uses an expected inflation of 2.25%

Note F – Deposit and Investment Disclosures (continued)

1. Investment Policy (continued)

It is expected that the ERS's implementation of the new long-term strategic allocation approved in FY 2016 will be completed by the end of the 2020 fiscal year as follows.

Implementation Plan for Long-term Strategic Policy					
	Current (6/30/2017)	1/1/2018	1/1/2019	1/1/2020	Long-Term 7/1/2020
Broad Growth	76%	72%	68%	64%	**63%**
Principal Protection	9%	8%	8%	7%	**7%**
Real Return	5%	7%	8%	9%	**10%**
Crisis Risk Offset	10%	13%	16%	20%	**20%**
Opportunities	0%	0%	0%	0%	**0%**
Total Portfolio	100%	100%	100%	100%	**100%**

Rate of Return

For the year ended June 30, 2017, the annual money-weighted return on pension plan investments, net of pension plan investment expense, was 13.7%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

2. Deposits

Cash includes amounts in demand deposits for operations and invested funds held by ERS investment managers. The deposits are held in several financial institutions, including the custodian bank for processing investment transactions. Per State statute, deposits, held by banks located in the State, in excess of Federal Deposit Insurance Corporation (FDIC) coverage are guaranteed by securities pledged as collateral by the bank with the State Director of Finance. Uninsured and uncollateralized amounts are primarily cash held by the investment custodian for settlement of investment transactions. Deposits are presented in the basic financial statements at cost, which represent market or fair value.

Custodial Credit Risk for Deposits is the risk that in the event of a bank failure, the ERS' deposits may not be returned to them. The ERS has not adopted a formal policy specific to custodial credit risk. The ERS' policy is to deposit cash in excess of operating requirements in income producing investments to maximize investment income.

At June 30, 2017, the carrying amount of deposits totaled approximately $870,014,229 and the corresponding bank balance was $875,586,168, all of which was exposed to custodial credit risk

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value

The following table shows the investments of the ERS by investment type as of June 30, 2017.

Investments at fair value		
Cash and short-term instruments		
Cash and cash equivalents	$	870,014,229
Short-term bills and notes		1,331,571,235
Pooled and others		206,957,971
Fixed income securities		
U.S. Treasury bonds and notes		1,862,493,722
U.S. government agencies bonds		30,418,270
U.S. government agency mortgage backed		350,610,531
U.S. government-sponsored agency mortgage backed		10,519,685
Commercial mortgage backed securities		9,869,480
U.S. corporate bonds		607,128,996
Non-U.S. government / agency bonds		735,341,391
Non-U.S. corporate bonds		328,097,701
Pooled and Others		11,830,568
Derivatives		
Forwards - Cash and short-term instruments		(18,514,350)
Forwards - Debt securities		14,666,610
Futures - Debt securities		(31,911,510)
Options - Cash and short-term instruments		78,990
Options - Equities		(28,870,974)
Options - Debt securities		188,964
Swaps - Equity securities		(488,876)
Swaps - Debt securities		1,301,060
Equities		7,219,901,827
Real estate		1,112,391,820
Alternative investments		1,259,025,683
Total investments	$	15,882,623,023
Short-term instruments for securities lending collateral pool	$	1,039,906,540

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

Investments are measured at fair value. The ERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. Fair value is a market-based measurement of 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. A fair value measurement assumes that a transaction to sell an asset or transfer a liability takes place in either the principal market or most advantageous market (after taking into account transaction costs and transportation costs).

The fair value hierarchy categorizes the inputs to valuation techniques used to measure fair value into three levels. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

- Level 1—Unadjusted quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- Level 3—Valuations derived from valuation techniques in which significant inputs are unobservable.

If the fair value of an asset or a liability is measured using inputs from more than one level of the fair value hierarchy, the measurement is considered to be based on the lowest priority level input that is significant to the entire measurement. The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk.

Fair value hierarchy levels

Equity securities classified in level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities based on published market prices, quotations from national security exchanges, and security pricing services as of each month-end closing of the New York Stock Exchange. Fixed income securities classified as Level 1 include U.S. Treasuries. Fixed income pooled funds classified in Level 1 of the hierarchal framework are mutual funds with instruments which trade on a national exchange and the fund's NAV is the basis for the fund's transactions. Derivative securities classified in Level 1 include certain options and futures are valued using prices quoted in active markets for those securities.

Short-term, fixed income securities, and invested securities lending collateral classified in level 2 have non-proprietary information that was readily available to market participants from multiple independent sources, which are known to be actively involved in the market. Pricing inputs may include market quotations, yields, maturities, call features and ratings. Derivative securities classified in level 2 are securities whose values are derived daily from associated traded securities.

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

Fixed income securities classified in level 3 are mortgaged backed term loans and bonds where input data is sourced from instruments whose values are estimated, out of necessity, using unobservable inputs due to lack of comparable securities in the market place or are valued using discounted cash flows.

Real Estate and Alternative Investments Limited Partnerships and Limited Liability Companies classified as level 3 are considered to be directly held: The ERS has a controlling interest in certain real estate and alternative investment partnerships and limited liability companies. These investment companies provide quarterly valuations based on the most recent capital account balance to ERS management and are audited annually. Individual properties are valued internally by the investment companies at least annually, in accordance with standard industry practice, and are adjusted as frequently as quarterly if material market or operational changes have occurred. Properties are generally valued every one to three years by external third-party appraiser(s). Alternative investments are valued using their respective NAV, and are generally audited annually. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners in conjunction with management, investment advisors, and valuation specialists. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. The fair value for these investments could differ significantly if a readily accessible market values for these assets existed. Annual audits of most partnerships and limited liability companies include a review of compliance with the investment company's valuation policies.

Notes Payable: Notes payable are shown at estimated fair values. Notes payable, classified as level 3, consists of mortgage notes within the limited liability companies and limited partnerships of real estate (direct investment) that are secured by real estate of the respective company.

Investments measured at the net asset value (NAV)

Short-Term Investment Funds and Pooled Equity (not publicly traded) are reported on their respective net asset value (NAV). Fair value are based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges. Annual audits the pooled funds include a review of compliance with the investment company's valuation policies.

Real estate and alternative investments measured at their respective NAV and are generally audited annually. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. The fair value for these investments could differ significantly if a readily accessible market values for these assets existed.

Investments measured at NAV are not required to be categorized in the fair value hierarchy levels.

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

The following table shows the fair value hierarchy by investment type as of June 30, 2017.

Investments, Derivative Instruments and Invested Securities Lending Collateral Measured at Fair Value

		Fair Value Measurement Using		
	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level 6/30/2017				
Short-term investments				
Short-term bills and notes	$ 1,331,571,235	$ 1,262,153,248	$ 69,417,987	$ -
Equity securities				
Common stocks	5,223,499,581	5,223,499,581	-	-
Preferred shares and other	42,488,106	30,653,306	11,820,697	14,103
Total equity securities	5,265,987,687	5,254,152,887	11,820,697	14,103
Fixed income securities				
U.S. Treasury bonds and notes	1,862,493,722	1,416,610,553	445,883,169	-
U.S. government agencies bonds	30,418,270	-	30,418,270	-
U.S. government agency mortgage backed	350,610,531	-	350,610,531	-
U.S. government-sponsored agency mortgage backed	10,519,685	-	10,519,685	-
Commercial mortgage backed securities	9,869,480	-	9,869,480	-
U.S. corporate bonds	607,128,996	-	446,922,564	160,206,432
Non-U.S. government / agency bonds	735,341,391	-	735,341,391	-
Non-U.S. corporate bonds	328,097,701	-	305,246,926	22,850,775
Pooled and Others	11,830,568	8,008,714	3,821,854	-
Total fixed income securities	3,946,310,344	1,424,619,267	2,338,633,870	183,057,207
Real estate (direct investment)	726,944,346	-	-	726,944,346
Alternative investments (direct investment)	208,787,438	-	-	208,787,438
Total assets at fair value level	$ 11,479,601,050	$ 7,940,925,402	$ 2,419,872,554	$ 1,118,803,094
Liabilities				
Notes payable (on real estate-direct)	$ 174,497,016	$ -	$ -	$ 174,497,016
Total investments (excluding derivatives), net of notes payable measured by fair value level	$ 11,305,104,034	$ 7,940,925,402	$ 2,419,872,554	$ 944,306,078
Investment derivative instruments				
Currency purchases forwards	$ (18,514,350)	$ -	$ (18,514,350)	$ -
To Be Announced (TBAs) forwards	14,666,610		14,666,610	-
Bond futures	(17,874,459)	(17,874,459)	-	-
Commodity futures	(5,102,182)	(5,102,182)	-	-
Currency futures	7,372,812	7,372,812	-	-
Index fixed income futures	(12,622,833)	(12,622,833)	-	-
Interest rate futures	(3,684,848)	(3,684,848)	-	-
Options	(28,870,974)	(5,346,660)	(23,524,314)	-
Options on currency	78,990		78,990	-
Options on debt securities	188,964	52,615	136,349	-
Credit default swaps	(1,562,368)	-	(1,562,368)	-
Currency swaps	6,454,247	-	6,454,247	-
Equity variance swaps	(488,876)	-	(488,876)	-
Interest rate swaps	(3,590,819)	-	(3,590,819)	-
Total investment derivative instruments	$ (63,550,086)	$ (37,205,555)	$ (26,344,531)	$ -

Note F – Deposits and Investment Disclosures (continued)

3. Investments and fair value (continued)

Investments, Derivative Instruments and Invested Securities Lending Collateral Measured at Fair Value (contnued)

		Fair Value Measurement Using		
	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Invested securities lending collateral				
Short-term instruments				
Repurchase agreements	$ 399,991,154	$ -	$ 399,991,154	$ -
Global asset backed notes	52,030,580	-	52,030,580	-
Global corporate notes	587,884,806	-	587,884,806	-
Total invested securities lending collateral	$ 1,039,906,540	$ -	$ 1,039,906,540	$ -

Investments and Derivative Instruments Measured at Fair Value (contnued)

Investments measured at net asset value (NAV)	
Short-term investments	$ 206,957,971
Equity securities	1,953,914,140
Real estate	385,447,474
Alternative investments	1,050,238,245
Total investments measured at NAV	3,596,557,830

	June 30, 2017	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Short-term investments (a)	$ 206,957,971	$ -	Daily	1 day
Equity securities (b)	1,953,914,140	-	Daily	2 days
Real estate (c)	385,447,474	389,114,000	Not eligible	n/a
Alternative investments (d)	1,050,238,245	1,265,505,000	Not eligible	n/a
Total investments measured at NAV	$ 3,596,557,830	$ 1,654,619,000		

(a) Short-term investments primarily consist of two pooled funds to invest excess cash at the ERS' custodian, The Bank of New York Mellon and over 25 other accounts. NAV is based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges.

Note F – Deposits and Investment Disclosures (continued)

3. Investments and fair value (continued)

(b) Equity securities consist of one fund that invests based on the all country world index. NAV is based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges.

(c) Real estate consists of 30 limited partnerships or limited liability companies that primarily invest in U.S. real estate. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment, and are generally audited annually.

(d) Alternative investments consist of 209 limited partnerships or limited liability companies that invest in venture capital, growth equity, corporate finance/buyout, special situations, mezzanine debt, distressed debt, or co/direct investments. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment, and are generally audited annually.

Reconciliation of Investment Level Disclosure to the Statement of Fiduciary Net Position

	Investments by Fair Value Level	Investments Measured by the NAV	Derivative Investments by Fair Value Level	Invested Securities Lending Collateral by Fair Value Level	Statement of Fiduciary Net Postion
Assets					
Short-term investments	$ 1,331,571,235	$ 206,957,971	$ (18,435,360)	$ -	$ 1,520,093,846
Equity securities	5,265,987,687	1,953,914,140	(29,359,850)	-	7,190,541,977
Fixed income securities	3,946,310,344	-	(15,754,876)	-	3,930,555,468
Real estate investments	726,944,346	385,447,474	-	-	1,112,391,820
Alternative investments	208,787,438	1,050,238,245	-	-	1,259,025,683
Invested securities lending collateral	-	-	-	1,039,906,540	1,039,906,540
	$ 11,479,601,050	$ 3,596,557,830	$ (63,550,086)	$ 1,039,906,540	$ 16,052,515,334
Liabilities					
Notes payable	$ 174,497,016	$ -	$ -	$ -	$ 174,497,016
	$ 174,497,016	$ -	$ -	$ -	$ 174,497,016

Note F – Deposits and Investment Disclosures (continued)

4. Credit Risk

Credit risk is defined as the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Information regarding ERS' credit risk on derivative investments is discussed below in derivative disclosures note F10 while policies related to credit risk for securities lending program are discussed in note F9 below.

Risk Based Asset Class - The fixed income mandate was transitioned to the new risk-based asset allocation methodology. Authorized security types are the same as the Asset-type based allocation guidelines. Investment managers were assigned to:

- Extended Global Credit component of the Broad Growth risk-based asset class, or
  - Benchmark: 50% BC Global Credit (Hedged) + 33.34% BC Global High Yield (Hedged) + 16.66% S&P LSTA Leveraged Loan
- Principal Protection risk-based asset class.
  - Benchmark: BC U.S. Intermediate Aggregate ex-Credit
- Summary of Concentration Limits for debt securities are:
  - Principal protection managers may invest in specific Issue or Issuer of 5% (without limit in supranationals, U.S. Treasuries, U.S. agencies, CMOs and asset-backed securities with minimum of AAA rating, sovereign debt and equivalently rated agencies of Organisation for Economic Co-operation and Development (OECD) governments). These managers are limited to (i) 10% in emerging markets (local currency and debt); (ii) 10% in private placements; (iii) 10% in preferred stocks and converted common stocks (common stock holdings not to exceed 180 days); (iv) 10% in non-U.S. Agency CMOs; and (v) 10% of Non-U.S. Dollar denominated securities (excludes money market securities and money market futures
  - Extended Global Credit managers may invest in specific Issue or Issuer of 5% (without limit in supranationals, U.S. Treasuries, U.S. agencies, CMOs and asset-backed securities with minimum of AAA rating, sovereign debt and equivalently rated agencies of Organisation for Economic Co-operation and Development (OECD) governments). They are limited to: (i) 10% in preferred stocks and converted common stocks (common stock holdings not to exceed 180 days); (iii) 75% in non-investment grade / Unrated; (iv) in Non-Benchmark markets up to 40% of non-benchmark non-government supported and up to 40% of non-benchmark government supported. Foreign currency is limited to (i) a 40% net foreign currency exposure (as measured by net amount of currency's outstanding long and short positions versus the U.S. Dollar); and (ii) a 80% gross foreign currency exposure (as measured by absolute value of all country-level currency long and short currency positions versus the U.S. Dollar)

Note F – Deposits and Investment Disclosures (continued)

4. Credit Risk (continued)

A table of the ERS' fixed income securities as of June 30, 2017 is below. Securities below investment grade of Baa and non-rated issues (average rating by S&P, Moody's and/or Fitch) amounted to $503,002,114 or 12.8% of total fixed income investments. All short-term investments, not held in a pooled investment, are rated A1/P1or better.

Credit Ratings - Average rating by S&P, Moodys and Fitch as of June 30, 2017

Ratings	US Govt Agency	US Govt sponsored-agency mortgage backed	US corporate bonds	Commercial mortgage backed securities	Non-US corporate bonds	Non US-govt/agencies bonds	Pooled & others	Total
AAA	$ 30,418,270	$ 350,287,340	$ 8,386,886	$ 2,875,662	$ 72,157,929	$ 211,214,449	$ -	$ 675,340,536
AA1	-	323,191	870,707	-	7,329,073	5,338,370	-	$ 13,861,341
AA2	-	-	1,097,800	101,656	4,287,848	151,413,450	-	$ 156,900,754
AA3	-	-	5,082,455	-	15,389,288	10,069,587	-	$ 30,541,330
A1	-	-	8,048,055	203,279	15,402,497	15,204,778	-	$ 38,858,609
A2	-	-	26,788,080	171,942	4,850,795	18,490,037	-	$ 50,300,854
A3	-	-	45,882,691	681,652	15,107,640	124,962,674	-	$ 186,634,657
BAA1	-	-	64,657,312	71,091	23,123,685	52,647,308	-	$ 140,499,396
BAA2	-	-	53,555,741	913,104	36,242,500	78,029,497	723,720	$ 169,464,562
BAA3	-	-	73,247,028	-	20,528,333	14,117,423	-	$ 107,892,784
BA1	-	-	28,161,459	-	30,772,071	1,930,464	-	$ 60,863,994
BA2	-	-	51,864,355	-	11,726,354	10,919,894	-	$ 74,510,603
BA3	-	-	56,295,242	-	13,475,984	650,475	770,000	$ 71,191,701
B1	-	-	45,570,111	-	16,808,732	2,153,453	107,869	$ 64,640,165
B2	-	-	55,215,936	-	10,944,049	4,794,025	540,800	$ 71,494,810
B3	-	-	28,759,814	-	8,041,479	10,773,923	-	$ 47,575,216
CAA1	-	-	15,281,796	1,771,178	5,437,708	-	-	$ 22,490,682
CAA2	-	-	6,694,410	-	845,857	-	18,700	$ 7,558,967
CAA3	-	-	2,165,938	-	-	-	-	$ 2,165,938
CA	-	-	497,750	1,567,166	72,900	-	-	$ 2,137,816
C	-	-	261,091	-	-	-	-	$ 261,091
D	-	-	-	-	556,000	-	-	$ 556,000
Not rated	-	-	28,744,339	1,512,750	14,996,979	22,631,584	9,669,479	$ 77,555,131
	$ 30,418,270	$ 350,610,531	$ 607,128,996	$ 9,869,480	$ 328,097,701	$ 735,341,391	$ 11,830,568	2,073,296,937
US Treasury Bonds and Notes								1,862,493,722
US Government agency - Government National Mortgage Association (GNMAs) mortgage backed								10,519,685
subtotal								$ 3,946,310,344
Derivatives								(15,754,876)
Total fixed income securities in Investments								$ 3,930,555,468

5. Custodial Credit Risk

Custodial credit risk for investments is the risk that, in the event of a failure of the counterparty, the ERS will not be able to recover the value of the investment or collateral securities that are in the possession of an outside party. All securities, except certain pooled funds, are registered in the name of the ERS and are held in the possession of the ERS' custodial bank, The Bank of New York Mellon. Pooled funds not held by the custodial bank, such as certain equity investments, are registered in the name of the ERS. The ERS had $870,014,229 in cash and securities exposed to custodial credit risk.

Note F – Deposits and Investment Disclosures (continued)

6. Concentrations of Credit Risk

The ERS' debt securities managers are expected to maintain diversified portfolios by sector, quality, and maturity as discussed above in Credit Risk.

Equity securities shall be diversified by industry and in number. An investment manager may not hold more than 5% of an individual company's stock if that company's securities represent less than 3% of the investment manager's respective benchmark. (If those securities constitute more than 3% of the respective benchmark the manager shall not hold more than the benchmark weight plus 2 percentage points.)

At June 30, 2017, there was no single issuer exposure within the ERS' portfolio that comprises over 5% of the overall portfolio, or an investment that exceeded the above manager guidelines, and therefore, there is no concentration of credit risk to report.

7. Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. The ERS has not adopted a formal policy that limits investment maturities as a means of managing its exposure to fair value changes arising from changing interest rates. External investment managers are given full discretion within their operational guidelines and are expected to maintain a diversified portfolio between and within sectors, quality, and maturity.

Duration is a measure of a debt investment's exposure to fair value changes arising from changes in interest rates. It uses the present value of cash flows, weighted for those cash flows as a percentage of the investment's full price. At June 30, 2017, the table below shows fixed income investment securities by investment type, amount, and the effective weighted duration for the ERS' total portfolio. Interest rate risk associated with swaps and other derivative instruments are discussed in the derivatives disclosure below:

Effective duration of fixed income assets by security type (excluding derivatives)

		Fair Value	Weighted Modified Duration (years)
Fixed Income Securities			
U.S. Treasury bonds and notes	$	1,862,493,722	2.3
U.S. government agencies bonds		30,418,270	1.7
U.S. government agency mortgage backed		350,610,531	23.5
U.S. government-sponsored agency mortgage backed		10,519,685	23.8
Commercial mortgage backed securities		9,869,480	21.7
U.S. corporate bonds		607,128,996	7.3
Non-U.S. government / agency bonds		735,341,391	10.2
Non-U.S. corporate bonds		328,097,701	8.6
Pooled and Others		11,830,568	10.2
Total	$	3,946,310,344	7.0

Note F – Deposits and Investment Disclosures (continued)

8. Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. The foreign currency risk exposure to the ERS arises from the international fixed income and international equity investment holdings. Board policy limits the use of foreign currency as a defensive measure to protect the portfolio value of non-U.S. equity and non-U.S. fixed income investments. External investment managers authorized to invest in these securities are given full discretion regarding their respective portfolio's foreign currency exposures, including using currency forward contracts, as established by their investment mandate. Cross-hedging is only allowed in non-U.S. fixed income portfolios. Counterparties for foreign currency derivatives must be rated A or equivalent. Derivatives investments are discussed in more detail in Note F.10.

The following table summarizes the ERS' exposure to foreign currency risk in U.S. dollars as of June 30, 2017. (Securities denominated in U.S. dollars are not presented.)

	Cash and Short Term Instruments	Debt Securities	Derivatives	Equities	Alternative	Real Estate	Grand Total
Argentine peso	$ 179,396	$ 3,948,259	$ 4,921,325	$ -	$ -	$ -	$ 9,048,980
Australian dollar	900,444	56,548,671	(18,151,415)	89,940,002	-	-	129,237,702
Brazilian real	127,140	8,977,694	16,116,474	39,483,039	-	-	64,704,347
Canadian dollar	(366,002)	19,631,653	(23,649,937)	153,561,694	-	-	149,177,408
Chilean peso	-	-	(8,035,138)	3,638,131	-	-	(4,397,007)
Chinese Yuan Renminbi	(131)	-	(20,619,712)	-	-	-	(20,619,843)
Colombian peso	-	-	1,854,236	1,330,196	-	-	3,184,432
Czech koruna	67,611	873,991	(896,896)	706,804	-	-	751,510
Danish krone	235,665	32,255,715	(27,654,070)	33,967,011	-	-	38,804,321
Egyptian pound	-	-	-	598,376	-	-	598,376
Euro currency unit	4,872,512	182,117,823	99,460,136	357,144,868	-	-	643,595,339
Hong Kong dollar	1,743,551	-	(463,594)	158,003,334	-	-	159,283,291
Hungarian forint	35,130	-	22,145,272	6,230,752	-	-	28,411,154
Indian Rupee	-	-	64,764,671	-	-	-	64,764,671
Indonesian rupiah	7,615	2,549,145	10,145,477	23,981,819	-	-	36,684,056
Israeli shekel	4,274	-	48,116,103	14,129,522	-	-	62,249,899
Japanese yen	68,886,298	23,234,428	(209,334,244)	252,543,251	-	-	135,329,733
Malaysian ringgit	(163,457)	-	675,724	15,155,758	-	-	15,668,025
Mexican peso	2,306,873	4,735,296	21,367,324	23,913,509	-	-	52,323,002
New Taiwan dollar	818,228	-	6,055,628	119,517,375	-	-	126,391,231
New Zealand dollar	495,935	74,352,294	10,745,177	11,553,273	-	-	97,146,679
Norwegian krone	120,207	20,085,924	(127,997,251)	22,635,593	-	-	(85,155,527)
Peruvian sol	-	-	5,124,387	-	-	-	5,124,387
Philippine peso	-	-	3,631,942	6,396,090	-	-	10,028,032
Polish zloty	175,293	62,828,119	(5,043,140)	13,056,539	-	-	71,016,811
Pound sterling	7,474,889	142,758,399	(117,050,646)	228,997,998	-	-	262,180,640
Qatari riyal	-	-	-	1,388,889	-	-	1,388,889
Russian ruble (new)	70,489	4,569,589	16,682,424	4,569,792	-	-	25,892,294
Singapore dollar	68,122	20,151,215	28,327,859	17,801,214	-	-	66,348,410
South African rand	108,789	61,699,834	(18,549,352)	25,875,481	-	-	69,134,752
South Korean won	699,761	-	6,363,440	122,693,523	-	-	129,756,724
Swedish krona	457,364	17,425,924	(98,103,692)	22,041,081	-	-	(58,179,323)
Swiss franc	(88,401)	-	(70,990,190)	31,963,835	-	-	(39,114,756)
Thai baht	15,506	-	16,547,072	34,358,137	-	-	50,920,715
Turkish lira	296,049	-	8,077,251	15,178,723	-	-	23,552,023
UAE dirham	-	-	-	637,947	-	-	637,947
Urugayan peso	-	671,480	-	-	-	-	671,480
Various Countries	-	-	-	1,769,492,943	-	-	1,769,492,943
Total	$ 89,549,150	$ 739,415,453	$ (355,417,355)	$ 3,622,486,499	$ -	$ -	$ 4,096,033,747

Note F – Deposits and Investment Disclosures (continued)

9. Securities Lending

The ERS participates in a securities lending program administered by its bank custodian, The Bank of New York Mellon. Under this program, which is permissible under Chapter 88 of the HRS, certain equity and fixed-income securities of the ERS are lent to participating broker-dealers and banks (borrowers). In return, the ERS receives cash, securities issued or guaranteed by the U.S. government, securities issued or guaranteed by OECD (Organization for Economic Cooperation and Development) member states or their local authorities, Canadian Provincial debt, equity securities that are part of the U.S. and non U.S. indices, and/or letters of credit as collateral. The ERS does not have the ability to pledge or sell collateral securities absent of borrower default, thus only cash received as collateral is reported on the financial statements in accordance with accounting standards. Risk is mitigated by the investment policies and operational procedures regarding issuer, credit, exposure and rating limits utilized in the securities lending program. Borrowers are required to deliver collateral for each loan equal to: (a) in the case of loaned fixed-income securities and loaned equity securities denominated in U.S. dollars or whose primary trading market was located in the U.S., 102% of the market value of the loaned securities; and (b) in the case of loaned equity securities not denominated in U.S. dollars or whose primary trading market was not located in the U.S., 105% of the market value of the loaned securities. The collateral is marked to market daily. If the market value of the collateral falls below the minimum collateral requirements, additional collateral is provided. In addition, the bank custodian indemnifies the ERS by agreeing to purchase replacement securities or return cash collateral in the event the borrower fails to return the loaned security or fails to pay the ERS for income distributions by the securities' issuers while the securities are on loan.

The ERS does not impose any restrictions on the amount of loans the bank custodian made on behalf of the ERS. Also, the ERS and the borrowers maintain the right to terminate securities lending transactions on demand. The Bank of New York Mellon invests the cash collateral related to the ERS' loaned securities in a separate account, according to the ERS investment policies and procedures as discussed above in notes C2 and F1. As such, the maturities of the investments made with cash collateral generally do not match the maturities of the securities loans. The extent of such mismatch as of June 30, 2017 was 129 days.

At June 30, 2017, there was no credit risk exposure to borrowers since the ERS was collateralized as discussed above. The total securities on loan and collateral received are shown below.

Securities lent for collateral	Fair value of underlying securities	Cash	Noncash
U.S. fixed income	$ 419,801,769	$ 389,953,458	$ 41,856,254
U.S. equities	621,222,398	602,094,625	35,438,562
International equities	198,709,078	46,454,025	171,787,276
International fixed income	33,905,656	1,404,432	34,517,611
	$ 1,273,638,901	$ 1,039,906,540	$ 283,599,703

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments

Derivatives are instruments (securities or contracts) whose value is dependent on such things as stock or bond prices, interest rate levels, or currency exchange rates. These are financial arrangements between two parties whose payments are based on or "derived" from the performance of some agreed-upon benchmark. As with any investment, derivative contracts are subject to various types of credit and market risks. Notably, these would include the possible inability of the counterparty to meet the terms of the contract, changes in the market value of the underlying collateral, changes in the interest rate environment, and fluctuation in foreign currency rates. The ERS enters into various derivative investment contracts to hedge, for the minimization of transaction costs and as a means of implementing value added strategies to enhance returns as authorized by Board policy.

Generally, derivatives are subject both to market risk and counterparty risk. The derivatives utilized by the ERS typically have no greater risk than their physical counterparts, and in many cases are offset by exposures elsewhere in the portfolio. Counterparty risk, the risk that the "other party" to a contract will default, is managed by utilization of exchange-traded futures and options where practicable (in which case the futures exchange is the counterparty and guarantees performance) and by careful screening of counterparties where use of exchange-traded products is impractical or uneconomical. ERS investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, posting collateral, and exposure monitoring procedures. The ERS anticipates that counterparties will be able to satisfy their obligations under the contracts.

Derivative securities are priced and accounted for at their fair value. For exchange-traded securities such as futures and options, closing prices from the securities exchanges are used. Foreign exchange contracts are valued at the price at which the transaction could be settled by offset in the forwards markets.

The tables below summarize the ERS' investments in derivative securities and contracts held at June 30, 2017 and their associated risks. The various risks associated with these investments are included in the tables expressed in terms of market values, summarized by the type of contract as follows: credit, equity, foreign exchange, interest, and other. Due to the level of risk associated with certain derivative investment securities, it is reasonably possible that changes in the values of investment securities will occur in the near term, and such changes could affect the amounts reported in the financial statements. ERS could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. ERS investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, posting collaterals, and exposure monitoring procedures.

The notional amount is the nominal or the underlying face amount that is used to calculate payments made on that instrument or contract. Changes in the market value of all derivative contracts are recorded as net appreciation (depreciation) in fair value of investments in the Statement of Changes in Fiduciary Net Position.

The following table summarizes the ERS' investments in derivative securities and contracts held at June 30, 2017 with the related maturity information:

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

Asset categories		Notional values	Market value	Maturity (Range from)
Forwards	Currency purchases	$ -	$ (18,514,350)	0.0 yrs
	To Be Announced (TBAs)	-	14,666,610	30.0 yrs to 30.2 yrs
	Total forwards	-	(3,847,740)	
Futures	Bond contracts	1,834,012,584	(17,874,459)	0.3 yrs
	Commodity contracts	(295,418,704)	(5,102,182)	0.0 yrs to 0.8 yrs
	Currency contracts	(130,977,063)	7,372,812	0.3 yrs
	Index contracts	1,045,328,847	(12,622,833)	0.0 yrs to 0.6 yrs
	Interest rate contracts	2,945,813,629	(3,684,848)	0.1 yrs to 2.5 yrs
	Futures total	5,398,759,293	(31,911,510)	
Options	Options	-	(28,870,974)	0.0 yrs to 3.3 yrs
	Options on debt securities	-	188,964	0.0 yrs to 0.8 yrs
	Options on currency	-	78,990	0.0 yrs to 2.8 yrs
	Options total	-	(28,603,020)	
Swaps	Credit default swaps	-	(1,562,368)	0.5 yrs to 45.9 yrs
	Currency swaps	-	6,454,247	1.4 yrs to9.3 yrs
	Equity variance swaps	-	(488,876)	0.0 yrs to 1.0 yrs
	Interest rate swaps	-	(3,590,819)	0.7 yrs to 32.4 yrs
	Swaps total	-	812,184	
	Grand Total	$ 5,398,759,293	$ (63,550,086)	

Forward Currency Exchange Contracts and To-Be-Announced (TBA) Securities

The ERS enters into various forward currency exchange contracts to manage exposure to changes in foreign currency exchange rates and to facilitate the settlement of foreign security transactions. A forward contract is an agreement to buy or sell a specific amount of currency at a specific delivery or maturity date for an agreed-upon price. Risks associated with such contracts include movements in the value of the foreign currency relative to the U.S. dollar and the ability of the counterparty to perform in accordance with the terms of the contract.

The TBA market that ERS invests in as part of its toolkit to manage interest rates and liquidity includes the forward trading of mortgage-backed securities (MBS) issued by federal agencies and federally sponsored agencies (commonly known as pass-through securities issued by Freddie Mac, Fannie Mae, and Ginnie Mae). The TBA market is one of the most liquid, and consequently the most important secondary market for mortgage loans as one MBS pool can be considered to be interchangeable with another pool.

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

Futures

Futures represent commitments to purchase (asset) or sell (liability) securities at a future date and at a specified price. Futures contracts are traded on organized exchanges (exchange traded) thereby minimizing the ERS' credit risk. The net change in the futures contracts value is settled daily in cash with the exchanges. Net gains or losses arising from the daily settlements are included in the net appreciation in fair value of securities in the Statement of Changes in Fiduciary Net Position. Refer to the table above for the net notional value of futures contracts at June 30, 2017.

Options

Options represent or give the buyers the right, but not the obligation, to buy or sell an asset at a preset price over a specified period. The option's price is usually a small percentage of the underlying asset's value. As a writer of financial options, the ERS receives a premium at the outset of the agreement and bears the risk of an unfavorable change in the price of the financial instrument underlying the option. As a purchaser of financial options, the ERS pays a premium at the outset of the agreement and the counterparty bears the risk of an unfavorable instrument underlying the option.

Swaps

Swaps represent an agreement between two or more parties to exchange sequences of cash flows over a period in the future. At June 30, 2017, the ERS had currency, equity variance, inflation, interest rate, and credit default swaps as allowed by Board policy. In the most common type of interest rate swap arrangement, one party agrees to pay fixed-interest payments on designated dates to a counterparty who, in turn, agrees to make return interest payments that float with some reference rate. Currency swaps allow an investor to exchange the principal and/or interest payments of a loan in one currency for equivalent amounts, in net present value terms, to another currency. Credit default swaps are the most common global credit market derivative that allows flexibility as an active portfolio management tool based on its ability to customize the exposure to corporate credit such as credit spreads and default risks. Credit default spreads and total return swaps are also used to gain access to global markets that do not have the transparency or efficiency of the U.S. credit markets. Variance swaps allow the investor to offset risks associated with the magnitude of movement of some underlying product (such as stock index price). Gains and losses from swaps are determined on market values and are included in the net appreciation in fair value of securities in the Statement of Changes in Fiduciary Net Position.

Derivatives, such as interest rate swaps, inflation swaps, and credit default swaps, are a tool or instrument used to manage inflation, interest rate, credit quality, and yield curve exposures of the investments. In certain situations, derivatives may result in a lower overall cost to the portfolio than owning individual securities underlying the derivatives. When evaluating securities, risk, and return are measured at the security and portfolio levels.

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

On June 30, 2017, credit ratings of the counterparty for ERS' investments in derivatives were as follows:

Counterparty	S&P's Rating	Moody's Rating	Fair Value
Bank of America Merrill Lynch	BBB+	Baa1	3,063,424.00
BNP Paribas SA	A	A1	(45,351.00)
Canadian Imperial Bank of Commerce	A+	Not Rated	5,236,005.00
Citibank NA	BBB+	Not Rated	67,615.00
Citigroup Inc	BBB+	Not Rated	633,382.00
CME Group Inc	AA-	Aa3	(240,861.00)
Credit Suisse Group AG	BBB+	Not Rated	(11,692.00)
Credit Suisse Securities (USA) LLC	A	Not Rated	(15,856,152.00)
Deutsche Bank Securities Inc	A-	Baa2	(1,521,241.00)
Goldman Sachs Group Inc/The	BBB+	A3	2,007,761.00
HSBC Holdings PLC	A	Not Rated	(139,077.00)
Intercontinental Exchange Inc	A	A2	(1,056,566.00)
JPMorgan Chase & Co	A-	A3	(3,211,871.00)
London Stock Exchange Group PLC	A-	Baa1	245,053.00
Morgan Stanley	BBB+	A3	(4,310,509.00)
Royal Bank of Canada	AA-	A1	75,845.00
SG Americas Securities LLC	A	Not Rated	804,393.00
Societe Generale SA	A	Not Rated	174,154.00
UBS Group AG	A-	Not Rated	(11,917,569.00)
United Kingdom of Great Britain and Northern Ireland	AA	Aa1	283,674.00
Exchange traded derivatives			(37,830,503)
Total			$ (63,550,086)

Note G – Pension Liability

1. Net Pension Liability

The components of the net pension liability of the ERS at June 30, 2017 were as follows:

Total Pension Liability	$28,648,630,533
Plan Fiduciary Net Position	15,698,324,306
Net Pension Liability	$12,950,306,227
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	54.8%
Net Pension Liability as a Percentage of Covered Payroll	305.2%

Multi-year trend information regarding whether the actuarial value of plan assets is increasing or decreasing over time relative to the actuarial accrued liabilities for benefits can be found in the required supplementary information following the *Notes to the Financial Statements.*

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions

The total pension liability was determined using the provisions of the GASB Statements No. 67 and No. 82 actuarial valuation as of June 30, 2017. These GASB rules only define pension liability for financial reporting purposes. The actuarial assumptions were based on the results of an experience study for the period from July 1, 2010, through June 30, 2015. When measuring the total pension liability, GASB uses the same actuarial cost method, all actuarial assumptions, and the same discount rate as the ERS uses for funding which can be found in the Notes to Required Supplementary Information.

Summary of Actuarial Valuation as of June 30, 2017 follows:

Valuation date	June 30, 2017
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, open
Actuarial assumptions:	
Inflation assumption	2.50%
Investment rate of return, including inflation at 2.50%	7.00%
Payroll growth rate:	3.50%
Projected salary increases, including inflation at 2.50%	
- Police and Fire Employees	5.00% to 7.00%
- General Employees	3.50% to 6.50%
- Teachers	3.75% to 5.75%
Cost of living adjustments (COLAs)	
- COLAs are not compounded; and are based on original pension amounts.	
- Membership date prior to July 1, 2012	2.5%
- Membership date after June 30, 2012	1.5%

Mortality rate assumptions include the effects of the retirement status of members.

Pre-retirement mortality rates are:

Multiples of the RP 2014 mortality table for active employees based on the occupation of the member as follows:

	General Employees	Teachers	Police and Fire
	Male & Female	Male & Female	Male & Female
Ordinary	75%	55%	58%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions

Post-Retirement Mortality rates are:

Healthy Retirees: The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2016 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

The following table provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years

	Year of Retirement			
Gender	2020	2025	2030	2035
General Retirees				
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
Teachers				
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
Police and Fire				
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled retirees: Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions (continued)

The long-term expected geometric rate of returns on pension plan investments based on ERS' investment consultant, Pension Consulting Alliance, Inc.'s 2017 capital market projections for the target asset allocation as of June 30, 2017, are summarized in the following table:

Strategic Allocation (risk-based classes)	Long-term Expected geometric rate of return
Broad Growth	8.05%
Principal Protection	2.45%
Real Return	5.80%
Crisis Risk Offset	5.35%

Single Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

3. Sensitivity of the Net Pension Liability to Changes in the Single Discount Rate

The following presents the ERS' net pension liability calculated using a single discount rate of 7.00%, as well as what the ERS' net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (6.00%) or 1–percentage-point higher (8.00%) than the current rate.

1% Decrease (6.00%)	Current Discount Rate (7.00%)	1% Increase (8.00%)
$ 16,846,997,813	$ 12,950,306,227	$ 9,737,284,744

Note H – Risk Management

The ERS is exposed to various risks of loss related to torts; theft of, damage to, or destruction of assets; errors or omissions; natural disasters; and injuries to employees. As required by state law, the ERS participates in coverage with the State. The State retains various risks and insures certain excess layers with commercial insurance policies. The excess layers are consistent with the prior fiscal year. Settled claims for the State did not exceed the coverage provided by commercial insurance policies during the year ended June 30, 2017. Losses not covered by insurance are generally paid from legislative appropriations.

1. Torts

The ERS is involved in various litigation and claims, including claims regarding retirement benefits, the outcome of which cannot be presently determined. In the opinion of management, the outcome of these actions will not have a material adverse effect on the ERS' financial position.

2. Property and Liability Insurance

The ERS also purchased property and liability insurance for all real estate owned from outside carriers. During the past three fiscal years, no loss settlements exceeded insurance coverages.

3. Workers' Compensation Policy

The State has a self-insured workers' compensation policy. Workers' compensation claims are paid from legislative appropriations.

Note I – Commitments

In the normal course of business, the ERS enters into commitments with associated risks. The ERS adheres to the same credit policies, financial and administrative controls, and risk limiting and monitoring procedures for these commitments as for all investments.

The ERS has future financial commitments of up to $1,654,619,000 as of June 30, 2017, consisting of $389,114,000 in real estate investments, and $1,265,505,000 in alternative investments.

Note J – Deferred Compensation Plan

The ERS does not sponsor a deferred compensation program. The ERS' employees are eligible to participate in the deferred compensation plan sponsored by the State. The State-sponsored plan was created in accordance with Internal Revenue Code Section 457. The plan, available to all ERS employees, permits them to defer a portion of their salaries. The deferred compensation is not available to the employees until termination, retirement, death, or an unforeseeable emergency. All compensation deferred under the plan is held in trust by a custodian for the exclusive benefit of participants and beneficiaries.

Schedule of Changes in the Employers' Net Pension Liability and Related Ratios

Fiscal Years Ended June 30, 2017, 2016, 2015 and 2014

	2014	2015	2016	2017
A. Total pension liability				
1. Service Cost	$421,956,129	$437,901,029	$484,278,499	$576,724,568
2. Interest on the Total Pension Liability	1,618,917,776	1,693,252,684	1,748,619,873	1,894,622,190
3. Changes of benefit terms	-	-	-	-
4. Difference between expected and actual experienceof the Total Pension Liability	66,400,876	(192,816,757)	297,534,219	61,179,390
5. Changes of assumptions	-	261,213,541	2,915,922,677	-
6. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)
7. Net change in total pension liability	$976,353,170	$1,018,297,839	$4,200,838,243	$1,209,396,904
8. Total pension liability – beginning	21,243,744,377	22,220,097,547	23,238,395,386	27,439,233,629
9. Total pension liability – ending	$22,220,097,547	$23,238,395,386	$27,439,233,629	$28,648,630,533
B. Plan fiduciary net position				
1. Contributions – employer	$653,127,697	$717,792,981	$756,558,222	$781,244,218
2. Contributions – employer (picked-up employee contributions)	204,821,010	221,909,859	235,079,968	249,211,751
2. Contributions – employee	1,306,327	1,595,560	1,721,893	1,492,316
3. Net investment income	2,175,479,961	556,436,475	(169,368,110)	1,934,512,507
4. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)
5. Pension Plan Administrative Expense	(12,626,030)	(14,032,964)	(13,960,587)	(14,986,159)
6. Other	-	-	-	-
7. Net change in plan fiduciary net position	$1,891,187,354	$302,449,253	($435,485,639)	$1,628,345,389
8. Fiduciary net position – beginning	12,311,827,949	14,203,015,303	14,505,464,556	14,069,978,917
9. Fiduciary net position – ending	$14,203,015,303	$14,505,464,556	$14,069,978,917	$15,698,324,306
C. Net pension liability	$8,017,082,244	$8,732,930,830	$13,369,254,712	$12,950,306,227
D. Fiduciary net position as a percentage of the total pension liability	63.92%	62.42%	51.28%	54.80%
E. Covered-employee payroll	$3,829,002,983	$3,995,447,345	$4,112,227,306	$4,243,521,876
F. Net pension liability as a percentage of covered employee payroll	209.38%	218.57%	325.11%	305.18%

* Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Schedule of the Employers' Net Pension Liability
Fiscal Year Ended June 30, 2013 to June 30, 2017*

Fiscal year ended June 30,:	Total Pension Liability	Fiduciary Net Position	Net Pension Liability	Fiduciary Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a Percentage of Covered Payroll
2013	$21,243,744,377	$12,311,827,949	$8,931,916,428	57.96%	$3,720,809,962	240.05%
2014	$22,220,097,547	$14,203,015,303	$8,017,082,244	63.92%	$3,829,002,983	209.38%
2015	$23,238,395,386	$14,505,464,556	$8,732,930,830	62.42%	$3,995,447,345	218.57%
2016	$27,439,233,629	$14,069,978,917	$13,369,254,712	51.28%	$4,112,227,306	325.11%
2017	$28,648,630,533	$15,698,324,306	$12,950,306,227	54.80%	$4,243,521,876	305.18%

* Schedule is intended to show information for 10 years. Additional years will be built prospectively as data becomes available.

Schedule of Employer Contributions
2008 to 2017
(In thousands)

Fiscal year ended June 30,:	Statutory Contributions	Covered Employee Payroll	Contributions as a Percentage of Covered Payroll
2008	$488,770	$3,601,722	13.6%
2009	578,672	3,838,000	15.1%
2010	547,670	3,713,593	14.7%
2011	538,692	3,731,383	14.4%
2012	548,353	3,706,137	14.8%
2013	581,447	3,720,810	15.6%
2014	653,128	3,829,003	17.1%
2015	717,793	3,995,447	18.0%
2016	756,558	4,112,227	18.4%
2017	781,244	4,243,522	18.4%

Notes: All contributions shown reflect statutory employer-paid contributions only. Employer contributions (picked-up employee/member contributions) and member contributions are excluded.

Schedule of Investment Returns
2014 to 2017

For fiscal year ended June 30,:	Annual Money-Rate of Return
2014	17.9%
2015	4.0%
2016	-1.2%
2017	13.7%

* Schedule is intended to show information for 10 years. Additional years will be built prospectively as data becomes available.

June 30, 2017

Note A - Description

There have been no changes in benefit terms or actuarial assumptions since the last valuation.

Future employer contribution rates will increase due to legislation passed in 2017.

> Per Act 17 (SLH 2017), future employer contributions from State and counties are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. The rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1 , 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020.

Methods and Assumptions Used in Calculations of Actuarially Determined Contributions

The actuarially determined contribution rates in the schedule of contributions are calculated as of June 30, 2017. The following significant actuarial methods and assumptions were used to determine contribution rates reported in that schedule. Please refer to the Actuarial Section for additional information on actuarial assumptions.

Valuation date	June 30, 2017
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, open
Asset valuation method	4-year smoothed market
Assumed inflation rate	2.5%
Investment rate of return	7.00% (including 2.5% for inflation and a 4.50% net real rate of return)
Cost-of-living adjustments (COLAs)	
- COLAs are not compounded; and are based on original pension amount.	
- Membership date prior to July 1, 2012	2.5% (not compounded)
- Membership date after June 30, 2012	1.5% (not compounded)
Payroll growth rate assumption	3.50%

Projected salary increases are comprised of the following components:

	General Employees	Teachers	Police and Fire
Service component by year of credited service (a)	0.0% to 3.0%	0.0% to 2.0%	0.0% to 2.0%
General increase (b)	1.0%	1.25%	2.5%
Inflation (c)	2.5%	2.5%	2.5%
Total increase (a + b +c)	3.5% to 6.5%	3.75% to 5.75%	5.0% to 7.0%

Detailed salary increase rates by years of service are shown below:

	General Employees		Teachers	
Years of Service	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)
1	3.00%	6.50%	2.00%	5.75%
2	3.00%	6.50%	1.75%	5.50%
3	2.00%	5.50%	1.75%	5.50%
4	1.50%	5.00%	1.50%	5.25%
5	1.50%	5.00%	1.00%	4.75%
6	1.25%	4.75%	1.00%	4.75%
7	1.25%	4.75%	0.75%	4.50%
8	1.00%	4.50%	0.75%	4.50%
9	1.00%	4.50%	0.50%	4.25%
10	1.00%	4.50%	0.50%	4.25%
11	0.75%	4.25%	0.50%	4.25%
12	0.75%	4.25%	0.50%	4.25%
13	0.50%	4.00%	0.25%	4.00%
14	0.50%	4.00%	0.25%	4.00%
15	0.50%	4.00%	0.25%	4.00%
16	0.50%	4.00%	0.25%	4.00%
17	0.50%	4.00%	0.25%	4.00%
18	0.50%	4.00%	0.25%	4.00%
19	0.50%	4.00%	0.25%	4.00%
20	0.25%	3.75%	0.25%	4.00%
21	0.25%	3.75%	0.25%	4.00%
22	0.25%	3.75%	0.25%	4.00%
23	0.25%	3.75%	0.25%	4.00%
24	0.25%	3.75%	0.25%	4.00%
25 or more	0.00%	3.50%	0.00%	3.75%

	Police and Fire	
Years of Service	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)
1	2.00%	7.00%
2	2.00%	7.00%
3 or more	0.00%	5.00%

Mortality rates used in the valuation are:

Pre-retirement mortality rates are:

Multiples of the RP 2014 mortality table based on the occupation of the member.
The following factors are used in conjunction with the described above to derive the death rates:

	General Employees	Teachers	Police and Fire
Ordinary	75%	55%	58%
% of Ordinary Choosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Post-retirement mortality rates are:

Healthy Retirees:

The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience.

The following are sample rates of the base table as of 2017 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

Notes to Required Supplementary Information - Unaudited

The following are life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years

Gender	Year of Retirement 2020	2025	2030	2035
General Retirees				
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
Teachers				
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
Police and Fire				
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled Retirees:

Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

Change of Assumptions

There was no change in the 2017 assumptions.

Prior year trends including changes in assumptions are discussed below in Note B.

Note B – Significant Factors Affecting Trends in Actuarial Information

2016 Changes in Actuarial Assumptions

The following changes were made to the actuarial assumptions as of June 30, 2015 to June 30, 2016:

- The investment rate of return assumption was decreased from 7.65% to 7.00 %.
- Change the investment return assumption from net of all expenses to net of only investment expenses, add explicit charge for administrative expenses (0.35% of pay)
- The inflation assumption was decreased from 3.00% to 2.50 %
- Decrease the wage inflation (or employer budget growth) assumption from 4.00% to 3.50%
- The inflation component of salary increase rates decreased for all groups. The salary increase rates were changed to reflect a smaller productivity component for Teachers and Police & Fire. The service based component generally increased for most General Employees, decreased for most Teachers, and remain unchanged for most Police and Fire. The overall impact decreased assumed salary rate increase rates for all General Employees and Teachers, while remaining unchanged for almost all Police and Fire.
- The rates of mortality for active employees were decreased.
- The rates of mortality for healthy retirees and beneficiaries for most employee groups were decreased, adding an explicit assumption for continued future mortality improvement (generational approach).
- The rates of mortality for disabled retirees for most employee groups were decreased.
- The rates of disability of active employees increased for all General Employees, for Police and Fire from duty-related reasons and for Teachers from non-duty-related reasons.
- The rates of termination assumption for all employee groups was changed from separate male and female by employee group to a combined male & female by employee group. The rate of terminations for Police & Fire was increased. The rate of terminations for General Employees in the first six years of service decreased, and remains unchanged for other General Employees. After six years of service, the rates of termination generally increased Teachers, and remain unchanged for other Teachers.

2015 Changes in Actuarial Assumptions

The investment rate of return assumption was decreased from 7.75% as of June 30, 2014 to 7.65 % as of June 30, 2015.

2011 Changes in Plan Provisions Since 2010

The following changes were made to the actuarial assumptions:

- The investment rate of return assumption decreased from 8.00% to 7.75%.
- The salary increase rates were changed to reflect a larger productivity component for Police & Fire. Small changes also made to service-based components for all groups. The overall impact increased assumed salary increase rates for all employees.
- The rates of mortality for healthy retirees and beneficiaries for most employee groups were decreased.
- The rates of mortality for disabled retirees for most employee groups were increased.
- The rates of mortality for active employees for most employee groups were increased.
- The rates of disability for active employees for most general employees and teachers were decreased.
- The rates of retirement for most employees were increased.
- The rates of termination in the first six years of service for males generally increased, and remained mostly unchanged for females. After six years of service, the rates of termination generally increased for younger employees and decreased for employees from the age of 50.

Schedule 1

Combining Schedule of Changes in Fiduciary Net Position – All Trust Funds

Year ended June 30, 2017

	2017			
	Pension Accumulation Reserves	**Annuity Savings Reserves**	**Expense Reserves**	**Total**
Additions				
Appropriations and contributions:				
Employers	$ 781,244,218	$ -	$ -	$ 781,244,218
Members	-	250,704,067	-	250,704,067
Net investment gain	1,934,512,507	-	-	1,934,512,507
Total additions	2,715,756,725	250,704,067	-	2,966,460,792
Deductions				
Benefit payments	1,306,788,954	-	-	1,306,788,954
Refunds of member contributions	-	16,340,290	-	16,340,290
Administrative expenses	-	-	14,986,159	14,986,159
Total deductions	1,306,788,954	16,340,290	14,986,159	1,338,115,403
Other changes in net position restricted for pension benefits:				
Transfer due to retirement of members	178,916,248	(178,916,248)	-	-
Transfer of interest allocation	(105,519,722)	105,519,722	-	-
Transfer to pay administrative expenses	(20,418,249)	-	20,418,249	-
Return of unrequired funds due to savings in administrative expenses	-	-	-	-
	52,978,277	(73,396,526)	20,418,249	-
Net increase	1,461,946,048	160,967,251	5,432,090	1,628,345,389
Fiduciary net position restricted for pensions:				
Beginning of year	11,585,911,670	2,474,556,296	9,510,951	14,069,978,917
End of year	$ 13,047,857,718	$ 2,635,523,547	$ 14,943,041	$ 15,698,324,306

See accompanying independent auditors' report.

Supplementary Information (continued)

Schedule 2

Social Security Contribution Fund

Statement of Changes in Assets and Liabilities

Year ended June 30, 2017

	2017			
	Beginning Balance	**Additions**	**Deductions**	**Ending Balance**
Assets				
Receivable from employers	$ -	$ 231,793,473	$ 231,793,473	$ -
Total assets	$ -	$ 231,793,473	$ 231,793,473	$ -
Liabilities				
Due to employers	$ -	$ 231,793,473	$ 231,793,473	$ -
Total liabilities	$ -	$ 231,793,473	$ 231,793,473	$ -

Supplementary Information (continued)

Schedule 3

Schedule of Administrative Expenses

Year ended June 30, 2017

		2017
Personnel services		
Salaries and wages	$	6,038,693
Fringe benefits		2,892,689
Net change in unused vacation credits		30,448
Total personnel services		8,961,830
Professional services		
Actuarial		174,750
Auditing and tax consulting		697,133
Disability hearing expenses		82,487
Legal services		664,419
Medical		325,526
Other services		1,560
Total professional services		1,945,875
Communication		
Postage		177,642
Printing and binding		117,501
Telephone		84,668
Travel		139,812
Total communication		519,623
Rentals		
Rental of equipment		98,037
Rental of premises		17,931
Total rentals		115,968
Other		
Armored car service		7,268
Repairs and maintenance		1,984,310
Stationery and office supplies		34,996
Miscellaneous		119,533
Total other		2,146,107
Depreciation		1,296,756
	$	14,986,159

See accompanying independent auditors' report.

Schedule 4

Schedule of Investment Expenses

Year ended June 30, 2017

		2017
Real estate and alternative investment expenses		
Operating expenses	$	35,275,577
Mortgage interest		6,252,734
Total real estate and alternative investment expenses		41,528,311
Investment expenses		
Investment manager/advisor fees	$	35,205,531
Bank custodian fees		331,719
Other investment expenses		2,412,401
Total investment expenses		37,949,651
Securities lending expenses		
Borrower rebates		4,908,271
Management fees		980,937
Total securities lending expenses		5,889,208
	$	85,367,170

See accompanying independent auditors’ report.

Employees' Retirement System

of the State of Hawaii

INVESTMENT SECTION

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Letter from Chief Investment Officer

DAVID Y. IGE
GOVERNOR

THOMAS WILLIAMS
EXECUTIVE DIRECTOR

KANOE MARGOL
DEPUTY EXECUTIVE DIRECTOR

STATE OF HAWAII
EMPLOYEES' RETIREMENT SYSTEM

November 16, 2018

Board of Trustees
201 Merchant Street, Suite 1400
Honolulu, HI 96813

Dear Members of the Board:

I am pleased to present investment highlights and performance for the Investment Section of the Comprehensive Annual Financial Report ("CAFR") for the fiscal year ending June 30, 2017.

- ERS's Fiduciary net position was valued at $15.7 billion as of June 30, 2017. The portfolio increased by $1.6 billion over the fiscal year. The ERS continues to be ranked as one of the 250 largest institutional investors globally, a list that includes sovereign wealth funds, public retirement plan sponsors, and corporate plan sponsors.

- The ERS investment portfolio outperformed its one-year, three-year, and five-year Policy Benchmark returns by an annualized 1.8%, 0.8% and 0.7%, respectively. The portfolio's return for the year was 13.7%. The portfolio continued to outperform its peer group as measured by the BNY Mellon Public Funds Greater than $1 billion, for the one year, three year and five year periods by an annualized 1.1%, 0.1% and 0.6%, respectively.

- The return for the ERS portfolio was 13.7% for fiscal year 2017, well in excess of the 7.0 percent target rate of return, reducing the unfunded liability by about $900 million more than if the ERS had exactly achieved its target.

- The exceptional performance for the fiscal year was led by strong appreciation of broad growth class (up 17.4%), which includes traditional growth strategies (up 22.0%), private growth strategies (up 18.6%), and stabilized growth strategies (up 10.9%) with all three components beating their benchmarks.

- Performance for principal protection was 1.9%, exceeding its benchmark by 1.9% during a difficult year for global government bonds, while real return posted a return of 2.6% trailing its CPI+3% benchmark for the fiscal year by 2.1%.

- The capital allocations among the five risk classes on June 30, 2017 was virtually identical to the policy allocations with broad growth accounting for 76%, crisis risk offset 10%, principal protection 9%, real return 5%, and opportunities 0%; from a risk allocation standpoint, growth risk accounted for about 90% of the volatility in the portfolio.

ECONOMIC & CAPITAL MARKET CONDITIONS

Markets were complacent throughout fiscal-year 2017 with very little volatility and a remarkably consistent "risk-on" sentiment that permeated global capital markets. The markets shrugged off nearly every geopolitical event as global equity markets rose 20% with no corrections (declines greater than 10%). Global bond markets were lackluster during the fiscal year with investment grade debt uniformly flat to down slightly, while the riskier high yield and emerging markets debt experienced strong returns in the 5% to 13% range.

Major events and actors that influenced the markets included the U.S. election and a surprise victory for Donald Trump that only briefly increased stock market volatility, but created uncertainty regarding the policies of the new administration; the continuation of the new U.S. Fed policy to gradually increase short-term interest rates, pushing the Fed Funds rate up by 25 basis points three times; negative Northern Europe interest rates as the European Central Bank sought to stimulate growth; political turmoil in Europe related to elections/referenda in the U.K., France and Italy following terror attacks; fears over aggressive actions by Russia and North Korea; high unemployment in the southern E.U.; and the impact of the Chinese economic slowdown coupled with concerns over the health of China's financial institutions and further Chinese currency devaluations .

In the U.S., economic conditions were nearly ideal with inflation coming in at a benign 1.6%, U.S. unemployment dropping to 4.4% by fiscal year-end, strong corporate earnings growth, and strengthening economic growth that picked up in the second half of the fiscal year as GDP grew 2.5%.

Overall, despite all of these macro risks, the 2017 fiscal year proved to be an unusually favorable time to take risk in the capital markets, and the markets ended the year poised for continued strength.

PORTFOLIO RESTRUCTURING ACTIVITY

Fiscal year 2017 was a time of transition for the portfolio to the new risk-based methodology adopted by the Board in October 2014 as well as investment office making significant strides in enhancing the risk culture within the ERS investment office. Highlights included:

- Launching the $1.3 billion CRO platform with seven investment managers to trade the three component strategies and a platform manager to handle back and middle office functions related to the daily operations of the accounts.

- Expanding the options-based equity mandate within stabilized growth by adding three managers and allocating $1.9 billion to the new global cash collateralized put writing mandate, as well as rolling the covered call replication portfolio into the non-replication covered call portfolio.

- Transitioning the small-cap active equity traditional growth mandate to global strategies rather than distinct buckets based on geographic location and style, resulting in the hiring of two managers and transitioning $0.8 billion from three managers to the new mandate.

- Committing $0.8 billion of capital to 18 funds to build out the private growth portfolio.

- Launching Blackrock Aladdin's risk management system that measures and reports the risk of the entire holdings of the ERS portfolio on a daily basis.

PORTFOLIO ANALYSIS & CONCEPTUAL REDESIGN

The ERS investment portfolio is becoming more robust because it has lower fees, less risk, greater transparency, and better risk-adjusted performance than ever before. Lower fees come from more passive strategies and renegotiation of contracts and searches. Less risk is from a more diversified set of strategies, focus on income (over capital appreciation), and systematically gaining exposure. Greater transparency comes in the form of more disclosure in reports and online, and in a functional risk class portfolio that provides greater insights into the risk relative to return of the underlying strategies. Better performance is demonstrated on both an absolute (e.g., high nominal compounding returns) and a relative (e.g. outperforming the assumed rate of return and policy benchmark; outperforming peers and other institutional investors) basis using a variety of metrics including standard measures of risk-adjusted returns. The redesigned functional risk class portfolio provides for the increased probability that the plan will be sustainable.

Office Development

The 2017 fiscal year was the third complete year for the investment team in the Investment Office. The team consists of three Investment Offices, two Investment Specialists, one Chief Investment Officer, and one Secretary. Enhancement to the office's resources were significant with the addition of the Aladdin portfolio risk model and the RiskMetrics risk model utilized by the Crisis Risk Offset ("CRO") platform manager and ERS staff to measure and monitor the CRO strategies. Staff is working with the Board and consultants to execute major policy changes focused on the further development of the Investment Policy Manual and restructure of the portfolio. It is expected that the actions taken during the next 24 months will result in the complete remaking of the former traditional asset class portfolio into a "risk aware' portfolio. By risk aware, we mean that the portfolio is employing dynamic strategies like those in CRO that automatically adjust to changing market conditions by increasing the exposure to risk assets when market conditions are favorable and reduce exposure to risk assets when market conditions are unfavorable. This restructuring along with ongoing professional management of the trust's assets will greatly increase the potential for the overall pension plan to remain a sustainable program.

OUTLOOK

The capital market outlook is strong going into fiscal year 2018 with corporate earnings and economic growth looking favorable across the globe, but particularly in the U.S. Monetary policy has been very accommodative globally as well, but that is changing in the U.S. as the Fed has embarked on a path to gradually increase short-term interest rates; U.S. fiscal policy on the other hand is expansionary. Inflation remains muted in the developed economies and fears of deflation have largely subsided.

The investment staff has become more efficient with the new risk models, but responsibilities are growing and the office needs even more tools and staff to fulfill all of its responsibilities and capabilities. The opportunity cost of not getting these resources is significant—most likely in the hundreds of millions of dollars annually. The "risk aware" portfolio that staff, with the oversight of the Trustees and assistance of the three ERS consultants, is building will be better able to withstand the episodic market downturns we are sure to face in the future, and position the ERS to take advantage of the valuation displacements that these crises create by allowing staff to redeploy ERS capital to these opportunities.

Respectfully yours,

Howard M. Hodel

Howard Hodel
Acting Chief Investment Officer

PCA PENSION CONSULTING ALLIANCE

MEMORANDUM

February 22, 2018

Board of Trustees
Employees' Retirement System of the State of Hawaii
City Financial Tower
201 Merchant Street, Suite 1400
Honolulu, HI 96813-2980

Dear Trustees:

Enclosed is our report on the investment activity for the Employees' Retirement System of the State of Hawaii (ERS) for periods ending June 30, 2017, as requested by the Government Financial Officers' Association (GFOA).

Hawaii ERS-Total Fund Performance

The total net assets of the Retirement System were approximately $15.7 billion as of June 30, 2017, an increase of roughly $1.6 billion for the fiscal year. The ERS Total Fund generated solid absolute and relative returns throughout the majority of the portfolio. The investment return for the Total Fund, expressed as a time-weighted total rate of return, was +13.7% for the 2017 fiscal year, compared to the benchmark's return of +11.9% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +12.6%. For the three-year period ending June 30, 2017, the Total Fund returned 5.5% per annum versus the benchmark's return of +4.7% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +5.4%. For the trailing five-year period ending June 30, 2017, the Total Fund returned +9.3% per annum versus the benchmark's return of +8.6% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +8.7%. The Total Fund's returns over all examined periods were consistent with the global capital markets, and in particular, were primarily driven by the public global equity markets.

Strategic Class Performance

In 2014, the ERS adopted a risk-based, functional framework for allocating capital within the Total Fund. This framework makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies. As of June 30, 2017, nearly all the ERS's existing asset classes have been remapped to various risk-based, functional strategic classes. Based on these changes, the verbiage below highlights the performance of the ERS's risk-based strategic classes.

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As calculated by BNY Mellon, the ERS's custodial bank, the Broad Growth[1] class produced a +17.4% return for the fiscal year versus the Broad Growth benchmark's return of 14.4%. The Broad Growth class utilizes three sub-components: 1) Traditional Growth, 2) Stabilized Growth[1], and 3) Private Growth[1]. The Traditional Growth sub-component generated a +22.0% return for the fiscal year, the Stabilized Growth[2] sub-component produced a 10.9% return for the fiscal year, and the Private Growth[2] sub-component generated an +18.6% return for the fiscal year. The Principal Protection class produced a 1.9% return for the fiscal year versus the Principal Protection benchmark's return of 0.0%. The Real Return class produced a return of +2.6% for the year ending June 30, 2017. A new strategic class, the Crisis Risk Offset (CRO) class, had an inception date of April 1, 2017, so it does not have a full fiscal year of investment performance. As of June 30, 2017, the CRO had a market value of approximately $1.5 billion, nearly matching its interim target level of 10% of Total Fund assets.

The four major strategic classes above utilize seventeen underlying sub-asset classes. These classes are (in order of size): Options-based Equity, Passive Public Equity, Active Public Equity, Intermediate Fixed Income, Private Equity, Low Volatility Equity, Extended Global Credit, Trend Following Strategies, Core Real Estate, Inflation-linked Fixed Income, Alternative Return Capture Strategies, Long Duration Fixed Income, Non-Core Real Estate, Timber, Other Investments, Opportunities, and Infrastructure. Performance of these various classes is provided in the Investment Results section of this letter.

Furthermore, as a result of the 2015 Asset-Liability Study that was finalized in the 2016 fiscal year, it is expected that the ERS's implementation of the its long-term strategic allocation will be completed by the end of the 2020 fiscal year.

Market Conditions

The market backdrop for fiscal year 2017 was marked by strong equity market returns, supported by improving economic fundamentals, despite continued geopolitical uncertainty and the unwinding of the supportive Federal Reserve's quantitative easing program. With respect to the Federal Reserve's actions, fiscal year 2017 marked a continuation of the new trend to increase short-term interest rates. During calendar 2017, the Federal Reserve hiked interest rates three times, all in 25-basis point increments.

1 May contain lagged and non-lagged components.
2 Lagged one quarter

Letter from Investment Consultant (continued)

The largest geopolitical event driving the markets was the 2016 U.S. election, which occurred toward the middle of the fiscal year. While the markets reflected significant uncertainty during the U.S. election cycle, the markets responded favorably to the election's outcome, despite the highly volatile rhetoric surrounding the event. In general, the markets have interpreted the U.S. election results as introducing a tendency toward deregulation and other pro-business stances, all of which the markets have interpreted as favorable.

Despite the uncertainty revolving around the U.S. election cycle, inflation remained muted throughout the fiscal year, with CPI posting a +1.6% change. Unemployment in the United States continued to decline throughout the fiscal year, ultimately coming in at 4.4% by June 30, 2017 (unemployment was 4.9% one year prior). Real economic growth also improved, particularly in the second half of the fiscal year, as reported real GDP growth exceeded +2.5% by fiscal year end.

During fiscal year 2017, equities within the U.S., as measured by the Russell 3000 Index, advanced by 18.5%, while non-U.S. equities, as measured by the MSCI ACWI ex U.S. Index GD, rose by +21.0%. The relative performance between growth and value stocks in the domestic equity market was variable, with growth stocks producing material outperformance versus value stocks in the larger cap segment while producing near-parity results in the smaller cap segment. Additionally, emerging markets equities outperformed their developed market counterparts during fiscal year 2017 by a significant margin.

In aggregate, global fixed income markets produced negative-to-flat returns primarily as a result of the U.S.'s policy to increase interest rates. With the exception of high yield, the majority of the fixed income indices produced moderate negative returns. With respect to particular indices, investment-grade bonds, as measured by the Bloomberg Barclays Capital Aggregate Bond Index, returned -0.3%. Government bonds (BB Government) produced a return of -2.2%, mortgage-backed bonds (BB MBS) generated a -0.1% return, investment-grade credit bonds (BB Credit) rose by +1.8%, high-yield corporate bonds (BB High Yield) returned +12.7%, and emerging markets bonds (BB Emerging Markets) increased by +5.6%.

Throughout the complicated market conditions of the past few years, with its constant review and oversight, the Board continues to position the Employees' Retirement System of the State of Hawaii for competitive long-term performance consistent with its objectives.

Sincerely,

Pension Consulting Alliance, LLC

Report on Investment Activity by Investment Consultant

PCA PENSION CONSULTING ALLIANCE

Report on Investment Activity for the
Employees' Retirement System of the State of Hawaii
Prepared by Pension Consulting Alliance, LLC
June 2017

Outline of Investment Policies

The primary goal of the Plan is the preservation of capital. The Board of Trustees seeks preservation of capital with a consistent, positive return for the Fund. Although pure speculation is to be avoided, the Board appreciates the fact that an above-average return is associated with a certain degree of risk. Risk to be assumed must be considered appropriate for the return anticipated and consistent with the total diversification of the Fund.

Strategic Asset Allocation Policy

A formal asset-liability study is conducted every three-to-five years to verify or amend the Plan's policy targets. The targets are designed to achieve a certain level of return, and associated level of risk, that is aligned with the Plan's goals and objectives. The targets are evaluated on the basis of assets designated to each strategic class by the Board, rather than on a current invested position. The targets will be pursued primarily by cash flow on a long-term basis and will be revised if significant changes occur within the economic and/or capital market environment according to the rebalancing guidelines. The targets are to be reviewed annually for reasonableness relative to significant economic and market changes. The Board of Trustees initiated a new asset-liability study during fiscal year 2015 that was completed during fiscal year 2016. As a result of the 2015 Asset-Liability Study, the Board adopted a new long-term strategic allocation policy which included evolving policy targets designed to efficiently transition the Plan to the new long-term strategic allocation over time. It is expected that the ERS's implementation of the new long-term strategic allocation will be completed by the end of the 2020 fiscal year. The 2015 Asset-Liability Study, and the approved long-term strategic allocation, fully incorporated a risk-based, functional allocation framework. The strategic allocation policy highlighted below, coupled with the actual ERS portfolio, reflect the multiple stages of decisions associated with the 2015 Asset-Liability Study.

Strategic Asset Allocation Policy (as of 6/30/2017)

During the 2017 fiscal year, the Plan was strategically invested in the following classes:

	Strategic Allocation (functional/risk-based classes)
Broad Growth	**76%**
Principal Protection	**9%**
Real Return	**5%**
Real Estate	**10%**
Total	**100%**

The above strategic allocation is supported by seventeen underlying sub-asset class (see supporting pages).

Report on Investment Activity by Investment Consultant (continued)

PCA PENSION CONSULTING ALLIANCE

Long-Term Strategic Allocation Policy

As a result of the formal asset-liability study that began in fiscal year 2015 and was completed in fiscal year 2016, the Board adopted a new long-term strategic allocation policy. It will likely require multiple years to fully complete this transition, and thus it is expected that the ERS's implementation of the new long-term strategic allocation policy will be completed by the end of the 2020 fiscal year.

Expected Annualized Return and Risk

As a result of the formal asset-liability study that began in fiscal year 2015 and was completed in fiscal year 2016, the Board adopted a new long-term strategic allocation policy. It is expected that final implementation and allocations across the new long-term strategic allocation policy will be completed by the end of the 2020 fiscal year.

Long-Term Strategic Allocation Targets

The ERS will strategically invest in the following asset classes:

Strategic Allocation (risk-based classes)	Strategic Class Weights	Expected Long-term Geometric Average Return	Expected Long-term Real Return[1]	Expected Annual Standard Deviation
Broad Growth	63%	8.05%	5.80%	15.35%
Principal Protection	7%	2.45%	0.20%	3.50%
Real Return	10%	5.80%	3.55%	9.80%
Crisis Risk Offset	20%	5.35%	3.10%	10.90%
Total Portfolio	**100%**			

[1] Uses an expected inflation of 2.25%

PENSION CONSULTING ALLIANCE

Evolving Strategic Allocation Policy

Implementation Plan for Long-term Strategic Policy					
	Current (6/30/2017)	1/1/2018	1/1/2019	1/1/2020	Long-Term 7/1/2020
Broad Growth	76%	72%	68%	64%	**63%**
Principal Protection	9%	8%	8%	7%	**7%**
Real Return	5%	7%	8%	9%	**10%**
Crisis Risk Offset	0%	0%	0%	20%	**20%**
Opportunities	76%	72%	68%	0%	**0%**
Total Portfolio	*100%*	*100%*	*100%*	*100%*	***100%***

Manager Evaluation

Public markets managers are measured against relevant indices and/or their respective peer groups of managers. Market indices and peer group benchmarks (when applicable) are assigned to each manager and are intended to serve as a guide for the investment manager to understand the risk/reward posture of their portfolio. Real Estate managers are measured against the median performance of the BNY Mellon Real Estate Database and the appropriate NCREIF Real Estate Index. Private Equity managers are measured against public market proxies and relevant peer groups. Managers have full discretion to manage the risk posture of their portfolios relative to their designated market index and may, with conviction and appropriate expertise, execute security strategies not reflected by their market index as long as they conform to the investment guidelines and the laws of the State of Hawaii.

Investment Practices

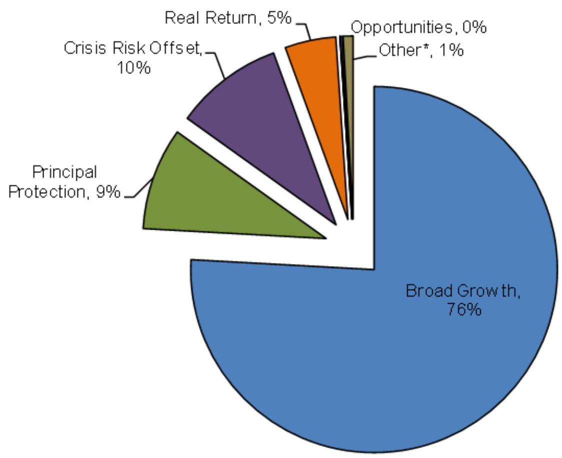
The full Employees' Retirement System of the State of Hawaii Investment Policy, Guidelines, and Procedures Manual (Manual) describes, in detail, acceptable investment practices, manager reporting requirements, manager performance guidelines, distribution of brokerage commissions, and securities lending guidelines. Material revisions to the Manual occurred during each of the last five fiscal years and will continue to transpire throughout the evolution of the Plan. A current version of the Manual is located on the ERS's website.

All rates of return are calculated using methodologies that are generally accepted by the Global Investment Performance Standards (GIPS). All public markets manager returns are time-weighted rates of return based on daily or monthly custodial data. All private markets manager returns seek to accurately represent cash flows and appraisal values.

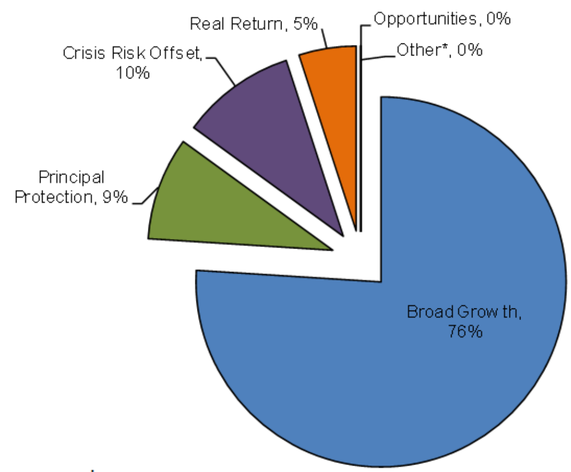
Report on Investment Activity by Investment Consultant (continued)

Strategic Allocation as of June 30, 2017 (Risk-based Classes):

Actual Allocation



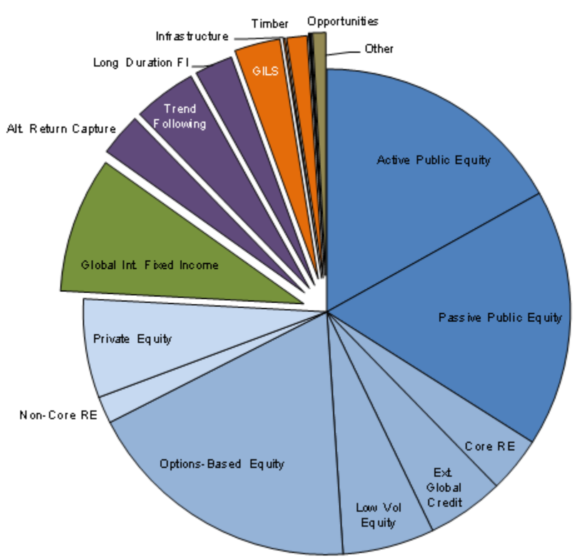
Target Allocation



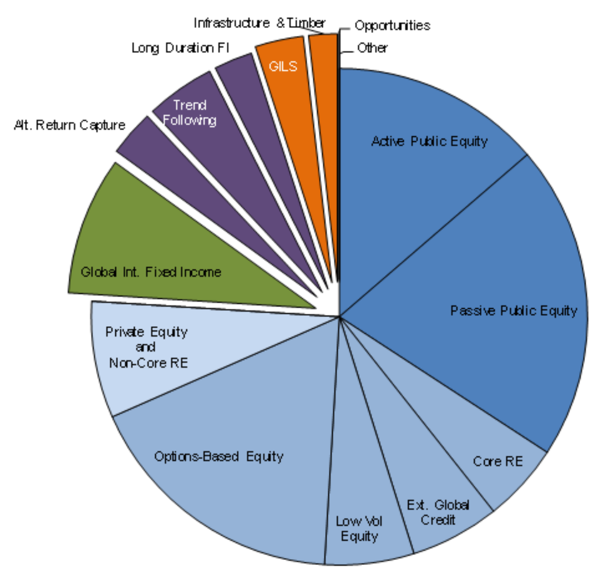
*Includes Board of Trustees Discretionary Managed Assets, and transition activity/accounts that were in-process at the end of the fiscal year

Strategic Allocation as of June 30, 2017 (Risk-based Classes - Sub-Components):

Actual Allocation



Target Allocation



PCA PENSION CONSULTING ALLIANCE

Investment Results as of June 30, 2017 (Risk-based Classes):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2017	2016	2015	2014	2013	6/2017	6/2017
Broad Growth *	**17.42%**	**(2.62%)**	---	---	---	---	---
Broad Growth Blended Index[1]	**14.39%**	**(2.17%)**	---	---	---	---	---
Principal Protection	**1.94%**	**3.11%**	**2.78%**	**6.28%**	**1.72%**	**2.61%**	**3.15%**
Principal Protection Blended Index[2]	(-0.02%)	4.24%	1.73%	5.28%	0.72%	1.97%	2.37%
Crisis Risk Offset**	**15.06%**	**15.06%**	---	---	---	---	---
Crisis Risk Offset Blended Index[3]	11.84%	11.84%	---	---	---	---	---
Real Return	**2.60%**	**5.33%**	**5.37%**	**7.96%**	**0.34%**	**4.42%**	**4.29%**
CPI + 3%	4.70%	4.05%	3.17%	5.08%	4.81%	3.97%	4.36%
Total Fund	**(0.78%)**	**(0.78%)**	**4.23%**	**17.77%**	**12.57%**	**6.79%**	**6.48%**
Composite Benchmark[4]	11.87%	(0.04%)	2.75%	17.51%	11.61%	6.47%	6.71%
Median Fund***	12.63%	0.43%	3.11%	17.14%	12.65%	6.48%	6.43%

* Per BNY Mellon data, the Broad Growth composite was incepted 10/1/2014. Contains lagged and non-lagged components.

** Per BNY Mellon data, the Crisis Risk Offset composite was incepted 4/1/2017.

*** Universe data provided by BNY Mellon and Northern Trust. Class universes include managers and/or composites. Total Fund universe is the BNY Mellon: Public Funds > $1 billion for 2014-2016 & trailing periods and the Northern Trust: Public Funds > $1 Billion for 2012-2013 fiscal years.

[1] 78.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 5.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 12/31/15;

77.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 6.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 6/30/16;

45.0% Stabilized Growth Blended Benchmark, 45.0% Traditional Growth Blended Benchmark, and 10.0% Private Growth Blended Benchmark thereafter.

[2] BC Aggregate Index through 6/30/08;

85% BC US Universal Index and 15% Multiverse Non-US Hedged Index through 9/30/14;

BC Global Intermediate Aggregate ex. Credit (hedged) Index thereafter.

[3] 30.0% 90-Day T-Bill +5%, 45.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index.

[4] 34.9% S&P 500 Index, 4.5% S&P 400 Mid Cap Index, 4.5% Russell 2000 Index, 14.5% MSCI EAFE Free ND Index, 2.5% MSCI Emg Mkts ND Index, 7.5% NCREIF Property Index lagged, 3.6% Alternative Investments, 21.0% BC Aggregate Index, and 7.0% CG WGBI ex US Index through 12/31/08;

41.0% Russell 3000 Index, 14.5% MSCI EAFE Free ND Index, 2.5% MSCI Emg Mkts ND Index, 9.0% NCREIF Property Index lagged, 5.0% Alternative Investments, 21.0% BC Universal Index, and 7.0% BC Multiverse ex US Hedged Index through 6/30/11;

41.0% Russell 3000 Index, 14.5% MSCI World ex US ND Index, 2.5% MSCI Emg Mkts ND Index, 9.0% NCREIF Property Index lagged, 5.0% Alternative Investments, 21.0% BC Universal Index, and 7.0% BC Multiverse ex US Hedged Index through 9/30/11;

35.0% Russell 3000 Index, 18.0% MSCI World ex US ND Index, 3.0% MSCI Emg Mkts ND Index, 7.0% NCREIF Property Index lagged, 5.0% Private Equity, 5.0% Real Return, 18.0% BC Universal Index, 6.0% BC Multiverse ex US Hedged Index, and 3.0% CBOE BXM Index through 6/30/12;

30.0% Russell 3000 Index, 26.0% MSCI ACWI ex US ND Index, 7.0% NCREIF Property Index lagged, 6.0% Private Equity, 5.0% Real Return, 15.75% BC Universal Index, 5.25% BC Multiverse ex US Hedged Index, and 5.0% CBOE BXM Index through 6/30/13;

30.0% Russell 3000 Index, 26.0% MSCI ACWI ex US ND Index, 7.0% NCREIF Property Index lagged, 7.0% Private Equity, 5.0% Real Return, 15.0% BC Universal Index, 5.0% BC Multiverse ex US Hedged Index, and 5.0% CBOE BXM Index through 9/30/14;

76% Broad Growth Blended Benchmark, 12% BC Global Intermediate Aggregate ex. Credit (hedged) Index, 5% CPI + 3%, and 7% NCREIF Property Index (quarter lagged) through 6/30/16;

83.0% Broad Growth Blended Benchmark, 12.0% BC Global Intermediate Aggregate ex. Credit (hedged) Index, and 5.0% CPI + 3%, through 3/31/17;

76.0% Broad Growth Blended Benchmark, 9.0% BC Global Intermediate Aggregate ex. Credit (hedged) Index, 5.0% CPI + 3%, and 10% Crisis Risk Offset Blended Benchmark thereafter

Report on Investment Activity by Investment Consultant (continued)

PCA PENSION CONSULTING ALLIANCE

Investment Results as of June 30, 2017 (Risk-Based Classes – Sub-Components):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2017	2016	2015	2014	2013	6/2017	6/2017
Broad Growth*	**17.42%**	**(2.62%)**	---	---	---	---	---
Broad Growth Blended Index[1]	14.39%	(2.17%)	---	---	---	---	---
Traditional Growth	**21.98%**	**(4.82%)**	**2.67%**	**24.07%**	**17.51%**	**6.03%**	**11.69%**
Traditional Growth Blended Index[2]	19.01%	(3.87%)	1.20%	23.64%	17.86%	5.01%	11.03%
Active Public Equity******	23.68%	---	---	---	---	---	---
Active Public Equity Index[3]	19.31%	---	---	---	---	---	---
Median Fund***	19.77%	---	---	---	---	---	---
Passive Public Equity******	19.87%	---	---	---	---	---	---
MSCI ACWI ND	18.78%	---	---	---	---	---	---
Median Fund***	19.77%	---	---	---	---	---	---
Stabilized Growth*	10.85%	4.24%	---	---	---	---	---
Stabilized Growth Blended Index[4]	9.21%	4.56%	---	---	---	---	---
Core Real Estate**	8.68%	14.86%	18.78%	5.26%	---	14.03%	---
NCREIF Total Property Index**	7.27%	11.84%	12.72%	11.18%	---	10.58%	---
Median Fund***	8.61%	11.88%	13.72%	14.20%	---	11.38%	---
Extended Global Credit*	8.06%	4.74%	---	---	---	---	---
Ext Global Credit Blended Index[5]	7.12%	4.83%	---	---	---	---	---
Low Volatility Equity******	---	---	---	---	---	---	---
MSCI ACWI Min Volatility Index	---	---	---	---	---	---	---
Options-Based Equity*	12.19%	3.57%	---	---	---	---	---
Options-Based Blended Index[6]	11.51%	4.76%	---	---	---	---	---
Private Growth	18.60%	5.17%	12.83%	20.39%	8.91%	12.07%	13.04%
Private Growth Blended Index[7]	17.37%	(2.36%)	7.64%	26.11%	25.71%	7.25%	14.36%
Non-Core Real Estate**	12.09%	14.98%	18.91%	18.31%	---	15.29%	---
NCREIF Total Property Index**	7.27%	11.84%	12.72%	11.18%	---	10.58%	---
Median Fund***	8.61%	11.88%	13.72%	14.20%	---	11.38%	---
Private Equity**	20.29%	5.26%	12.70%	20.39%	8.91%	12.58%	13.35%
MSCI ACWI IMI +2%**[7]	17.37%	(2.36%)	7.64%	26.11%	25.71%	7.25%	14.36%

*Per BNY Mellon data, the composite was incepted 10/1/2014. The Broad Growth and Stabilized Growth composites contain lagged and non-lagged components.

**Lagged one quarter.

*** Universe data provided by BNY Mellon.

****Per BNY Mellon data, the Active and Passive Public Equity composites were incepted 7/1/2016 and the Low Volatility Equity composite was incepted 9/1/2016.

[1] 78.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 5.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 12/31/15;
77.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 6.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 6/30/16;
45.0% Stabilized Growth Blended Benchmark, 45.0% Traditional Growth Blended Benchmark, and 10.0% Private Growth Blended Benchmark thereafter.

[2] 7.4% Russell 2000 Index, 7.4% S&P Mid Cap 400 Index, 57.3% S&P 500 Index, 23.8% MSCI EAFE Free ND, and 4.1% MSCI EM ND through 12/31/08;
70.7% Russell 3000 Index, 4.3% MSCI EM ND, and 25.0% MSCI ACWI ex US ND through 9/30/11;
62.5% Russell 3000 Index, 5.4% MSCI EM ND, and 32.1% MSCI ACWI ex US ND through 6/30/12;
53.6% Russell 3000 Index and 46.4% MSCI ACWI ex US ND though 9/30/14;
100% MSCI ACWI IMI ND thereafter.

[3] 30.0% MSCI ACWI Small Cap ND and 70.0% MSCI ACWI ND.

[4] 30.0% BBg BC Global Credit (hedged) Index, 10.0% S&P LSTA Leveraged Loan Index, 40.0% CBOE BXM Index, 20.0% BBg BC Global High Yield (hedged) Index through 6/30/16;
15.0% NCREIF Property Index (quarter lagged); 8.5% BBg BC Global Credit (hedged) Index, 2.8% S&P LSTA Leveraged Loan Index, 8.5% ICE ML 3-month Treasury Bill, 8.5% MSCI ACWI ex US ND, 17.0% CBOE BXM Index, 5.7% BBg BC Global High Yield (hedged) Index, 17.0% MSCI ACWI Minimum Volatility ND, and 17.0% CBOE Put-Write Index thereafter.

[5] 50.0% BBg BC Global Credit (hedged) Index, 16.7% S&P LSTA Leveraged Loan Index, and 33.3% BBg BC Global High Yield (hedged) Index.

[6] 16.7% ICE ML 3-month Treasury Bill, 16.7% MSCI ACWI ex US ND, 33.3% CBOE BXM Index, and 33.3% CBOE Put-Write Index.

[7] 100.0% Russell 3000 (quarter lagged) +3.5% through 9/30/14;
100.0% MSCI ACWI IMI (quarter lagged) +2% thereafter.

Report on Investment Activity by Investment Consultant (continued)

PCA PENSION CONSULTING ALLIANCE

Investment Results as of June 30, 2017 (Risk-Based Classes – Sub-Components) [continued]:

	Performance - Year Ended June 30, 2017	2016	2015	2014	2013	3 Years Ended 6/2017	5 Years Ended 6/2017
Principal Protection **(Global Int. Fixed Income)**	**1.94%**	**3.11%**	**2.78%**	**6.28%**	**1.72%**	**2.61%**	**3.15%**
Principal Protection Blended Index[1]	-0.02%	4.24%	1.72%	5.28%	0.72%	1.97%	2.37%
Crisis Risk Offset*	---	---	---	---	---	---	---
Crisis Risk Offset Blended Index[2]	---	---	---	---	---	---	---
Alternative Return Capture*	---	---	---	---	---	---	---
90-Day T-Bill + 5%	---	---	---	---	---	---	---
Systematic Trend Following*	---	---	---	---	---	---	---
MLM Global Index LT 15V	---	---	---	---	---	---	---
Long Duration Fixed Income*	---	---	---	---	---	---	---
BBg BC US Treasury Long Term	---	---	---	---	---	---	---
Real Return	**2.60%**	**5.33%**	**5.37%**	**7.96%**	**0.34%**	**4.42%**	**4.29%**
CPI + 3%	4.70%	4.05%	3.17%	5.08%	4.81%	3.97%	4.36%
Global Inflation-Linked Securities	2.20%	6.42%	3.10%	4.58%	(0.69%)	3.89%	3.09%
BBg BC World Govt Inflation-Linked	1.93%	7.39%	3.34%	4.39%	(1.98%)	4.20%	2.97%
Infrastructure**	12.29%	11.13%	---	---	---	---	---
CPI + 4%	5.71%	5.06%	---	---	---	---	---
Timber**	2.66%	2.92%	11.12%	16.63%	2.98%	5.49%	7.12%
NCREIF Timberland Index**	3.64%	2.90%	10.64%	9.77%	9.01%	5.67%	7.14%
Opportunities**	**6.04%**	---	---	---	---	---	---
Other[3]	**6.29%**	**(1.19%)**	**0.18%**	**2.89%**	**5.51%**	**1.70%**	**2.69%**

*Per BNY Mellon data, the Crisis Risk Offset composite was incepted 4/1/2017.
**Lagged one quarter.

[1] 100% BBg BC Aggregate Index through 6/30/08;
85.0% BBg BC US Universal Index and 15.0% Multiverse Non-US (hedged) Index through 9/30/14;
100% BBg BC Global Intermediate Aggregate ex. Credit (hedged) Index thereafter.
[2] 30.0% 90-Day T-Bill +5%, 45.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index.
[3] Includes Board of Trustees Discretionary Managed Assets and transition activity/accounts that were in-process at the end of the fiscal year.

Investment Managers

Active Public Equity (Broad Growth)
Bank of Hawaii
Barrow, Hanley, Mewhinney & Strauss
CM Bidwell & Associates
Fidelity Institutional
Franklin Templeton
JP Morgan Chase
Quantitative Management Associates (QMA)
Wellington

Passive Public Equity (Broad Growth)
Blackrock
Legal and General Investment Management

Core Real Estate (Broad Growth)
Cabot Industrial
H/2
Heitman Capital Management
Invesco Realty Advisors

Extended Global Credit (Broad Growth)
Bradford and Marzec
Pacific Investment Management Company
Western Asset Management Company

Low Volatility Equity (Broad Growth)
Robeco
TOBAM

Intermediate Fixed Income (Principal Protection)
First Hawaiian Bank
Oechsle International Advisors
Pacific Income Advisers
Pacific Investment Management Company

Inflation-linked Fixed Income (Real Return)
Blackrock

Infrastructure (Real Return)
Kohlberg Kravis Roberts

Timber (Real Return)
Hancock Timber Resource Group

Options-based Equity (Broad Growth)
Gateway
Neuberger Berman
UBS

Non-Core Real Estate (Broad Growth)
Angelo Gordon
Almanac
Blacksand Capital
Blackrock
Blackstone Realty
CB Richard Ellis
Cerebus
DRA
Fortress Japan
H/2
ISquared
LaSalle Investment Management
Lone Star
Mesa Capital
Prudential
Torchlight

Private Equity (Broad Growth)
Hamilton Lane
I Squared
Stafford Partners

Alternative Return Capture Strategies (CRO)
Graham Capital Management
P E Global
Welton Investment Partners

Trend Following Strategies (CRO)
Aspect Capital
Campbell & Company Investment Adviser
Crabel Capital Management

Long Duration Fixed Income (CRO)
Ryan Labs Asset Management

Opportunities (Opportunities)
Lowe Enterprises

Investment Professionals (Continued)

OTHER SERVICE PROVIDERS

COMMISSION RECAPTURE BROKERS

ConvergEx Execution Solutions, LLC
Capital Institutional Services, Inc.

CUSTODIAL BANK

Bank of New York Mellon

INVESTMENT ADVISOR

Pension Consulting Alliance, LLC
Courtland Partners
FRM Investment Management (USA) LLC
Hamilton Lane

Investment Schedules

List of Assets Directly Held (by fair value)*

as of June 30, 2017 (excludes investments in pooled vehicles and index funds)

** A complete list of holdings is available for review upon request.*

	Par / Shares	Security	Coupon	Maturity	Average Issue Rating	Fair Value
Domestic Fixed Income						
1	171,000,000	U.S. Treasury Note	1.000%	3/15/2018	AAA	$ 170,712,720
2	150,500,000	U.S. Treasury Note	1.000%	9/15/2018	AAA	150,477,425
3	147,000,000	U.S. Treasury Note	1.000%	12/15/2017	AAA	146,901,510
4	135,000,000	U.S. Treasury Note	1.125%	6/15/2018	AAA	134,784,000
5	37,000,000	U.S. Treasury Note	1.000%	3/15/2018	AAA	36,937,840
6	34,911,126	U.S. Treasury Note	0.125%	4/15/2022	AAA	34,744,600
7	29,100,000	U.S. Treasury CPI Inflation	1.625%	2/15/2026	AAA	27,656,349
8	26,000,000	U.S. Treasury Note	2.000%	12/31/2021	AAA	26,187,980
9	23,500,000	U.S. Treasury Note	0.875%	1/15/2018	AAA	23,463,340
10	23,300,000	U.S. Treasury Note	1.625%	11/15/2022	AAA	22,912,288
International Fixed Income						
1	72,973,000	Republic of Poland Government Bond	5.500%	10/25/2019	A3	21,237,597
2	83,183,000	Republic of Poland Government Bond	2.500%	7/25/2026	A3	21,193,350
3	17,584,000	Spain Government Bond 144A	1.600%	4/30/2025	BAA1	20,771,410
4	16,303,000	Italy Buoni Poliennali De 144A	3.500%	3/1/1930	BAA2	20,620,450
5	24,970,000	Landwirschaftliche Rentenbank	4.250%	1/24/2023	AAA	20,573,949
6	66,748,000	Republic of Poland Government Bond	5.750%	10/25/2021	A3	20,397,172
7	24,300,000	European Investment Bank	6.500%	8/7/2019	AAA	20,263,079
8	28,000,000	Singapore Government Bond	1.250%	10/1/2021	-	20,151,215
9	152,000,000	Norway Government Bond 144A	3.750%	5/25/2021	AAA	20,085,924
10	26,098,000	Export Development Canada	3.750%	5/8/2020	AAA	19,580,909
Domestic Equities						
1	410,072	Apple Inc				59,058,569
2	52,679	Amazon.Com Inc				50,993,272
3	717,065	Microsoft Corp				49,427,290
4	47,365	Alphabet Inc-Cl C				43,041,996
5	262,152	Facebook Inc				39,579,709
6	296,403	Jpmorgan Chase & Co				39,211,153
7	210,314	Johnson & Johnson				32,262,167
8	814,911	Home Depot Inc/The				31,716,337
9	163,648	Comcast Corp				23,656,954
10	674,226	Nvidia Corp				22,647,251
International Equities						
1	8,183	Samsung Electronics Co Ltd				17,000,380
2	1,800,000	Just Eat PLC				15,314,621
3	240,000	DSV A/S				14,726,637
4	700,000	Azimut Holding SPA				14,011,657
5	450,000	GN Store Nord A/S				13,122,814
6	351,700	Tencent Holdings Ltd				12,578,655
7	175,000	Symrise AG				12,378,959
8	175,000	Umicore SA				12,155,412
9	2,000,000	Amec Foster Wheeler Plc				12,137,389
10	160,000	KBC Group NV				12,119,028

Investment Schedules (continued)

Investments Summary

- excludes cash and cash equivalents and short-term investments

(Dollar values expressed in thousands)

		Fair Value as of June 30, 2017	Percentage
Equity securities			
Common stock	$	5,223,500	38.71%
Pooled funds		1,953,914	14.48%
Preferred shares and others		13,128	0.10%
		7,190,542	53.29%
Fixed income securities			
US treasury / government / agencies		1,903,432	14.11%
US mortgage-backed		360,480	2.67%
US corporate		607,129	4.50%
Non-US government / agencies		735,341	5.45%
Non-US corporate		328,098	2.43%
Pooled and others		(3,925)	-0.03%
		3,930,555	29.13%
Others			
Real estate investments		1,112,392	8.24%
Alternative investments		1,259,026	9.33%
		2,371,418	17.57%
Total, investments at fair value	$	13,492,515	99.99%

Investment Schedules (continued)

Schedule of Investment Fees
by Asset Class Allocation

(Dollar values expressed in thousands)

	Fair value as of June 30, 2017	Total FY 2017 Investment Fees	Basis Points
Broad Growth			
Active Public Equity	$ 2,636,153	$ 12,213	46 bp
Passive Public Equity	2,677,822	572	2
Core Real Estate	581,708	4,855	83
Extended Global Credit	798,553	1,793	22
Low Volatility Equity	950,705	1,593	17
Options-based Equity	2,896,985	4,224	15
Non-Core Real Estate	280,710	0	-
Private Equity	1,027,909	869	8
	11,850,545	26,119	22
Principal Protection			
Intermediate Fixed Income	1,411,265	2,369	17
Crisis Risk Offset			
Alternative Return Capture Strategies	446,222	1,310	29
Trend Following Strategies	652,217	1,319	20
Long Duration Fixed Income	393,575	71	2
	1,492,014	2,700	18
Real Return			
Inflation-linked Fixed Income	474,303	728	15
Infrastructure	18,198	-	-
Timber	210,320	1,762	84
	702,821	2,490	
Opportunities	28,735	123	43
Other	136,055	0	-
Subtotal on investments	15,621,435	33,801	22
Other Investment Services			
Custodian fees	n/a	577	n/a
Investment consultant fees	n/a	1,689	n/a
Total including consultant and custodian	$ 15,621,435	$ 36,067	23

Schedule of Broker Commissions

The Employees' Retirement System participates in a Commission Recapture Program with three brokerage firms for equity trades, which are listed in the Investment Professionals section. Certain domestic and international equity investment managers are required to direct at least 35% of all brokerage transactions to participating brokers, subject to best execution. Commissions charged per share are based on the investment manager's normal rate schedule. All commissions recaptured are used exclusively by the ERS for the benefit of its members and beneficiaries. ERS does not guarantee participating brokers any minimums, required volumes or fees. During the fiscal year ended June 30, 2017 the ERS recaptured $320,528 in commissions.

The following is a list of brokers who received commissions during Fiscal Year 2017.

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
ABG SEC AS (NORGE), FILIAL, STOCKHOLM	3,340	$ 38,256	$ 61	$ 0.018
ACADEMY SECURITIES, INC, NEW YORK	7,800	514,306	78	0.010
APEX CLEARING CORPORATION, DALLAS	56,700	3,206,259	1,985	0.035
ARCTIC SECURITIES ASA, OSLO	17,250	133,085	80	0.005
AUTONOMOUS, NEW YORK	104,900	6,273,119	3,672	0.035
BAIRD, ROBERT W & CO INC, MILWAUKEE	585,089	14,309,804	19,888	0.034
BANCO SANTANDER, NEW YORK	70,727	628,959	380	0.005
BANK J VONTOBEL & CO LTD, ZURICH	159	57,444	57	0.358
BANK OF NEW YORK, BRUSSELS	500	15,265	-	-
BANK OF NEW YORK, NEW YORK	9,400	672,224	-	-
BANQUE PARIBAS, PARIS	1,324,463	13,461,229	4,350	0.003
BARCLAYS CAPITAL INC./LE, NEW JERSEY	1,746,467	100,670,249	28,182	0.016
BARCLAYS CAPITAL LE, JERSEY CITY	368,056	12,863,703	6,137	0.017
BARCLAYS CAPITAL, LONDON	1,931,483	14,801,004	8,387	0.004
BB&T SECURITIES, LLC, RICHMOND	3,771	85,600	151	0.040
BBVA CORREDORES DE BOLSA SA, SANTIAGO	465,415	1,121,784	673	0.001
BERENBERG CAPITAL MARKETS, BOSTON	30,800	1,909,658	1,078	0.035
BERENBERG GOSSLER & CIE, HAMBURG	307,244	1,141,973	1,443	0.005
BERNSTEIN SANFORD C & CO, NEW YORK	2,060,375	83,797,208	22,380	0.011
BLOOMBERG TRADEBOOK LLC, NEW YORK	46,975	1,072,572	415	0.009
BLOOMBERG TRADEBOOK LLC, NY	22,538	1,099,974	354	0.016
BLOOMBERG TRADEBOOK, LONDON	322,851	5,157,225	1,247	0.004
BLOOMBERG TRADEBOOK,NEW YORK	616,291	22,428,802	7,113	0.012
BMO CAPITAL MARKETS CORP, NEW YORK	618,876	37,716,423	8,637	0.014
BNP PARIBAS PEREGRINE SEC LTD, HONG KONG	118,583	2,323,533	2,855	0.024
BNP PARIBAS SEC SVCS, LONDON	20,678	625,852	285	0.014
BNP PARIBAS SECS SERVS, SYDNEY	118,759	271,412	206	0.002
BNP PARIBAS SECURITIES SVCS, HONG KONG	23,500	108,533	78	0.003
BNY CONVERGEX EXECUTION SOL, NEW YORK	404,307	9,162,337	6,357	0.016
BNY CONVERGEX, NEW YORK	17,169	973,750	647	0.038
BRADESCO S.A. CTVM, SAO PAULO	585,432	3,689,876	2,216	0.004
BROADCORT CAPITAL CORP FI, NEW YORK	144,232	8,492,668	4,817	0.033
BROCKHOUSE AND COOPER, MONTREAL	3,711	65,845	14	0.004
BROWN BROS HARRIMAN & CO, NEW YORK	198,100	4,496,674	-	-
Amounts carried forward	12,355,941	353,386,605	134,223	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	12,355,941	$ 353,386,605	$ 134,223	
BTIG LLC, SAN FRANCISCO	141,813	2,856,002	4,067	$ 0.029
CALYON SECURITIES, NEW YORK	123,000	947,564	1,711	0.014
CANACCORD GENUITY CORP, MONTREAL (CCAM)	27,466	1,078,525	147	0.005
CANACCORD GENUITY INC.NEY YORK	42,680	1,262,936	1,596	0.037
CANACCORD GENUITY LTD, LONDON	91,817	1,621,005	645	0.007
CANTOR CLEARING SERV, NEW YORK	33,017	2,653,656	495	0.015
CANTOR FITZGERALD & CO INC, NEW YORK	203,992	5,581,921	5,480	0.027
CAP INSTL SVCS INC-EQUITIES, DALLAS	2,890,120	125,575,828	50,577	0.017
CHASE BK, LONDON	400	12,212	-	-
CIBC MELLON GSS, TORONTO (COMO)	3,445	218,056	13	0.004
CIBC WORLD MKTS INC, TORONTO	53,391	2,688,151	376	0.007
CIBC WORLD MKTS INC, TORONTO (WGDB)	162,377	6,695,813	819	0.005
CIMB GK SECURITIES PTE LTD, SINGAPORE	2,583,636	4,539,143	2,021	0.001
CITIGROUP GBL MKTS INC, NEW YORK	3,526,980	203,159,429	50,339	0.014
CITIGROUP GBL MKTS INC, TAIPEI	154,000	983,648	410	0.003
CITIGROUP GBL MKTS/SALOMON, NEW YORK	67,474,151	141,725,859	60,444	0.001
CITIGROUP GLOBAL MARKETS LTD, LONDON	17,027,818	77,353,364	68,029	0.004
CLSA AUSTRALIA PTY LTD, SYDNEY	846,957	4,470,921	1,376	0.002
CONVERGE LLC, NEW YORK	5,845,694	263,737,304	178,168	0.030
CORMARK SECURITIES INC./CDS, TORONTO	148,235	5,713,736	1,943	0.013
CORNERSTONE MACRO LLC, NEW YORK	20,800	742,027	728	0.035
COWEN AND COMPANY LLC, NEW YORK	824,441	31,662,596	15,485	0.019
CRAIG HALLUM, MINNEAPOLIS	1,377	21,256	52	0.038
CREDIT LYONNAIS SEC, SEOUL	101,489	2,948,049	4,544	0.045
CREDIT LYONNAIS SECS (ASIA), HONG KONG	45,278,730	42,485,602	20,546	0.000
CREDIT LYONNAIS SECS ASIA LTD, TAIPEI	1,363,000	1,498,159	2,054	0.002
CREDIT LYONNAIS SECS, SINGAPORE	28,805,300	37,537,215	11,024	0.000
CREDIT SUISSE (EUROPE), LONDON	94,319,017	186,154,017	86,465	0.001
CREDIT SUISSE (EUROPE), SEOUL	16,226	931,175	895	0.055
CREDIT SUISSE (HK) LIMITED, HONG KONG	8,555,492	9,417,922	6,332	0.001
CREDIT SUISSE AUSTRALIA EQ, MELBOURNE	2,254,662	14,520,737	4,773	0.002
CREDIT SUISSE, NEW YORK (CSUS)	9,062,651	250,342,385	90,339	0.010
CREDIT SUISSE, SAO PAULO	57,000	221,447	111	0.002
CREDIT SUISSE, TAIPEI	22,000	25,654	13	0.001
D CARNEGIE AB, STOCKHOLM	257,649	2,240,690	3,551	0.014
DAIWA SEC SMBC EUROPE LTD, LONDON	148,800	3,576,387	2,664	0.018
DAIWA SECS (HK) LTD, HONG KONG	103,900	209,613	188	0.002
DAIWA SECS AMER INC, NEW YORK	7,300	556,409	256	0.035
DAVY STOCKBROKERS, DUBLIN	8,669,805	2,509,912	3,011	0.000
DEN DANSKE BANK, COPENHAGEN	105,470	905,707	884	0.008
DEN NORSKE CREDITBANK, OSLO	2,217	21,031	26	0.012
DEUTSCHE BK INTL EQ, LONDN	28,268,698	105,973,214	49,084	0.002
Amounts carried forward	341,982,954	1,900,762,882	865,904	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	341,982,954	$ 1,900,762,882	$ 865,904	
DEUTSCHE BK SECS INC, NY	90,155,136	652,398,473	167,713	$ 0.002
DEUTSCHE MORGAN GRENFELL SEC, SYDNEY	99,891	274,125	439	0.004
DEUTSCHE SEC ASIA LTD, HONG KONG	10,692,718	35,562,598	24,645	0.002
DEUTSCHE SEC ASIA LTD, SEOUL	1,816	826,794	1,495	0.823
DEUTSCHE SEC ASIA LTD, TAIPEI	347,000	2,686,397	4,409	0.013
DEXIA BK (FORMERLY KEMPEN), AMSTERDAM	479	16,913	13	0.027
DREXEL HAMILTON LLC, JERSEY CITY	5,100	458,252	51	0.010
DWAC, BOSTON	212,255	8,954	-	-
EXANE, PARIS	387,307	9,637,379	5,207	0.013
FBR CAPITAL MARKETS & CO, ARLINGTON	4,301	64,681	144	0.033
FIDELITY CAP MKTS (DIV OF NFSC), BOSTON	101,504	4,563,924	1,962	0.019
FIDELITY CLEARING CANADA ULC, TOR (FIDC)	53,710	1,900,910	405	0.008
FOX RIVER EXECUTION TECH,LLC,JERSEY CITY	280,267	9,618,242	2,803	0.010
FRANK RUSSELL SEC INC, NEW YORK	8,745	203,241	175	0.020
FUJI SECURITIES INC, JERSEY CITY	68,167	2,363,505	2,527	0.037
GMP SECURITIES L.P. TORONTO (GMPT)	59,009	2,498,017	438	0.007
GMP SECURITIES, LLC, NEW YORK	1,743	71,658	70	0.040
GOLDMAN SACHS & CO, NY	30,956,118	559,427,696	164,227	0.005
GOLDMAN SACHS EXECUTION & CLEARING, NY	217,180	14,274,760	3,356	0.015
GOLDMAN SACHS INTL, LONDON	69,992,748	560,693,425	209,035	0.003
GOODBODY STOCKBROKERS, LONDON	200,750	1,729,771	1,027	0.005
GORDON HASKETT CAP CORP, NJ	9,844	254,945	394	0.040
GREEN STREET TRADING LLC, NEW YORK	2,700	73,162	108	0.040
GUGGENHEIM CAPITAL MKT LLC, JERSEY CITY	19,074	603,100	595	0.031
HANWHA SECS CO LTD, SEOUL	5,918	297,351	89	0.015
HILLTOP SECURITIES INC, DALLAS	225	3,456	2	0.009
HONG KONG & SHANGHAI BKG CORP, HONG KONG	440,400	569,688	350	0.001
HONG KONG SECS CLRG CO LTD, HONG KONG	698,000	309,928	62	0.000
HSBC BANK PLC (MIDLAND BK)(JAC), LONDON	3,964,513	39,108,811	16,649	0.004
HSBC BANK PLC (MIDLAND BK)(XXX), LONDON	200,636	2,215,918	4,465	0.022
HSBC JAMES CAPEL, SEOUL	40,863	2,895,226	1,857	0.045
HSBC MEXICO, S.A. INST DE BANCA,MEXICO	704,145	3,316,327	1,990	0.003
HSBC SECS INC, NEW YORK	16,032,225	16,170,705	9,678	0.001
HSBC SECS, TAIPEI	2,886,000	4,781,255	2,873	0.001
HSBC SECURITIES (USA) INC, NEW YORK	120,000	4,911,841	2,948	0.025
ICAP DO BRASIL DTVM LTDA, RIO DE JANEIRO	51,000	215,490	142	0.003
ICBC FINCL SVCS, NEW YORK	103,443	6,216,547	810	0.008
INSTINET AUSTRALIA CLEARING SERV, SYDNEY	2,761,388	9,055,768	2,316	0.001
INSTINET CORP, LONDON	1,165,080	502,399	302	0.000
INSTINET CORP, NEW YORK	13,805,959	54,654,828	21,183	0.002
INSTINET CORP, NY	318,148	19,621,001	4,169	0.013
INSTINET EUROPE LIMITED, LONDON	36,101,542	205,281,075	76,180	0.002
Amounts carried forward	625,260,001	4,131,101,418	1,603,207	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	625,260,001	$ 4,131,101,418	$ 1,603,207	
INSTINET PACIFIC LTD, HONG KONG	70,244,708	78,901,232	33,483	$ 0.000
INSTINET, SINGAPORE	604,470	2,389,260	692	0.001
INVESTEC SECURITIES , LONDON	936,548	291,793	326	0.000
INVESTMENT TECHNOLOGY GROUP LTD,DUBLIN	26,312,148	184,346,116	72,179	0.003
INVESTMENT TECHNOLOGY GROUP, LONDON	22,450	206,558	155	0.007
INVESTMENT TECHNOLOGY GROUP, NEW YORK	4,228,600	221,786,538	38,313	0.009
ISI GROUP INC, NY	68,561	1,892,604	2,147	0.031
ITG AUSTRALIA LTD, MELBOURNE	2,100	201,470	221	0.105
ITG CANADA CORP, TORONTO	2,316,013	77,191,953	26,464	0.011
ITG HONG KONG LIMITED, HONG KONG	28,736	739,511	281	0.010
ITG INC, NEW YORK	948,356	54,490,058	9,673	0.010
ITG INC, NY	81,912	263,968	158	0.002
IXIS SECURITIES, PARIS	4,525	106,370	42	0.009
J P MORGAN SEC LTD/STOCK LENDING, LONDON	685,691	17,423,704	4,411	0.006
J P MORGAN SEC, SYDNEY	1,720,868	10,204,871	3,574	0.002
J P MORGAN SECS LTD, LONDON	23,978,340	221,855,017	110,034	0.005
J P MORGAN SECURITIES INC, BROOKLYN	307,599	14,663,019	6,369	0.021
J.P. MORGAN CLEARING CORP, NEW YORK	3,387,368	137,097,336	43,981	0.013
J.P. MORGAN SECURITIES, HONG KONG	26,212,595	36,055,644	16,938	0.001
JANNEY MONTGOMERY SCOTT, PHILADELPHIA	3,782	54,870	151	0.040
JEFFERIES & CO INC, NEW YORK	2,751,804	147,219,850	45,555	0.017
JEFFERIES & CO LTD, LONDON	952,342	18,317,908	27,139	0.028
JEFFERIES INTERNATIONAL LTD, LONDON	235,100	2,399,036	3,558	0.015
JMP SECURITIES, SAN FRANCISCO	3,159	63,292	117	0.037
JONES & ASSOC, WESTLAKE VILLAGE	35,687	1,943,298	286	0.008
JONESTRADING INSTL SVCS LLC, WESTLAKE	21,579	672,554	606	0.028
JP MORGAN SECS (FAR EAST) LTD, SEOUL	117,861	5,467,030	3,105	0.026
JP MORGAN SECS (TAIWAN) LTD, TAIWAN	5,577,000	9,514,828	6,880	0.001
JP MORGAN SECS, SINGAPORE	4,704,600	12,387,480	7,441	0.002
JPMORGAN CHASE BK, DALLAS	6,595	471,577	-	-
JPMORGAN SECURITIES INC, NEW YORK	12,173,222	36,100,378	20,835	0.002
KEB SALOMON SMITH BARNEY SECS, SEOUL	152,045	6,094,372	5,325	0.035
KEEFE BRUYETTE AND WOODS, JERSEY CITY	112,177	2,272,017	3,927	0.035
KEPLER CAPITAL MARKETS, INC, NEW YORK	31,900	1,929,632	1,117	0.035
KEPLER EQUITIES, PARIS	110,000	7,647,646	11,454	0.104
KEYBANC CAPITAL MARKETS INC, JERSEY CITY	50,627	524,910	1,873	0.037
KEYBANC CAPITAL MARKETS INC, NEW YORK	25,352	1,136,142	992	0.039
KING (CL) & ASSOCIATES, ALBANY	26,023	49,758	178	0.007
KNIGHT CAPITAL EUROPE LTD, LONDON	298,229	5,175,555	1,683	0.006
KNIGHT EQUITY MARKETS L.P.,JERSEY CITY	754,456	28,348,298	26,076	0.035
KNIGHT SECS, NEW JERSEY	36,819	862,202	325	0.009
LARRAIN VIAL, SANTIAGO	619,217	233,809	140	0.000
Amounts carried forward	816,151,165	5,480,094,882	2,141,411	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	816,151,165	$ 5,480,094,882	$ 2,141,411	
LEERINK SWANN & CO, JERSEY CITY	28,041	1,274,373	717	$ 0.026
LIQUIDNET ASIA LTD, HONG KONG	341,000	1,989,159	1,393	0.004
LIQUIDNET CANADA INC, TORONTO	700	11,803	13	0.019
LIQUIDNET EUROPE LIMITED, LONDON	979,901	3,423,144	2,995	0.003
LIQUIDNET INC, NEW YORK	883,508	28,383,285	13,661	0.015
LONGBOW SECURITIES LLC, JERSEY CITY	3,567	167,315	143	0.040
LOOP CAPITAL MARKETS LLC, JERSEY CITY	800	92,667	8	0.010
LOOP CAPITAL MARKETS, JERSEY CITY	26,852	2,432,737	403	0.015
LUMINEX TRADING AND ANALYTICS, BOSTON	108,842	5,507,234	272	0.002
MACQUARIE BANK LIMITED, HONG KONG	1,414,800	890,760	536	0.000
MACQUARIE BANK LIMITED, SYDNEY	984,182	5,207,525	3,209	0.003
MACQUARIE BANK LTD, HONG KONG	87,246,698	68,280,416	33,997	0.000
MACQUARIE CAPITAL (USA) INC., NEW YORK	21,489	863,078	795	0.037
MACQUARIE CAPITAL LTD, LONDON	624,728	5,662,612	680	0.001
MACQUARIE SECS (SINGAPORE), SINGAPORE	508,870	1,751,140	3,377	0.007
MACQUARIE SECURITIES LTD, AUCKLAND	478,263	1,233,098	431	0.001
MACQUARIE SECURITIES LTD, SEOUL	113,583	7,149,235	4,472	0.039
MACQUARIE SECURITIES LTD, TAIPEI	3,546,000	7,331,781	4,415	0.001
MACQUARIE SECURITIES(USA)INC JERSEY CITY	207,916	15,254,395	5,604	0.027
MAXIM GROUP, JERSEY CITY	3,000	316,595	75	0.025
MERRILL LYNCH BROADCORT CAP, NEW YORK	15,759	328,107	158	0.010
MERRILL LYNCH GILTS LTD, LONDON	173,682	3,683,247	3,794	0.022
MERRILL LYNCH INTL LONDON EQUITIES	81,559,082	311,682,597	145,201	0.002
MERRILL LYNCH PIERCE FENNER SMITH INC NY	37,146,032	1,895,698,854	530,658	0.014
MERRILL LYNCH PIERCE FENNER, CHARLOTTE	38,626	469,494	-	-
MERRILL LYNCH PIERCE FENNER, WILMINGTON	1,831,105	21,012,188	9,452	0.005
MERRILL LYNCH PROFESSIONAL CLRG, PURCHAS	43,642	2,542,147	1,309	0.030
MIRAE ASSET SECURITIES, SEOUL	277	124,658	113	0.408
MITSUBISHI UFJ SECURITIES, NEW YORK	76,600	1,962,045	1,856	0.024
MIZUHO INTERNATIONAL PLC, LONDON	1,360,000	1,120,484	728	0.001
MIZUHO SECURITIES ASIA, HONG KONG	29,800	945,589	1,133	0.038
MIZUHO SECURITIES USA INC, NEW YORK	67,289	3,811,486	2,475	0.037
MIZUHO SECURITIES USA INC. NEW YORK	45,860	1,406,935	1,408	0.031
MKM PARTNERS LLC, GREENWICH	65,664	1,828,510	2,325	0.035
MORGAN STANLEY & CO INC, NY	41,917,157	446,954,970	193,212	0.005
MORGAN STANLEY & CO INTL LTD, SEOUL	1,365,153	55,118,239	24,752	0.018
MORGAN STANLEY & CO INTL LTD, TAPEI	1,411,000	6,107,790	5,577	0.004
MORGAN STANLEY & CO, LONDON	332,421,765	260,884,164	83,266	0.000
MORGAN STANLEY-INTERNATIONAL, BROOKLYN	1,113,213	52,320,506	10,895	0.010
NATIONAL FINL SVCS CORP, NEW YORK	2,224,532	98,253,005	40,233	0.018
NATIXIS SECURITIES AMERICAS LLC,NEW YORK	9	173	-	-
NBCN INC, TORONTO (NBCS)	3,419,649	33,931,285	20,779	0.006
Amounts carried forward	1,419,999,801	8,837,503,707	3,297,931	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	1,419,999,801	$ 8,837,503,707	$ 3,297,931	
NEEDHAM & CO, NEW YORK	1,967	7,680	59	$ 0.030
NEEDHAM AND COMPANY LLC, JERSEY CITY	7,445	261,207	275	0.037
NESBITT BURNS, TORONTO (NTDT)	345,621	11,395,083	6,109	0.018
NESSUAH, ISRAEL	2,000	86,774	104	0.052
NOMURA SECS INTL INC, NEW YORK	90,600	3,510,130	4,108	0.045
NORDEA BK PLC, HELSINKI	280	11,641	23	0.082
NORTHERN TR CO-TRUST, CHICAGO	9,805	398,594	-	-
NUMIS SECURITIES LTD, LONDON	25,671	99,487	120	0.005
ODDO ET CIE, PARIS	29,465	715,426	997	0.034
OPPENHEIMER & CO INC, NEW YORK	53,634	2,278,557	2,151	0.040
OTR GLOBAL TRADING LLC, NEW YORK	36,823	738,346	1,417	0.038
PAREL, PARIS	157,182	1,288,387	1,854	0.012
PENSERRA SECURITIES, NEW YORK	35,611	378,908	496	0.014
PERSHING LLC, JERSEY CITY	45,090,722	1,571,137,679	456,378	0.010
PERSHING SECURITIES LTD, LONDON	5,806	94,529	80	0.014
PICKERING ENERGY PARTNERS, HOUSTON	6,900	294,604	242	0.035
PIPER JAFFRAY & CO, MINNEAPOLIS	311,418	9,770,177	9,784	0.031
RAYMOND JAMES & ASSOC INC, ST PETERSBURG	499,289	14,375,124	16,346	0.033
RAYMOND JAMES LTD, TORONTO (MSLT)	27,155	1,105,341	674	0.025
RBC CAPITAL MARKETS LLC, NEW YORK	2,018,475	128,999,365	22,792	0.011
RBC DOMINION SECS INC, TORONTO (DOMA)	335,622	10,112,144	4,181	0.012
REDBURN PARTNERS LLP, LONDON	62,923	1,077,682	376	0.006
REDBURN, NEW YORK, NY	16,300	1,395,502	571	0.035
ROSENBLATT SECURITIES LLC, JERSEY CITY	8,300	600,018	125	0.015
ROYAL BANK OF CANADA EUROPE LTD, LONDON	393,962	3,538,399	3,701	0.009
S G WARBURG, SEOUL	151,173	7,979,609	4,910	0.032
SAMUEL A RAMIREZ & COMPANY, BROOKLYN	301	4,298	6	0.020
SANFORD C BERNSTEIN & CO INC, LONDON	252,477	5,026,734	4,995	0.020
SCOTIA CAPITAL (USA) INC, NEW YORK	189,569	15,125,273	2,497	0.013
SCOTIA CAPITAL MKTS, TORONTO	20,752	552,585	206	0.010
SCOTIA MCLEOD INC, TORONTO (SCOT)	63,775	1,987,283	429	0.007
SG AMERICAS SECURITIES LLC, NEW YORK	3,348,844	28,058,647	16,832	0.005
SG SEC (LONDON) LTD, LONDON	7,441,228	42,345,313	24,560	0.003
SG SECURITIES, HONG KONG	51,034,125	48,288,266	28,247	0.001
SIDOTI & CO LLC, NEW YORK	25,457	829,318	943	0.037
SINOPAC SECURITIES CORP,TAIPEI	1,802,000	5,952,719	1,260	0.001
SJ LEVINSON & SONS LLC, JERSEY CITY	107,740	9,384,014	1,616	0.015
SMBC NIKKO SECURITIES LTD, WAN CHAI	621,300	5,388,338	1,208	0.002
SMBC SECURITIES, INC NEW YORK	96,900	1,681,194	2,019	0.021
SOCIETE GENERALE CUSTODY, PARIS	21,318	907,193	635	0.030
SOCIETE GENERALE LONDON BRANCH, LONDON	1,679,206	23,714,248	13,336	0.008
STATE ST BK & TR CO/SAFEKEEPING, N QUINC	1,500	115,306	-	-
Amounts carried forward	1,536,430,442	10,798,514,829	3,934,593	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	1,536,430,442	$ 10,798,514,829	$ 3,934,593	
STATE STREET BK & TR CO (SEC), LONDON	2,097	23,713	24	$ 0.011
STATE STREET BROKERAGE SVCS, BOSTON	468,463	10,884,486	4,639	0.010
STATE STREET GLOBAL MARKETS LLC, BOSTON	178,036	6,110,391	1,771	0.010
STATE STREET GLOBAL MKT LLC, BOSTON	16,880	1,057,604	169	0.010
STEPHENS INC, LITTLE ROCK	111,055	3,766,714	2,857	0.026
STIFEL NICOLAUS	3,133,784	137,620,592	93,354	0.030
STRATEGAS SECURITIES LLC, NEW YORK	14,300	817,999	501	0.035
STUART FRANKEL & CO. INC, JERSEY CITY	32,000	2,182,738	480	0.015
SUNTRUST CAPITAL MARKETS INC, ATLANTA	56,417	1,666,455	2,088	0.037
SWEDBANK, STOCKHOLM	15,553	178,248	286	0.018
TD WATERHOUSE SEC, TORONTO (GIST)	158,000	4,667,168	1,181	0.007
TELSEY ADVISORY GROUP LLC, DALLAS	23,400	1,327,255	819	0.035
THEMIS TRADING LLC, JERSEY CITY	10,220,215	330,668,476	178,854	0.018
THINKEQUITY PARTNERS LLC, MINNEAPOLIS	2,581	82,904	103	0.040
TORONTO DOMINION SEC, TORONTO	228,241	11,642,888	1,714	0.008
UBS AG LONDON INTL GILTS, LONDON	34,718	1,040,583	624	0.018
UBS EQUITIES, LONDON	38,848,958	83,780,649	31,755	0.001
UBS LTD A/C EQUIT.PROP, LONDON	52,073	557,644	251	0.005
UBS LTD, LONDON	887	114,259	51	0.057
UBS SECS SINGAPORE PTE LTD	271,700	489,329	294	0.001
UBS SECURITIES CANADA, TORONTO (BWIT)	720,996	37,076,442	14,365	0.020
UBS SECURITIES INDONESIA, PT,JAKARTA	1,369,690	1,342,123	3,204	0.002
UBS SECURITIES LLC, STAMFORD	14,957,229	410,341,172	121,471	0.008
UBS WARBURG ASIA LTD, HONG KONG	12,400,480	11,242,025	7,451	0.001
UBS WARBURG AUSTRALIA EQUITIES, SYDNEY	1,713,178	15,877,064	5,641	0.003
UBS WARBURG LLC, STAMFORD	284,800	1,433,330	859	0.003
UBS WARBURG SEC,TAIWAN	9,278,120	10,327,270	6,283	0.001
UBS WARBURG, LONDON	9,701,289	94,535,098	62,857	0.006
VALEURS MOBILIERES, MONTREAL (VMDM)	204,929	3,596,369	2,012	0.010
VIRTU AMERICAS LLC, JERSEY CITY	1,666,560	93,193,038	28,791	0.017
WEDBUSH MORGAN SECS INC, LOS ANGELES	16,293	188,147	501	0.031
WEEDEN & CO, NEW YORK	1,434,884	20,551,469	20,544	0.014
WELLS FARGO SECURITIES LLC, CHARLOTTE	806,736	39,532,271	12,684	0.016
WILLIAM BLAIR & CO, CHICAGO	185,868	4,714,057	7,068	0.038
WILLIAMS CAPITAL GROUP LP, JERSEY CITY	12,955	596,143	194	0.015
WOLFE TRAHAN SECURITIES, NEW YORK	37,486	992,345	1,240	0.033
WOORI INVESTMENT & SECURITIES, SEOUL	361,980	8,140,419	2,035	0.006
WUNDERLICH SECURITIES, INC, MEMPHIS	4,142	129,083	166	0.040
XP INVESTIMENTOS CCTVM SA,RIO DE JANEIRO	857,620	4,337,562	1,143	0.001
Total trades	1,646,315,035	12,155,340,351	4,554,917	0.003
			$ (320,528)	
	1,646,315,035	$ 12,155,340,351	$ 4,234,389	$ 0.003

Employees' Retirement System

of the State of Hawaii

ACTUARIAL SECTION

GRS Retirement Consulting
P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

March 16, 2018

Board of Trustees
Employees' Retirement System of
the State of Hawaii
City Financial Tower
201 Merchant St., Ste. 1400
Honolulu, HI 96813-2980

Dear Trustees:

This report provides information required by the Employees' Retirement System of the State of Hawaii ("ERS") in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans."

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB Statement Nos. 67. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB No. 67 may produce significantly different results. This report may be provided to parties other than the ERS only in its entirety and only with the permission of ERS.

This report is based upon information, furnished to us by ERS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This information was checked for internal consistency, but it was not otherwise audited.

GRS provided the following information for the ERS to fulfill the GASB 67 reporting requirements that are included in the notes to the financial statements and the Required Supplementary Information located in the Financial Section of this CAFR.

- Single Discount Rate
- Required Discount Rate Sensitivity Information for the ERS providing the ratio of the Fiduciary Net Position to Total Pension Liability and the Net Pension Liability at a discount rate that is one percentage point lower and one percentage point higher that the discount rate at Meaturement Date
- Service Cost; Interest; Changes of Benefit Terms; Differences between Expected and Actual Experience; Changes in Assumptions.
- Required Supplementary Information – Schedule of Changes in Net Pension Liability.
- Required Supplementary Information – Schedule of Net Pension Liability.
- Required Supplementary Information – Schedule of Employer Contributions
- Actuarial components of Governmental Accounting and Standards Board (GASB) 67 requirements.

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GASB STATEMENT NO. 67 REPORT (continued)

Certain tables included in the Required Supplementary Information should include a 10-year history of information. As provided for in GASB No. 67, this historical information is only presented for the years in which the information was measured in conformity with the requirements of GASB No. 67. The historical information in this report will begin with the information presented for the fiscal year ending June 30, 2014.

This report complements the actuarial valuation report, issued on January 8, 2018, that was provided to ERS and should be considered in conjunction with that report. Please see the significant actuarial valuation report information as of June 30, 2017 (located later in this section of the ERS' CAFR) for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions. (The entire actuarial valuation report, as of June 30, 2017, is available on the ERS' website at ers.ehawaii.gov.)

To the best of our knowledge, this report is complete, accurate, and in accordance with generally recognized actuarial methods. One or more of the undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the Academy of Actuaries to render the actuarial opinion herein.

The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

By *Lewis Ward*	By *J. Newton*
Lewis Ward	Joseph P. Newton
Consultant	FSA, EA, MAAA

GABRIEL, ROEDER, SMITH & COMPANY

GASB STATEMENT NO. 67 REPORT (continued)

EXECUTIVE SUMMARY ***
as of June 30, 2017

	2017	2016
Actuarial Valuation Date	June 30, 2017	June 30, 2016
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	June 30, 2017	June 30, 2016
Membership		
Number of		
- Retirees and beneficiaries	46,927	45,506
- Inactive, nonretired members **	25,723	22,295
- Active members	65,911	67,377
- Total	138,561	135,178
Reported Payroll for Fiscal Year	$4,243,521,876	$4,112,227,306
Net Pension Liability		
Total Pension Liability	$28,648,630,533	$27,439,233,629
Plan Fiduciary Net Position	15,698,324,306	14,069,978,917
Net Pension Liability	$12,950,306,227	$13,369,254,712
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	54.80%	51.28%
Net Pension Liability as a Percentage of Covered Payroll	305.18%	325.11%
Development of the Single Discount Rate		
Single Discount Rate	7.00%	7.00%
Long-Term Expected Rate of Return	7.00%	7.00%
Long-Term Municipal Bond Rate*	3.56%	2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded (and 2016 to 2115)	None	None

*Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity's Index's "20-year Municipal GO AA Index" as of June 30, 2017. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax exempt securities. "State and Local Bonds" rate from Federal Reserve statistical release (H.15) as of June 30, 2016.
The statistical release describes this rate as the "Bond Buyer Index, general obligation, 20 years to maturity, mixed quality." In describing this index, the Bond Buyer notes that the bonds' average credit quality is roughly equivalent to Moody's Investor Service's Aa2 rating and Standard & Poor's Corp AA.

** Inactive, nonretired members for GASB 68 reporting includes terminated vested members entitled to benefits but not yet receiving benefits plus inactive members (that while currently not vested for benefits may become vested in the future should they return to service and fulfill the additional service and contribution requirements applicable to their respective membership). The inactive membership counts used in the previous reporting method under GASB Statement No. 25 only included terminated vested members.

*** This information should be considered with the June 30, 2017 Actuarial Valuation Report information that follows this section beginning on page 123.

GASB STATEMENT NO. 67 REPORT (continued)

Discussion on GASB Statement No. 67.

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, "Financial Reporting for Pension Plans," replaces the requirements of GASB Statement No. 25, "Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans," and GASB Statement No. 50, "Pension Disclosures." GASB Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability of employers and non-employer contributing entities for benefits provided through the pension plan.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are incorporated in the Financial Section of this CAFR. However, certain information, such as notes regarding accounting policies and investments, are not provided by GRS since the retirement system is responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 67 requires defined benefit pension plans to present two financial statements, notes of the plan's financial statements and required supplementary information (RSI):

- The *statement of fiduciary net position* presents the following items as of the end of the pension plan's reporting period, such as: assets; deferred inflows and outflows of resources; liabilities; and fiduciary net position (assets, plus deferred outflows, minus liabilities, minus deferred inflows).
- The *statement of changes in fiduciary net position* presents the following for the plan's reporting period: additions, such as contributions and investment income; deductions, such as benefit payments and expenses; and net increase or decrease in the fiduciary net position (the difference between additions and deductions).
- The notes of the plan's financial statements include: a description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs; the number and classes of employees covered by the benefit terms; the composition of the pension plan's Board and the authority under which benefit terms may be amended; a description of the plan's funding policy, which includes member and employer contribution requirements; the pension plan's investment policies; a description of how fair value is determined; concentrations of investments greater than or equal to 5%; annual money-weighted rate of return on pension plan investments; the portion of the present value of benefits to be provided through the pension plan to current active and inactive plan members; the pension plan's fiduciary net position; the net pension liability; the pension plan's fiduciary net position as a percentage of the total pension liability; significant assumptions and methods used to calculate the total pension liability; inputs to the discount rates; and certain information about mortality assumptions and the dates of experience studies.
- The RSI requires a 10-year fiscal history of: sources of changes in the net pension liability; information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy; and the annual money-weighted rate of return on pension plan investments for each year.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2017 and a measurement date of June 30, 2017.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00% the municipal bond rate is 3.56% (based on the daily rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting single discount rate is 7.00%.

Letter from the Actuary

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January 8, 2018

Board of Trustees
Employees' Retirement System of
the State of Hawaii
City Financial Tower
201 Merchant St., Ste. 1400
Honolulu, HI 96813-2980

Dear Trustees:

Subject: Actuarial Valuation as of June 30, 2017

We certify that the information contained in the 2017 actuarial valuation report is accurate and fairly presents the actuarial position of the Employees' Retirement System of the State of Hawaii (ERS) as of June 30, 2017. There have been no adjustments for events which occurred after this date.

All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the Hawaii statutes and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. One or more of them are an Enrolled Actuary and/or a Member of the American Academy of Actuaries. All are experienced in performing valuations for large public retirement systems.

Actuarial valuations

The primary purpose of the valuation report is to determine the adequacy of the current employer contribution rate through measuring the resulting funding period, to describe the current financial condition of ERS, and to analyze changes in ERS's condition. In addition, the report provides various summaries of the data. This report may not be appropriate for other purposes. The information required by ERS in connection with Governmental Accounting Standards Board Statement No. 67(GASB No.67) will be provided in a separate report. (A summary of the GASB Statement No. 67 is presented immediately before this section.)

Valuations are prepared annually, as of June 30th of each year, the last day of ERS's plan year and fiscal year.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Letter from the Actuary (continued)

Board of Trustees
January 8, 2018
Page 2

Financing objectives

Contribution rates are established by Law that, over time, are intended to remain level as a percent of payroll. The employee and employer contribution rates have been set by Law and are intended to provide for the normal cost plus the level percentage of payroll required to amortize the unfunded actuarial accrued liability (UAAL) over a reasonable amount of time, which will ensure benefit security and intergenerational equity.

Progress toward realization of financing objectives

We have determined that the funding period for paying off the UAAL of the System (in aggregate) is 26 years. Because this period is less than 30 years, the objectives set in State statute are currently being realized. (Hawaii Revised Statutes §88-122(e)(1) state that the employer contribution rates are subject to adjustment when the funding period is in excess of 30 years.)

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. The funded status alone is not appropriate for assessing the need for future contributions nor assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. However, the trend (historical and projected) of the funded ratio is a strong metric to use for assessing the dependability of the current funding policy and its ability to accumulate assets to pay benefits when due. The funded ratio is currently 54.9% and this is slighlty larger than the funded ratio from the previous valuation, primarily due to the significant amount of contributions towards the unfunded actuarial accrued liability.

The 2017 Legislature made significant changes to the future employer contribution rates. The employer contribution rate for Police and Fire employees are scheduled to increase to 28.00% in FY2018, 31.00% in FY2019, 36% in FY2020, and 41% for FY2021, and the employer contribution rate for All Other Employees are scheduled to increase to 18.00% in FY2018, 19.00% in FY2019, 22% in FY2020, and 24% for FY2021. Under current law, the contribution rates are expected to stay at these levels until the System is fully funded.

The 2011 Legislature made changes to the benefits and member contribution rates for employees hired after June 30, 2012. Because these changes result in significantly higher contributions towards the unfunded liability in the future than in the current year, we believe it is more appropriate to determine the funding period using an open group projection rather than a static mathematical formula, which assumes that all amortization payments in the future will be the same percentage of pay as in the current year.

The actuarial accrued liability, the unfunded actuarial accrued liability (UAAL), and the determination of the resulting funding period illustrate the progress toward the realization of financing objectives. The System had a liability experience loss which was caused by individual salary increases being larger than expected by the assumptions. The System also experienced a loss on its investments (on an actuarial asset basis). As a result, the UAAL grew based on this actuarial valuation as of June 30, 2017, ERS's underfunded status as measured by the UAAL is now $12.928 billion.

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Because of the favorable investment performance in FY2017, the System is now deferring only $22 million in investment losses, compared with $900 million in deferred losses last year. If there are no significant investment losses or other actuarial losses, the funded status of the System would be expected to increase in the near future and over the long term.

Thus, given the plan's current contribution rates and the new tier of benefits, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial valuation of assets), it is expected that:

1. The employer normal cost as a percentage of pay will decrease to the level of the newest tier as the old tier population declines and is replaced by new tier members,
2. The employer contribution will remain level throughout the amortization period,
3. Thus, the net amount available to amortize the UAAL will increase over time,
4. The unfunded actuarial accrued liability will increase in nominal dollars until the net amount for amortization is large enough to cover the interest charges, or approximately 2023, and then begin to decrease
5. The unfunded actuarial accrued liability will be fully amortized after 26 years, and
6. In the absence of benefit improvements and in consistent financial markets, the funded ratio should increase steadily until it reaches 100%.

However, it is important to note that these statements are based on the current assumptions which could change in the future. Also, these statements depend upon the employers meeting the contribution requirements established by the 2017 Legislature. Future changes to the actuarial assumptions or future changes to reduce the contribution requirements could significantly change the outlook of the System and the expectation on when the System will reach a 100% funded level.

Benefit provisions and Legislative changes

This is the fifth valuation with members covered under the new benefit tier.

There have been no changes in the benefit provisions since the prior valuation. See the *Summary of Retirement Benefit Plan Provisions* in the Introductory Section of this CAFR for more details on the benefit provisions for members of the System. However, the Legislature passed Act 017 which contains significant increases to the employer contribution rates over a 4-year period. These increases have improved the outlook of ERS. As long as the contributions are made the System's funded status should improve and the System should be able to absorb moderate adverse experience without a need to further increase the contribution rates.

Assumptions and methods

The actuarial assumptions used were adopted by the Board in December of 2016 based on the recommendations provided by an Experience Study performed by GRS.

Letter from the Actuary (continued)

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There have been no changes to the assumptions or methods since the prior valuation.

There was no change to the use of a 4-year smoothing technique to determine the actuarial value of assets, used for determining the funding period.

There was no change to the actuarial funding method. The Entry Age Normal cost method (EAN) is the current funding method being used to allocate the actuarial costs of the System. The Entry Age Normal method will generally produce relatively level contribution amounts as a percentage of payroll from year to year, and allocates costs among various generations of taxpayers in a reasonable manner. It is by far the most commonly used actuarial cost method for large public retirement systems.

Further detail on the assumptions and methods may be found in the *Summary of Actuarial Methods and Assumptions* in this section of this CAFR.

The actuarial assumptions represent estimates of future experience and are not market measures. 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 rates and funding periods. Based on the scope of this engagement, we have not performed analysis on the potential range of future measurements based on other factors. The actuarial calculations are intended to provide information for rational decision making.

In our opinion, the assumptions are internally consistent and are reasonably based on the actual experience of ERS.

Data

Member data for retired, active, and inactive participants was supplied as of March 31, 2017, by ERS's staff. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was supplied by ERS's staff.

Significant Events After the Census Date

A significant number of the covered active employees, employed by the Maui Hawaii Health System Corporation, were terminated from active coverage in the System as a result of privatization of their employer. We were provided the list of employees of this employer who were active on the census date (March 31, 2017). We treated these employees as terminated as of the valuation date and we removed their payroll from the actuarial valuation. If the employees were vested, then they were included in our terminated vested membership counts and liabilities. It is expected that some of the employees actually retired and began receiving their ERS benefits as of July 1, 2017. While the liabilities for these members reflected that possibility, they will not show up in the retiree counts until the next valuation.

Letter from the Actuary (continued)

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Responsibility for Tables and Schedules

The actuary is responsible for the information with respect to years after 1999 in the Required Supplementary Information, and the Notes to Required Supplementary Information in the Financial Section of the ERS's Comprehensive Annual Financial Report (CAFR). Information with respect to years prior to 2000 was supplied by ERS.

Tables and schedules in the Actuarial Section of the CAFR were generally prepared directly by the Actuary. However, certain of these tables were prepared by ERS utilizing information from this report. When the tables were prepared by ERS from our report, they are so noted.

The undersigned are independent actuaries and consultants. Mr. Newton is an Enrolled Actuary, a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Sincerely,

Joe Newton, FSA, EA Senior Consultant & Actuary	Lewis Ward Consultant	Linna Ye, ASA, MAAA Actuary

Executive Summary

The following table summarizes the key results of the June 30, 2017 actuarial valuation of the Employees' Retirement System of the State of Hawaii (ERS).

Item	2017	2016
Membership		
• Number of		
- Active members	65,911	67,377
- Retirees and beneficiaries	46,927	45,506
- Inactive, vested	9,241	7,741
- Total	122,079	120,624
• Covered payroll for active members	$4,134.2 million	$4,118.4 million
• Actual benefit payments and refunds	$1,323.1 million	$1,245.5 million
Assets		
• Actuarial (smoothed) value	$15,720.6 million	$14,998.7 million
• Market value	$15,698.3 million	$14,070.0 million
• Return on actuarial value	6.9%	5.6%
• Return on market value	13.9%	(1.2%)
• Employer contributions during fiscal year	$781,244,218	$756,558,222
• External cash flow %	(2.0%)	(1.9%)
Actuarial Information		
• Total normal cost % (employee + employer)	13.96%	13.98%
• Unfunded actuarial accrued liability (UAAL)	$12,928.0 million	$12,440.5 million
• Funded ratio (based on smoothed assets)	54.9%	54.7%
• Funded ratio (based on market assets)	54.8%	51.3%
• Funding period (years) *	26.0	66.0
• Employer contribution rate % of projected payroll ** For FY beginning July 1	19.16%	17.91%

* Funding Period based on actuarial value of assets, scheduled increases in employer contribution rates, and an open group projection reflecting changes in benefits and future member contribution rates.

** Weighted average of 28.00% Contribution Rate for Police and Firefighters and 18.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2017.

Weighted average of 25.00% Contribution Rate for Police and Firefighters and 17.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2016.

Actuarial Certification Statement

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Gross normal cost as a percentage of pay	25.56%	12.39%	13.98%
2. Present value of future benefits			
a. Active employees	$ 3,754,120,848	$ 13,911,516,934	$ 17,665,637,782
b. Inactive members	71,452,445	849,783,699	921,236,144
c. Pensioners and beneficiaries	2,672,319,502	12,348,284,110	15,020,603,612
d. Total	$ 6,497,892,795	$ 27,109,584,743	$ 33,607,477,538
3. Present value of future employee and employer contributions			
a. Present value of future normal costs	$ 1,161,189,615	$ 3,797,657,390	$ 4,958,847,005
b. Present value of future employee contributions	589,938,887	1,693,178,991	2,283,117,878
c. Present value of future employer normal cost (Item 3a - Item 3b)	$ 571,250,728	$ 2,104,478,399	$ 2,675,729,127
4. Actuarial accrued liability (Item 2d - Item 3a)	$ 5,336,703,180	$ 23,311,927,353	$ 28,648,630,533
5. Actuarial value of assets			
a. Annuity Savings Fund	$ 1,001,209,147	$ 1,634,314,400	$ 2,635,523,547
b. Pension Accumulation Fund	2,105,424,331	10,979,679,242	13,085,103,573
c. Total	$ 3,106,633,478	$ 12,613,993,642	$ 15,720,627,120
6. Unfunded actuarial accrued liability	$ 2,230,069,702	$ 10,697,933,711	$ 12,928,003,413
7. Adequacy of contribution rates			
a. Statutory Contribution Rate for Fiscal Year 2018	28.00%	18.00%	19.16%
B. Funding period in years as of June 30, 2017 *	26	26	26

*The Funding Period is calculated using an open group projection which reflects the impact of both the new employer contribution rates schedule and the benefits and member contribution rates for employees hired after June 30, 2012.

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Actuarial Certification Statement (continued)

The actuarial valuation as of June 30, 2017 is based on the provisions of Chapter 88 of the Hawaii Revised Statutes, as amended. The assumptions used in the cost calculations were those adopted by the Board of Trustees on December 12, 2016 based on the actuary's actuarial experience investigation report covering the five-year period July 1, 2010 – June 30, 2015. The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures.

In our opinion, the comparison of the current contribution policies to ERS's liabilities were calculated in accordance with the provisions of Chapter 88 regarding the funding of the Employees' Retirement System on an actuarial reserve basis.

All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned is an independent actuary and consultant. Mr. Newton is an Enrolled Actuary, a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries. Finally, he is experienced in performing valuations for large public retirement systems.

Joseph P Newton,, FSA, EA, MAAA
Senior Consultant & Actuary

Summary of 2017 Actuarial Valuation

Exhibit 1
Development of Employer Cost

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Projected FY 2018 payroll for contribution purposes	$ 495,136,855	$ 3,769,901,933	$ 4,265,038,788
2. Gross normal cost (Exhibit 3)	25.56%	12.39%	13.93%
3. Employer normal cost rate (Exhibit 3)	13.13%	7.33%	8.02%
4. Present value future benefits (Exhibit 2)	$ 6,497,892,795	$ 27,109,584,743	$ 33,607,477,538
5. Present value future employer normal cost	$ 571,250,728	$ 2,104,478,399	$ 2,675,729,127
6. Present value future employee contributions	$ 589,938,887	$ 1,693,178,991	$ 2,283,117,878
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 5,336,703,180	$ 23,311,927,353	$ 28,648,630,533
8. Actuarial value of assets	$ 3,106,633,478	$ 12,613,993,642	$ 15,720,627,120
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,230,069,702	$ 10,697,933,711	$ 12,928,003,413
10. Funding period *	26	26	26

	Police and Firefighters June 30, 2016	All Other Employees June 30, 2016	All Employees June 30, 2016
1. Projected FY 2017 payroll for contribution purposes	$ 484,128,704	$ 3,774,799,913	$ 4,258,928,617
2. Gross normal cost (Exhibit 3)	25.72%	12.46%	13.98%
3. Employer normal cost rate (Exhibit 3)	13.32%	7.57%	8.23%
4. Present value future benefits (Exhibit 2)	$ 6,148,967,061	$ 26,268,837,557	$ 32,417,804,618
5. Present value future employer normal cost	$ 568,203,796	$ 2,209,407,243	$ 2,777,611,039
6. Present value future employee contributions	$ 568,905,568	$ 1,632,054,382	$ 2,200,959,950
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 5,011,857,697	$ 22,427,375,932	$ 27,439,233,629
8. Actuarial value of assets	$ 2,918,650,683	$ 12,080,098,377	$ 14,998,749,060
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,093,207,014	$ 10,347,277,555	$ 12,440,484,569
10. Funding period *	Infinite	59	66

*The Funding Period is calculated using an open group projection which reflects the impact of both the new employer contribution rates schedule and the benefits and member contribution rates for employees hired after June 30, 2012.
Please refer to Exhibit 7 for the full projection.

Summary of 2017 Actuarial Valuation (continued)

Exhibit 2
Actuarial Present Value of Future Benefits

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Active members			
a. Service retirement benefits	$ 3,605,472,878	$ 12,733,560,754	$ 16,339,033,632
b. Termination benefits	105,091,726	797,543,978	902,635,704
c. Survivor benefits	19,810,420	141,612,493	161,422,913
d. Disability retirement benefits	23,745,824	238,799,709	262,545,533
e. Total	$ 3,754,120,848	$ 13,911,516,934	$ 17,665,637,782
2. Retired members			
a. Service retirement	$ 2,502,019,362	$ 11,448,616,086	$ 13,950,635,448
b. Disability retirement	29,297,997	234,759,723	264,057,720
c. Beneficiaries	141,002,143	664,908,301	805,910,444
d. Total	$ 2,672,319,502	$ 12,348,284,110	$ 15,020,603,612
3. Inactive members			
a. Vested terminations	$ 67,233,586	$ 763,256,731	$ 830,490,317
b. Nonvested terminations	4,218,859	86,526,968	90,745,827
c. Total	$ 71,452,445	$ 849,783,699	$ 921,236,144
4. Total actuarial present value of future benefits	$ 6,497,892,795	$ 27,109,584,743	$ 33,607,477,538

	Police and Firefighters June 30, 2016	All Other Employees June 30, 2016	All Employees June 30, 2016
1. Active members			
a. Service retirement benefits	$ 3,448,659,766	$ 12,706,944,580	$ 16,155,604,346
b. Termination benefits	102,331,078	806,508,688	908,839,766
c. Survivor benefits	19,051,626	141,603,947	160,655,573
d. Disability retirement benefits	22,655,202	239,258,944	261,914,146
e. Total	$ 3,592,697,672	$ 13,894,316,159	$ 17,487,013,831
2. Retired members			
a. Service retirement	$ 2,331,689,444	$ 10,903,901,755	$ 13,235,591,199
b. Disability retirement	30,740,070	221,253,328	251,993,398
c. Beneficiaries	126,823,342	613,796,593	740,619,935
d. Total	$ 2,489,252,856	$ 11,738,951,676	$ 14,228,204,532
3. Inactive members			
a. Vested terminations	$ 63,183,996	$ 565,038,743	$ 628,222,739
b. Nonvested terminations	3,832,537	70,530,979	74,363,516
c. Total	$ 67,016,533	$ 635,569,722	$ 702,586,255
4. Total actuarial present value of future benefits	$ 6,148,967,061	$ 26,268,837,557	$ 32,417,804,618

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Summary of 2017 Actuarial Valuation (continued)

Exhibit 3
Analysis of Normal Cost

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Normal cost as a percent of pay			
a. Service retirement benefits	22.66%	9.27%	10.87%
b. Deferred termination benefits	1.15%	0.91%	0.94%
c. Refunds	0.89%	1.33%	1.28%
d. Disability retirement benefits	0.32%	0.38%	0.37%
e. Survivor benefits	0.19%	0.15%	0.15%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	25.56%	12.39%	13.96%
2. Employee contribution rate	12.43%	5.06%	5.94%
3. Effective employer normal cost rate (Item 1g – Item 2)	13.13%	7.33%	8.02%

	Police and Firefighters June 30, 2016	All Other Employees June 30, 2016	All Employees June 30, 2016
1. Normal cost as a percent of pay			
a. Service retirement benefits	22.83%	9.35%	10.90%
b. Deferred termination benefits	1.15%	0.95%	0.97%
c. Refunds	0.89%	1.28%	1.24%
d. Disability retirement benefits	0.31%	0.38%	0.37%
e. Survivor benefits	0.19%	0.15%	0.15%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	25.72%	12.46%	13.98%
2. Employee contribution rate	12.40%	4.89%	5.75%
3. Effective employer normal cost rate (Item 1g – Item 2)	13.32%	7.57%	8.23%

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Summary of 2017 Actuarial Valuation (continued)

Exhibit 4
Development of Actuarial Value of Assets

			Year Ending June 30, 2017
1.	Actuarial value of assets at beginning of year	$	14,998,749,060
2.	Net new investments		
	a. Contributions	$	1,031,948,285
	b. Benefits paid		(1,323,129,244)
	c. Administrative expenses		(14,986,159)
	d. Subtotal		(306,167,118)
3.	Market value of assets at end of year	$	15,698,324,306
4.	Expected return	$	1,039,196,585
5.	Expected actuarial value of assets, end of year	$	15,731,778,527
6.	Excess/(shortfall) return (Item 3-Item 5)	$	(33,454,221)
7.	Development of amounts to be recognized as of June 30, 2017		

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2014	$ 0	$ 0	$ 0	1	$ 0	$ 0
2015	0	0	0	2	0	0
2016	(928,770,143)	895,315,922	(33,454,221)	3	(11,151,407)	(22,302,814)
2017	895,315,922	(895,315,922)	0	4	0	0
Total	$ (33,454,221)	$ 0	$ (33,454,221)		$ (11,151,407)	$ (22,302,814)

8.	Actuarial value of assets as of June 30, 2017 (Item 3 - Item 7)	$	15,720,627,120
9.	Ratio of actuarial value to market value		100.1%
10.	Asset gain (loss) for year (Item 8 - Item 5)	$	(11,151,407)

Summary of 2017 Actuarial Valuation (continued)

Exhibit 5
Total Experience Gain or Loss

Item	Police and Firefighters	All Other Employees	All Employees
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accured liability (UAAL), as of June 30, 2016	$ 2,093,207,014	$ 10,347,277,555	$ 12,440,484,569
2. Normal cost for the year (employer and employee)	$ 126,929,424	$ 464,781,303	$ 591,710,727
3. Less: contributions and assessments for the year	$ (191,804,894)	$ (840,143,391)	$ (1,031,948,285)
4. Interest at 7.00%			
a. On UAAL	$ 146,524,491	$ 724,309,429	$ 870,833,920
b. On normal cost	4,442,530	16,267,346	20,709,876
c. On contributions	(6,713,171)	(29,405,019)	(36,118,190)
d. Total	$ 144,253,850	$ 711,171,756	$ 855,425,606
5. Expected UAAL as of June 30, 2017 (Sum of Items 1– 4)	$ 2,172,585,394	$ 10,683,087,223	$ 12,855,672,617
6. Actual UAAL as of June 30, 2017	$ 2,230,069,702	$ 10,697,933,711	$ 12,928,003,413
7. Total gain (loss) for the year (Item 5 – Item 6)	$ (57,484,308)	$ (14,846,488)	$ (72,330,796)
B. Source of gains and losses			
8. Asset gain (loss) for the year (Exhibit 6)	$ (2,203,687)	$ (8,947,720)	$ (11,151,407)
9. Gain (loss) due to privatazation	-	33,679,419	33,679,419
10. Other liability gain (loss)	$ (55,280,621)	$ (39,578,187)	$ (94,858,808)
11. Change in benefit provisions	-	-	-
12. Total gain (loss) for the year	$ (57,484,308)	$ (14,846,488)	$ (72,330,796)

Summary of 2017 Actuarial Valuation (continued)

Exhibit 6
Investment Experience Gain or Loss

Item	June 30, 2017	June 30, 2016
1. Actuarial assets, beginning of year	$ 14,998,749,060	$ 14,463,670,277
2. Total contributions during year	$ 1,031,948,285	$ 993,360,083
3. Benefits and refunds paid	$ (1,323,129,244)	$ (1,245,517,025)
4. Administrative expenses paid	$ (14,986,159)	N/A
5. Assumed net investment income at 7.00%		
a. Beginning of year assets	$ 1,049,912,435	$ 1,106,596,855
b. Contributions	$ 36,118,190	$ 38,492,703
c. Benefits and refunds paid	$ (46,309,524)	$ (48,263,785)
d. Benefits and refunds paid	$ (524,516)	N/A
e. Total	$ 1,039,196,585	$ 1,096,825,773
6. Expected actuarial assets, end of year (Sum of Items 1 through 5)	$ 15,731,778,527	$ 15,308,339,108
7. Actual actuarial assets, end of year	$ 15,720,627,120	$ 14,998,749,060
8. Asset gain (loss) for year (Item 7– Item 6)	$ (11,151,407)	$ (309,590,048)
9. Asset gain (loss) as a percent of actuarial value of		

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Summary of 2017 Actuarial Valuation (continued)

Exhibit 7
Projection Results Based on June 30, 2017 Actuarial Valuation

Valuation as of June 30,	Employer Contribution Rate for Fiscal Year Following Valuation Date	Compensation (in Millions)	Employer Contributions (in Millions)	Actuarial Accrued Liability (AAL, in Millions)	Actuarial Value of Assets (AVA, in Millions)	Unfunded Actuarial Accrued Liability (UAAL, in Millions)	Funded Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2017	19.16%	$ 4,265.0	$ 817	$ 28,649	$ 15,721	$ 12,928	54.9%
2018	20.39%	4,375.1	892	29,710	16,370	13,341	55.1%
2019	23.61%	4,497.0	1,062	30,864	17,161	13,703	55.6%
2020	25.95%	4,624.9	1,200	32,022	18,108	13,914	56.5%
2021	25.95%	4,758.8	1,235	33,181	19,185	13,996	57.8%
2022	25.94%	4,897.2	1,270	34,342	20,293	14,049	59.1%
2023	25.93%	5,042.2	1,308	35,504	21,435	14,069	60.4%
2024	25.92%	5,192.9	1,346	36,666	22,614	14,052	61.7%
2025	25.91%	5,350.2	1,386	37,826	23,831	13,995	63.0%
2026	25.90%	5,515.3	1,429	38,985	25,092	13,893	64.4%
2027	25.89%	5,687.9	1,473	40,141	26,400	13,741	65.8%
2028	25.88%	5,867.9	1,519	41,297	27,763	13,534	67.2%
2029	25.88%	6,056.3	1,567	42,455	29,188	13,267	68.8%
2030	25.87%	6,252.6	1,617	43,615	30,683	12,932	70.3%
2031	25.86%	6,457.4	1,670	44,780	32,255	12,525	72.0%
2032	25.85%	6,670.3	1,724	45,951	33,913	12,038	73.8%
2033	25.85%	6,891.1	1,781	47,128	35,666	11,462	75.7%
2034	25.84%	7,121.5	1,840	48,314	37,523	10,791	77.7%
2035	25.84%	7,361.0	1,902	49,513	39,498	10,015	79.8%
2036	25.84%	7,609.8	1,966	50,726	41,601	9,125	82.0%
2037	25.84%	7,868.9	2,033	51,958	43,847	8,110	84.4%
2038	25.84%	8,139.4	2,103	53,212	46,252	6,960	86.9%
2039	25.84%	8,421.2	2,176	54,496	48,833	5,663	89.6%
2040	25.85%	8,714.4	2,252	55,813	51,608	4,205	92.5%
2041	25.85%	9,019.5	2,332	57,171	54,597	2,574	95.5%
2042	25.86%	9,336.5	2,414	58,577	57,823	754	98.7%
2043	4.30%	9,665.3	415	60,037	61,307	(1,270)	102.1%
2044	4.25%	10,006.9	425	61,558	62,916	(1,357)	102.2%
2045	4.21%	10,361.0	436	63,148	64,599	(1,451)	102.3%
2046	4.18%	10,727.5	448	64,811	66,362	(1,551)	102.4%

Projection assumes all assumptions exactly met, including a 7.00% annual return on the current actuarial value of assets.

Gabriel Roeder Smith & Company

Summary of 2017 Actuarial Valuation (continued)

Exhibit 8
Highlights of Last Five Annual Actuarial Valuations
2013 through 2017

Item	Valuation Date: June 30				
	2013	2014	2015	2016	2017
Number of active members	66,226	67,206	67,310	67,377	65,911
Number of inactive members	7,312	8,105	7,413	7,741	9,241
Number of pensioners	38,741	39,680	40,657	41,654	42,857
Number of beneficiaries	3,071	3,407	3,626	3,852	4,070
Average monthly contributory plan pension amount	$ 2,414	$ 2,508	$ 2,621	$ 2,730	$ 2,854
Average monthly noncontributory plan pension amount	$ 1,562	$ 1,585	$ 1,611	$ 1,637	$ 1,669
Average monthly hybrid plan pension amount	$ 2,092	$ 2,088	$ 2,114	$ 2,139	$ 2,178
Average monthly beneficiary amount	$ 1,247	$ 1,304	$ 1,361	$ 1,419	$ 1,472
Total actuarial value of assets ($millions)	$ 12,749	$ 13,642	$ 14,464	$ 14,999	$ 15,721
Unfunded actuarial accrued liability ($millions)	$ 8,494.9	$ 8,578.3	$ 8,774.7	$ 12,440.5	$ $12,928.0
Funding Period (in years) (1)	28.0	26.0	26.0	66.0	26.0

Item	Fiscal Year				
(Dollar amounts in millions(2))	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Employers contributions(2)	$ 581.4	$ 653.1	$ 717.8	$ 756.6	$ 781.2

(1) Beginning with the 2011 valuation, the funding period was determined using and open group projection. Prior valuations determined the remaining amortization based on the assumption that the amortization payment would remain constant as a percentage of pay.

(2) Beginning with the fiscal year beginning July 1, 2005, a dollar contribution amount is not determined under the provisions of Act 181/2004. Instead a fixed percentage of payroll is contributed (15.75% for Police and Fire, 13.75% for All Others).
Beginning July 1, 2008, the percentages increased to 19.70% for Police and Fire, 15.00% for All Others.
Beginning July 1, 2012, the percentages increased to 22.0% for Police and Fire, 15.5% for All Others.
Beginning July 1, 2013, the percentages increased to 23.0% for Police and Fire, 16.0% for All Others.
Beginning July 1, 2014, the percentages increased to 24.0% for Police and Fire, 16.5% for All Others.
Beginning July 1, 2015, the percentages increased to 25.0% for Police and Fire, 17.0% for All Others.
Beginning July 1, 2017, the percentages increased to 28.0% for Police and Fire, 18.0% for All Others.

Summary of Actuarial Methods and Assumptions
(Adopted on December 12, 2016)

Basis for assumption setting: The actuarial assumptions were adopted by the Board on December 12, 2016. Rationale for the recommendations are in the most recent experience study dated July 5, 2016.

I. *Valuation Date*

The valuation date is June 30th of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. *Actuarial Cost Method*

The normal cost and actuarial accrued liability are determined using the Entry Age Actuarial Cost Method. The actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years. The normal cost and accrued liability are determined on an individual basis.

The normal cost is the level percentage of payroll contribution required to accumulate the needed funds to pay all expected benefits. This percentage of payroll is then applied to the total compensation for the prior year for all active members, and is then adjusted for the payroll growth assumption.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

III. *Funding of Unfunded Actuarial Accrued Liability*

Since the State statutes governing the System establish the employee and employer contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL. Because of the legislated increases in future employer contribution rates and the new tier of benefits for employees hired after June 30, 2012, an open group projection of liabilities and assets was used to determine the length of time until the UAAL is eliminated. The open group projection assumed that the number of active members would remain static (i.e. each active employee who leaves employment due to termination, retirement, death or disability, would be replaced by exactly one new employee.

Because of this methodology for determining the funding period, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period.

Please see Section V of these *Assumptions* for a description of the new entrant profile used in the open group projection.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

IV. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a four-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. The expected actuarial value of assets is calculated net of investment expenses, and the expected investment return is equal to the assumed investment return rate multiplied by the prior year's actuarial value of assets, adjusted for contributions, benefits paid, and refunds.

V. New Entrant Profile

For the purposes of determining the funding period, an open group projection is used which replaces on a one-to-one basis each active member who leaves employment with an average new hire. The average new hire is determined based on a new entrant profile, which is created from the valuation data by determining the entry age and entry pay for anyone with seven or less years of service as of the valuation date. Each group of new hires' salaries is assumed to grow at the General Wage Inflation of 3.50% over the salaries of the previous year's group.

The new entrant profile for members assumed to be hired during the year following the valuation date for the Police and Fire Employees and the All Other Employees are shown in the table below.

New Entrant Profile for Police and Fire Employees

Entry Age	# of Employees	Average Salary
20-24	199	$42,080
25-29	421	41,841
30-34	286	41,807
35-39	136	42,273
40-44	47	42,310
45-49	17	43,503
50-54	6	45,708
55-59	1	40,632
Total	1,113	41,993

It is assumed that 92.7% of new hires will be male.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

New Entrant Profile for All Other Employees

Entry Age	# of Employees	Average Salary
15-19	19	$26,410
20-24	1,433	37,250
25-29	3,459	40,108
30-34	2,759	42,208
35-39	2,388	43,097
40-44	1,954	41,537
45-49	1,785	40,980
50-54	1,449	42,278
55-59	1,169	45,146
60-64	484	46,511
65-69	52	47,971
Total	16,951	41,610

It is assumed that 40.0% of new hires will be male.

VI. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 7.00% per year, compounded annually, composed of an assumed 2.50% inflation rate and a 4.50% net real rate of return (net of investment expenses).
2. General Wage Inflation: 3.50% per annum.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

3. Salary increase rates: As shown below

	General Employees		Teachers	
Years of Service	Service-related Component	Total Rate Including 2.50% Inflation Component and 1.00% Productivity Component	Service-Related Component	Total Rate Including 2.50% Inflation Component and 1.25% Productivity Component
1	3.00%	6.50%	2.00%	5.75%
2	3.00%	6.50%	1.75%	5.50%
3	2.00%	5.50%	1.75%	5.50%
4	1.50%	5.00%	1.50%	5.25%
5	1.50%	5.00%	1.00%	4.75%
6	1.25%	4.75%	1.00%	4.75%
7	1.25%	4.75%	0.75%	4.50%
8	1.00%	4.50%	0.75%	4.50%
9	1.00%	4.50%	0.50%	4.25%
10	1.00%	4.50%	0.50%	4.25%
11	0.75%	4.25%	0.50%	4.25%
12	0.75%	4.25%	0.50%	4.25%
13	0.50%	4.00%	0.25%	4.00%
14	0.50%	4.00%	0.25%	4.00%
15	0.50%	4.00%	0.25%	4.00%
16	0.50%	4.00%	0.25%	4.00%
17	0.50%	4.00%	0.25%	4.00%
18	0.50%	4.00%	0.25%	4.00%
19	0.50%	4.00%	0.25%	4.00%
20	0.25%	3.75%	0.25%	4.00%
21	0.25%	3.75%	0.25%	4.00%
22	0.25%	3.75%	0.25%	4.00%
23	0.25%	3.75%	0.25%	4.00%
24	0.25%	3.75%	0.25%	4.00%
25 or more	0.00%	3.50%	0.00%	3.75%

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

3. Salary increase rates (continued):

	Police & Firefighters	
Years of Service	Service-related Component	Total Annual Rate of Increase Including 2.50% Inflation Component and 2.50% General Increase Rate
1	2.00%	7.00%
2	2.00%	7.00%
3 or more	0.00%	5.00%

Salary increases are assumed to occur once a year, on July 1. Therefore the pay used for the period between the valuation date and the first anniversary of the valuation date is equal to the reported pay for the prior year, annualized if necessary, and then increased by the salary increase assumption. To adjust the pays received as of March 31st to the June 30th valuation date, the reported pay for each member is increased by 1%.

B. Demographic Assumptions

1. Mortality rates

Active Members: Multiples of the RP 2014 mortality table for active employees based on the occupation of the member as follows:

	General Employees	Teachers	Police and Fire
	Male & Female	Male & Female	Male & Female
Ordinary	75%	55%	58%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Healthy Retirees: The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2016 with the corresponding multipliers:

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

The following table provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years

	Year of Retirement			
Gender	2020	2025	2030	2035
General Retirees				
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
Teachers				
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
Police and Fire				
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled retirees: Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

2. Disability rates – The assumed total disability rates at select ages are multiples of the client specific table that follows:

Age	Male & Female
25	0.000%
30	0.001%
35	0.008%
40	0.026%
45	0.064%
50	0.146%
55	0.198%
60	0.217%

Note: The disability rates project the percentage of employees at each age that is assumed to become disabled before retiring. Multiples of the rates above are assumed to be ordinary disability or accidental disability, and varies by employee group as follows:

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

	General Employees	Teachers	Police & Fire
Type	Male & Female	Male & Female	Male & Female
Ordinary	210%	75%	70%
Accidental	30%	5%	75%

3. Termination Rates -Same male and female rates, based solely on the member's service. Rates reflect terminations for causes other than death, disability or retirement. Employees eligible for retirement are assumed to have no probability of termination. Sample rates are shown below:

	Expected Terminations per 1000 Lives (Male & Female)		
Years of Service	General Employees	Teachers	Police & Fire
0	185.9	243.6	110.0
1	152.5	200.8	95.0
2	124.6	164.7	37.0
3	101.6	134.4	30.1
4	82.9	109.4	26.1
5	67.9	89.0	23.3
6	56.1	72.5	21.0
7	47.0	59.5	19.2
8	40.1	49.4	17.7
9	35.1	41.7	16.4
10	31.5	36.0	15.2
11	29.1	31.9	14.1
12	27.6	29.0	13.2
13	26.6	27.0	12.3
14	25.9	25.7	11.5
15	25.5	24.8	10.8
16	25.1	24.0	10.1
17	24.5	23.2	9.5
18	23.9	22.4	8.9
19	23.0	21.4	8.3
20	22.0	20.2	7.7
21	20.8	18.7	7.2
22	19.5	17.1	6.8
23	18.3	15.4	6.3
24	17.4	13.6	5.8
25	16.8	12.1	0.0
26	16.8	10.9	0.0
27	16.8	10.4	0.0
28	16.8	10.7	0.0
29	16.8	10.0	0.0
30 and more	0.0	0.0	0.0

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

4. Retirement rates - Separate male and female rates, based on age. Sample rates are shown below:

<u>Contributory Members</u>

Expected Retirements per 100 Lives

	General Employees				Teachers				Police & Fire
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement		Unreduced Retirement
Age	Male	Female	Male	Female	Male	Female	Male	Female	Male & Female
45	0	0	0	0	0	0	0	0	12.5
46	0	0	0	0	0	0	0	0	12.5
47	0	0	0	0	0	0	0	0	12.5
48	0	0	0	0	0	0	0	0	12.5
49	0	0	0	0	0	0	0	0	12.5
50	0	0	0	0	0	0	1	0	15.0
51	0	0	2	1	0	0	1	1	15.0
52	0	0	2	1	0	0	1	1	15.0
53	0	0	2	1	0	0	2	2	15.0
54	0	0	3	2	0	0	3	3	15.0
55	25	20	3	2	20	18			20.0
56	25	20			15	16			20.0
57	16	13			15	16			20.0
58	16	13			15	16			22.0
59	13	13			15	16			25.0
60	13	15			14	18			30.0
61	13	15			14	18			30.0
62	28	25			14	25			30.0
63	20	20			14	20			30.0
64	20	20			14	15			30.0
65	20	20			20	25			100.0
66	18	20			15	25			
67	18	20			15	20			
68	18	20			15	20			
69	18	20			15	20			
70	20	20			15	20			
71	20	20			15	20			
72	20	20			15	20			
73	20	20			15	20			
74	20	20			15	20			
75	100	100			100	100			

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Noncontributory Members

Expected Retirements per 100 Lives

	General Employees				Teachers			
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	20	11	1	1	10	13	1	2
56	18	11	1	1	10	7	1	2
57	13	11	1	1	10	8	1	2
58	10	11	1	1	10	10	2	2
59	10	11	2	2	10	20	3	3
60	10	14	3	3	10	11	5	5
61	11	18	4	4	10	16	7	5
62	20	20			16	25		
63	20	20			12	20		
64	12	20			10	15		
65	14	20			20	25		
66	20	20			15	25		
67	20	20			15	25		
68	20	20			15	25		
69	20	20			15	25		
70	20	20			15	25		
71	20	20			15	25		
72	20	20			15	25		
73	20	20			15	25		
74	20	20			15	25		
75	100	100			100	100		

Note: Retirement rates for the 25 & out group ages 50-54 are 10% for male and 11% for female.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Hybrid Members

Expected Retirements per 100 Lives

	General Employees				Teachers			
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	16	18	1	1	20	16	2	2
56	10	13	1	1	13	10	2	2
57	10	13	1	1	13	10	2	2
58	14	13	1	2	13	12	2	2
59	14	13	2	2	13	12	3	3
60	14	13	2	4	14	14	3	5
61	14	15	3	4	14	18	3	10
62	21	20			22	30		
63	18	20			14	20		
64	18	20			14	20		
65	21	20			20	25		
66	18	18			15	25		
67	18	18			15	25		
68	18	18			15	25		
69	18	18			15	25		
70	20	20			15	25		
71	20	20			15	25		
72	20	20			15	25		
73	20	20			15	25		
74	20	20			15	25		
75	100	100			100	100		

Note: Retirement rates for the 25 & out group ages 50-54 are 6% for both male and female.

For members hired after June 30, 2012 the retirement rates for members once they reach unreduced retirement eligibility are increased 10% (multiplicative) for each year the member is beyond the age the member would have been eligible under the Hybrid provisions for members hired prior to June 30, 2012.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

C. <u>*Other Assumptions*</u>

1. Projected payroll for contributions: The aggregate projected payroll for the fiscal year following the valuation date is calculated by increasing the actual payroll paid during the previous fiscal year by the payroll growth rate and multiplying by the ratio of current active members to the average number of active members during the previous fiscal year.

2. Age difference: Male members are assumed to be four years older than their spouses, and female members are assumed to be four years younger than their spouses.

3. Marriage Assumption: While not implicitly used in the valuation, 100% of active members are assumed to be married when setting other benefit election and eligibility assumptions.

4. Percent electing annuity on death for contributory participants (when eligible): All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity or a refund, whichever is more valuable at time of participant's death.

5. Payment Option: Future healthy retirees are assumed to choose the life only payment option. 50% of future disabled retirees are assumed to choose the 100% Joint and Survivor option.

6. Percent electing deferred termination benefit: vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

7. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt when eligible for early retirement.

8. Administrative expenses: Administrative expenses are assumed to be 0.35% of active member payroll.

9. Reemployment, purchase of service, transfers: No recognition is made of (i) future member reimbursements upon reemployment, (ii) future purchase of additional service, or (iii) special transfer provisions.

10. Sick Leave: It is assumed that all members will have their benefit service increased by sick leave and the following loads will be applied by group:

General Employees	3.75%
Teachers	4.25%
Police and Fire	5.00%

11. COLA delay: It is assumed that the first COLA will be received 9 months after retirement. Teachers are assumed to receive COLA 12 months after retirement.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

12. There will be no recoveries once disabled.

13. No surviving spouse will remarry and there will be no children's benefit.

14. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

15. Decrement timing: Retirements and terminations of Teachers are assumed to occur at the beginning of the year. All other decrements are assumed to occur mid-year.

16. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

17. Decrement relativity: Decrement rates are used directly from the Experience Study, without adjustment for multiple decrement table effects.

18. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

19. Benefit Service: All members are assumed to accrue 1 year of service each year. Exact fractional service is used to determine the amount of benefit payable.

20. Police officers, firefighters, investigators of the Department of the Prosecuting Attorney and the Attorney General, narcotic enforcement investigators, and public safety investigators hired prior to June 30, 2012 are not assumed to retire at age 55 unless they have 10 years of service.

VII. Participant Data

Participant data was supplied in electronic files for (i) active members, (ii) inactive vested members, who are entitled to a future deferred benefit, (iii) members and beneficiaries receiving benefits.

Salary supplied for the current year was based on the actual pensionable earnings for the 12-month period ending the March preceding the valuation date. This pay was increased by 1% to reflect the three month difference from March to June. For members with less than one year of service, the base pay rate provided in the data was used.

VIII. Dates of Adoption of Assumptions and Methods

The actuarial assumptions and methods were adopted by the Board of Trustees on December 12, 2016 as recommended by Gabriel, Roeder, Smith & Company (GRS).

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

IX. Changes in Assumptions and Methods since Prior Valuation

The actuarial assumptions have been materially revised since the prior valuation. The major changes were (i) a decrease in the investment return assumption from 7.65% to 7.00%, and (ii) the mortality assumption was modified to assume longer life expectancies as well as to reflect continuous mortality improvement (generational mortality improvement). Please see our Experience Study report dated July 5, 2016 for a more extensive discussion of the changes in the actuarial assumptions and the rationale for the current assumptions.

Summary of Actuarial Methods and Assumptions (continued)

Summary of Plan Changes

Act 65, effective July 1, 1999

Requires judges who enter or re-enter service after June 30, 1999 to be at least 55 years old and five years of service or have 25 years of service to retire.

Act 100, effective June 30, 1999

Uses actuarial investment earnings in excess of a ten percent (10%) actuarial investment yield rate to reduce the employer's contribution requirements by $147.0 million and $50.6 million for fiscal years ending June 30, 2000 and 2001, respectively.

Act 284, effective June 30, 2001

Provide an increase in pension benefits for current retirees with military service who retired prior to July 2, 1989. A retirant who rendered honorable active military service could be granted up to 4 years of military service credits based upon his/her years of credited service under the ERS, not to exceed his/her actual years of military service. The years of military service credits granted are based on the following schedule:

- 0 years for retirants with less than 8 years of credited service
- Up to 2 years of retirants with 8 years or more of credited service
- Up to 3 years of retirants with 20 years or more of credited service
- Up to 4 years of retirants with 25 years or more of credited service

For each year of military service credits granted on the schedule above, the retirant will be provided a $36.00 increase is his/her monthly pension or retirement allowance.

Act 199, effective June 30, 2003

Emergency Medical Technicians (EMTs) are allowed to retire with an unreduced benefit after 25 years of service regardless of age, of which the last five or more years prior to retirement must be in that capacity. This feature is phased in one year at a time, July 1, 2003 through June 30, 2008.

Act 177, effective July 1, 2004

This Act allows police officers with a permanent service-connected disability to retain the 2-1/2% benefit multiplier for each year of service as a police officer.

Act 179, effective July 1, 2004

This Act increased the Noncontributory service-connected disability formula to 35% of average final compensation. The Act also changed the methodology for crediting interest on contributions for terminated members so that interest continues to accrue until the date of refund. The Act adds a "pop-up" feature to the joint & survivor benefit options if the beneficiary pre-deceases the retiree.

This Act also created the new Hybrid Plan which became effective July 1, 2006.

Summary of Plan Changes (continued)

Act 181, effective July 1, 2004

This Act establishes fixed employer contribution rates as a percentage of compensation effective July 1, 2005. Employers will contribute 15.75% for their police officers and firefighters and 13.75% for other employees.

Act 183, effective July 1, 2004

This Act amends the ERS statutes to comply with the federal tax limits on compensation retroactive to July 1, 1996.

Act 56, effective December 1, 2004

This Act amends the ERS statutes to allow the automatic cost-of-living-adjustment to be reflected when determining actuarial equivalent optional forms of payment.

Act 256, effective July 5, 2007

Legislation was enacted to remove the statutory salary increase assumption from the statutes and to grant the System's Board of Trustees the authority to set the salary increase assumption. As a result of that legislation, the Board has adopted effective with this valuation the salary increase assumption recommended by GRS as a result of the Experience Study performed in 2006.

Legislation was also enacted to increase the employer contribution rates to the System. Effective July 1, 2008, the employer contribution rate for Police and Fire employees will increase from 15.75% to 19.70% and the rate for All Other employees will increase from 13.75% to 15.00%

Act 163, effective June 23, 2011

Legislation was enacted that increased the future employer contribution rates to ERS. Employers of Police and Fire employees will contribute 22.0% of pay in FY 2013, 23.0% in FY 2014, 24.0% in FY 2015, and 25.0% in FY 2016 and beyond. Employers of All Other Employees will contribute 15.5% of pay in FY 2013, 16.0% in FY 2014, 16.5% in FY 2015, and 17.0% in FY 2016 and beyond.

Act 163 continued on next page

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Summary of Plan Changes (continued)

Act 163, effective June 23, 2011 (continued)

Legislation was enacted that made numerous changes to the benefits and member contribution rates for employees hired after June 30, 2012. Key changes are shown below:

Benefit Provision	Police & Fire Employees	All Other Employees
Benefit Multiplier	2.25%	1.75%
Normal Retirement	Age 55 with 25 years of service, or age 60 with 10 years of service	Age 60 with 30 years of service, or age 65 with 10years of service
Post-Retirement Increase	1.5%	1.5%
Hybrid Match	N/A	120%
Average Final Compensation	Highest 5 annual base salaries	Highest 5 annual base salaries
Eligibility for Deferred Benefit	10 years of service	10 years of service
Member Contribution Rate	14.20%	8.00%

Similar changes were also made to the benefits of Judges, Legislative Officers, etc.

Similar changes were also made to those employees in the All Other Employees group who are eligible to retire at 25 years of service including the addition of a minimum age requirement (55).

Finally, legislation was enacted that set the investment return assumption for the June 30, 2011 valuation at 7.75% (the rate recommended in the Experience Study presented to the Board in December of 2010). In addition, the legislation granted ERS's Board the authority to set this assumption for valuations after 2011.

Act 152, effective June 26, 2012

Legislation was enacted to require employers to pay additional contributions if a retiring employee, who was first employed prior to July 1, 2012 and who was last employed by the employer, has significant non-base pay increases included in their average final compensation. The additional contribution is equal to the actuarial present value of the additional benefits earned due to the "excessive" non-base pay increases.

Act 153, effective June 26, 2012

Legislation was enacted to eliminate most types of non-base pay from the definition of compensation for employees hired after June 30, 2012. For the impacted employees, non-base pay compensation will be excluded in determining both the contributions made by and on behalf of these employees and the benefits they will earn in the System.

Summary of Actuarial Methods and Assumptions (continued)

Act 017, effective July 1, 2017

Legislation was enacted that increased the future employer contribution rates to ERS. Employers of Police and Fire employees will contribute 28% of pay in FY 2018, 31% in FY 2019, 36% in FY 2020, and 41% in FY 2021 and beyond. Employers of All Other Employees will contribute 18% of pay in FY 2018, 19% in FY 2019, 22% in FY 2020, and 24% in FY 2021 and beyond.

Ten Year Actuarial Schedules
2008 to 2017

- Retirement System Membership **
  - 2017 Membership Data *
- Historical Summary of Active Member Data *
- Pensioners, Average Annual Pension and Active Member/Pensioner Comparison **
- Number of Retirants and Beneficiaries **
- Solvency Test **
- Employer Contribution Rates as a Percentage of Payroll **
- Employer Appropriations to Pension Accumulation Fund, Appropriation Years 2007-2008 to 2016-2017 **

Note: * Prepared by Gabriel, Roeder, Smith & Company
** Compiled by ERS Staff from actuary reports, or other data.

Retirement System Membership **
2008 to 2017

March 31,	Active Members	Terminated Vested Members	Inactive Nonvested Members (a)	Pensioners & Beneficiaries	Total Membership
2008	66,589	5,847	n/a	36,260	108,696
2009	67,912	6,016	n/a	36,999	110,927
2010	65,890	6,895	n/a	38,441	111,226
2011	65,310	6,649	n/a	39,689	111,648
2012	65,599	6,909	n/a	40,774	113,282
2013	66,226	7,312	n/a	41,812	115,350
2014	67,206	8,105	11,247	43,087	129,645
2015	67,310	7,413	13,840	44,283	132,846
2016	67,377	7,741	14,554	45,506	135,178
2017	65,911	9,241	16,482	46,927	138,561

** Schedule compiled by ERS Staff from actuary reports.
(a) Number not reported in prior years, included in counts for GASB Statement No. 68 reporting.
n/a = not available

Ten-Year Actuarial Schedules (continued)

2017 Membership Data

	Police and Firefighters		All Other Employees		All Employees	
	June 30, 2017	June 30, 2016	June 30, 2017	June 30, 2016	June 30, 2017	June 30, 2016
1. Active members						
a. Number	5,009	5,087	60,902	62,290	65,911	67,377
b. Total payroll	$ 478,393,096	$ 458,092,919	$3,655,763,685	$3,660,258,732	$4,134,156,781	$4,118,351,651
c. Average salary	$ 95,507	$ 90,052	$ 60,027	$ 58,762	$ 62,723	$ 61,124
d. Average age	42.8	42.5	48.4	48.3	48.0	47.9
e. Average service	14.6	14.3	13.2	13.2	13.3	13.3
2. Terminated vested members (a)						
a. Number	378	366	8,863	7,375	9,241	7,741
b. Total annual deferred benefits	$ 6,372,538	$ 6,084,027	$ 75,657,983	$ 69,037,725	$ 82,030,521	$ 75,121,752
c. Average annual deferred benefit	$ 16,859	$ 16,623	$ 8,536	$ 9,361	$ 8,877	$ 9,704
3. Service retirees						
a. Number	3,439	3,331	37,809	36,726	41,248	40,057
b. Total annual benefits	$ 186,219,761	$ 173,883,842	$ 989,160,649	$ 940,185,518	$1,175,380,410	$1,114,069,360
c. Average annual benefit	$ 54,149	$ 52,202	$ 26,162	$ 25,600	$ 28,495	$ 27,812
4. Disabled retirees						
a. Number	124	135	1,485	1,462	1,609	1,597
b. Total annual benefits	$ 2,722,839	$ 2,852,210	$ 19,580,231	$ 18,585,276	$ 22,303,070	$ 21,437,486
c. Average annual benefit	$ 21,958	$ 21,127	$ 13,185	$ 12,712	$ 13,861	$ 13,424
5. Beneficiaries						
a. Number	304	285	3,766	3,567	4,070	3,852
b. Total annual benefits	$ 11,184,933	$ 10,053,859	$ 60,704,184	$ 55,514,373	$ 71,889,117	$ 65,568,232
c. Average annual benefit	$ 36,793	$ 35,277	$ 16,119	$ 15,563	$ 17,663	$ 17,022

(a) As of June 30, 2014 - Terminated vested members does not include 11, 247 Inactive members that may return to service and earn additional service credits to become vested (612 Police and firefighters plus 10,635 All other employees). As of June 30, 2015, there were 13,840 (568 Police and firefighters plus 13,272 All other employees). As of June 30, 2016, there were 14,554 (599 Police and firefighters plus 13,955 All other employees). As of June 30, 2017, there were 16,482 (641 Police and firefighters plus 15,841 All other employees).

Historical Summary of Active Member Data

Year Ending June 30,	Active Members		Covered Payroll		Average Salary			
	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
2008	66,589	2.1%	3,601.7	7.8%	54,089	5.7%	46.6	12.9
2009	67,912	2.0%	3,838.0	6.6%	56,514	4.5%	46.8	12.9
2010	65,890	-3.0%	3,713.6	-3.2%	56,360	-0.3%	47.1	13.2
2011	65,310	-0.9%	3,731.4	0.5%	57,133	1.4%	47.4	13.4
2012	65,599	0.4%	3,706.1	-0.7%	56,497	-1.1%	47.6	13.5
2013	66,226	1.0%	3,720.8	0.4%	56,184	-0.6%	47.7	13.5
2014	67,206	1.5%	3,871.0	4.0%	57,600	2.5%	47.8	13.5
2015	67,310	0.2%	3,952.6	2.1%	58,723	1.9%	47.8	13.2
2016	67,377	0.1%	4,118.4	4.2%	61,124	4.1%	47.9	13.3
2017	65,911	-2.2%	4,134.2	0.4%	62,723	2.6%	48.0	13.3

Ten-Year Actuarial Schedules (continued)

Pensioners, Average Annual Pension and Active Member/Pensioner Comparison**

2008 to 2017

March 31,	Number of Pensioners	Average Annual Pension (1)	Ratio of Active Members per Pensioner
2008	33,893	$21,734	1.9
2009	34,429	$22,337	1.9
2010	35,763	$23,173	1.8
2011	36,871	$24,160	1.8
2012	37,830	$24,853	1.7
2013	38,741	$25,485	1.7
2014	39,680	$26,032	1.7
2015	40,657	$26,671	1.7
2016	41,654	$27,260	1.6
2017	42,857	$27,946	1.5

** Schedule compiled by ERS Staff from actuary reports.

(1) Pension amount includes base pension plus 2.5% post-retirement increases (excludes other bonuses and cost-of-living adjustments).

Number of Retirants and Beneficiaries**

2008 to 2017

Retirants							
2008	1,712	$20,715	936	$15,396	33,893	$21,734	2.71%
2009	1,531	$20,861	995	$16,053	34,429	$22,337	2.77%
2010	2,316	$25,153	982	$16,362	35,763	$23,173	3.74%
2011	2,056	$27,808	948	$18,154	36,871	$24,160	4.26%
2012	1,987	$24,680	1,028	$17,958	37,830	$24,853	2.87%
2013	1,994	$23,503	1,083	$18,144	38,741	$25,485	2.54%
2014	2,027	$22,585	1,088	$19,456	39,680	$26,032	2.15%
2015	2,229	$22,997	1,252	$19,820	40,657	$26,671	2.45%
2016	2,237	$23,785	1,240	$20,694	41,654	$27,260	2.21%
2017	2,402	$28,043	1,199	$21,286	42,857	$27,946	2.52%
Beneficiaries							
2008	229	$14,244	75	$10,659	2,367	$12,749	3.61%
2009	298	$14,518	95	$9,772	2,570	$13,308	4.38%
2010	214	$14,803	106	$9,713	2,678	$13,814	3.80%
2011	212	$15,843	72	$12,107	2,818	$14,256	3.20%
2012	225	$14,798	99	$11,882	2,944	$14,628	2.61%
2013	238	$14,515	111	$11,790	3,071	$14,962	2.28%
2014	442	$17,964	106	$12,439	3,407	$15,651	4.60%
2015	310	$19,597	91	$12,530	3,626	$16,337	4.38%
2016	325	$20,598	99	$14,371	3,852	$17,022	4.19%
2017	333	$19,992	115	$13,012	4,070	$17,663	3.77%

** Schedule compiled by ERS staff from actuary reports.

Ten-Year Actuarial Schedules (continued)

Solvency Test**

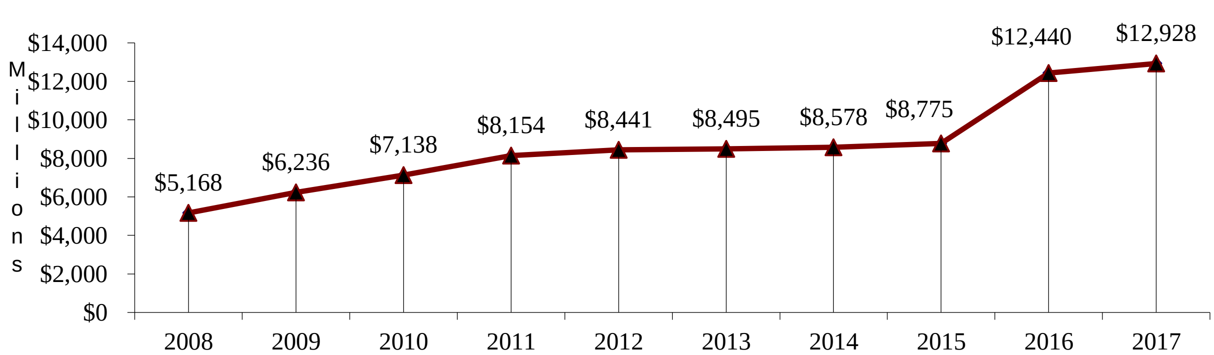
2008 to 2017

June 30,	Actuarial Accrued Liabilities (AAL): Active Member Contributions	Retirees, Beneficiaries, and Inactive Vested Members	Active and Inactive Members Employer Financed Portion	Actuarial Value of Assets	Cumulative Portion of Actuarial Accrued Liabilities Covered by Assets: Column (1)	Column (2)	Column (3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2008	1,029.5	8,230.3	7,289.2	11,381.0	100%	100%	29.1%
2009	1,168.9	8,584.0	7,883.4	11,400.1	100%	100%	20.9%
2010	1,265.0	9,259.4	7,959.2	11,345.6	100%	100%	10.3%
2011	1,364.2	10,183.7	8,549.0	11,942.8	100%	100%	4.6%
2012	1,485.1	10,707.2	8,491.1	12,242.5	100%	100%	0.6%
2013	1,658.2	11,182.5	8,403.0	12,748.8	100%	99%	0.0%
2014	1,812.9	11,673.0	8,734.2	13,641.8	100%	100%	1.8%
2015	1,981.8	12,321.8	8,934.8	14,463.7	100%	100%	1.8%
2016	2,150.4	14,228.2	11,060.6	14,998.7	100%	90%	0.0%
2017	2,183.2	15,020.6	11,444.8	15,720.6	100%	90%	0.0%

(Amounts in $millions)

** Schedule compiled by ERS Staff from actuary reports

Unfunded Actuarial Accrued Liability FY 2008-2017



Ten-Year Actuarial Schedules (continued)

Employer Contribution Rates as a Percentage of Payroll **

2008 to 2017

Actuarial Valuation as of June 30,	Police and Firefighters			All Other Employees			All Active Employees		
	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate
2008	6.56%	9.19%	15.75%	5.75%	8.00%	13.75%	5.85%	8.10%	13.95%
2009	6.58%	13.12%	19.70%	5.79%	9.21%	15.00%	5.89%	9.57%	15.46%
2010	6.59%	13.11%	19.70%	5.78%	9.22%	15.00%	5.88%	9.59%	15.47%
2011	6.60%	13.10%	19.70%	5.79%	9.21%	15.00%	5.90%	9.59%	15.49%
2012	8.09%	11.01%	19.70%	5.78%	9.22%	15.00%	6.06%	9.46%	15.52%
2013	7.98%	14.02%	22.00%	5.69%	9.81%	15.50%	5.97%	10.14%	16.11%
2014 *	7.17%	14.83%	23.00%	5.34%	10.66%	16.00%	5.54%	11.22%	16.76%
2015 *	8.04%	15.96%	24.00%	5.76%	10.74%	16.50%	6.02%	11.26%	17.28%
2016 *	13.32%	11.68%	25.00%	7.57%	9.43%	17.00%	8.23%	9.66%	17.89%
2017 *	13.13%	14.87%	28.00%	7.33%	10.67%	18.00%	8.02%	9.89%	17.91%

Note: Effective with the June 30, 2004 valuation, the employer contribution rate is statutorily changed to a percentage of pay of 15.75% of actual pay for Police and Fire and 13.75% of actual pay for All Other Employees, per Act 181/2004 SLH. Effective July 1, 2008, the employer contribution rate increased to 19.70% of actual pay for Police and Fire and 15.00% of actual pay for All Other Employees, per Act 256/2006 SLH.

Per Act 163/2011 SLH, the statutory employer contribution rate for Police and Fire employees will be 22.00% in FY 2013, 23.00% in FY 2014, 24.00% in FY 2015 and 25.00% in FY 2016 and thereafter, and the rate for All Other Employees will be 15.50% in FY 2013, 16.00% in FY 2014, 16.50% in FY 2015 and 17.00% in FY 2016 and thereafter.

* This chart does not include the effects of GASB Statement No 67 (implemented by the ERS only for FY 2014) that requires member contributions "picked up" as employer contributions pursuant to IRC section 414(h)(2) to be reported as Employer Contributions. ERS implemented GASB Statement No. 82 in FY 2015 that excludes these amounts from Employer Contributions.

** Schedule compiled by ERS Staff from actuary reports.

Ten-Year Actuarial Schedules (continued)

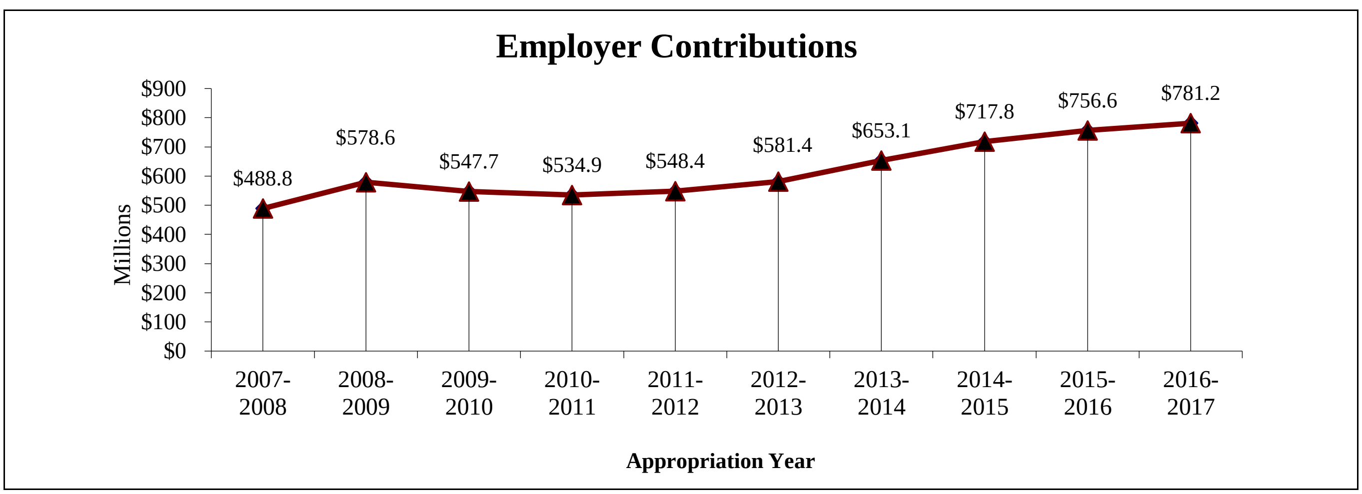
Employer Appropriations to Pension Accumulation Fund**

	Investment Yield Rate	
Fiscal Year	Assumed for Actuarial Valuation	Actuarial Investment Return
2007-2008	8.0%	8.89%
2008-2009	8.0%	0.87%
2009-2010	8.0%	(0.42)%
2010-2011	7.75%	7.10%
2011-2012	7.75%	5.05%
2012-2013	7.75%	6.67%
2013-2014	7.75%	9.23%
2014-2015	7.65%	7.85%
2015-2016	7.00%	5.59%
2016-2017	7.00%	6.92%

Notes: (1) Beginning with the valuation for fiscal year 1996-97 (appropriation fiscal year 1999-2000), the actuarial investment income is the sum of the expected net investment income based on the actuarial assumption of 8% and a four-year smoothing of the difference between the market value of assets at year-end and the expected actuarial value of assets. In prior years, the actuarial investment income was the sum of interest, dividends, and net realized gains less net realized losses and investment expenses.

(2) Beginning fiscal year 2005/2006 employers contributed 15.75% of actual payroll for Police and Fire and 13.75% for All Other Employees, per Act 181/2004 SLH. Effective July 1, 2008, the employer contribution rate increased to 19.70% of actual pay for Police and Fire and 15.00% of actual pay for All Other Employees, per Act 256/2006 SLH. Pursuant to Act 163/2012 SLH, the employer rates increased over a four-year phase in period. The employer contribution rates for Police and Fire employees increased according to the following schedule: 22.00% in FY2013, 23.00% in FY 2014, and 24.00% in FY 2015, and 25.00% in FY 2016 and beyond. The employer contribution rates for All Other Employees increased according to the following schedule: 15.50% in FY2013, 16.00% in FY 2014, and 16.50% in FY 2015, and 17.00% in FY 2016 and beyond. Pursuant to Act 163/2012 SLH, the employer rates increased over a four-year phase in period. The employer contribution rates for Police and Fire employees increased according to the following schedule: 22.00% in FY2013, 23.00% in FY 2014, and 24.00% in FY 2015, and 25.00% in FY 2016 and beyond. The employer contribution rates for All Other Employees increased according to the following schedule: 15.50% in FY2013, 16.00% in FY 2014, and 16.50% in FY 2015, and 17.00% in FY 2016 and FY 2017.

** Schedule compiled by ERS Staff from actuary reports.



*** This chart of Employer Contributions does not include Member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS (as required by GASB Statement No. 68 in FY 2014).

AGGREGATED FUNDED RATIOS FOR STATES

Funded Ratio		Aggregated Statewide Retirement Systems (all statewide systems for state employees, teachers, school employees, or municipal employees)			
100% or more	2	South Dakota	100.0%	Wisconsin	100.0%
90% to 99%	4	Tennessee	95.9%	North Carolina	93.7%
		New York	93.9%	Washington	90.3%
80% to 89%	10	Nebraska	89.6%	Iowa	83.7%
		Delaware	89.0%	Missouri	81.5%
		Utah	86.3%	Maine	81.5%
		Idaho	86.3%	Arkansas	80.8%
		Florida	85.4%	Texas	80.7%
70% to 79%	12	Oregon	78.7%	Georgia	74.4%
		Wyoming	78.1%	Nevada	74.1%
		Minnesota	78.1%	Ohio	74.0%
		Oklahoma	75.6%	Montana	73.7%
		Virginia	74.8%	Maryland	70.8%
		West Virginia	74.5%	Alaska	70.4%
60% to 69%	12	New Mexico	69.9%	Vermont	65.4%
		Arizona	69.5%	North Dakota	64.3%
		California	69.4%	Michigan	62.0%
		Alabama	68.0%	Indiana	61.1%
		Kansas	67.1%	Rhode Island	61.0%
		Louisiana	65.5%	South Carolina	60.4%
Less than 60%	10	New Hampshire	59.9%	New Jersey	56.5%
		Mississippi	59.9%	**Hawaii**	**54.7%**
		Pennsylvania	58.1%	Illinois	48.5%
		Massachusetts	57.5%	Kentucky	47.3%
		Colorado	57.0%	Connecticut	46.9%

Source: Compiled from most recent Public Funds Survey by Gabriel, Roeder, Smith & Company

Note: Funded Ratios are shown for all 50 states. Multiple statewide retirement systems are aggregated together to produce the overall funded ratio for the state.

Employees' Retirement System

of the State of Hawaii

STATISTICAL SECTION

Summary

This section contains various statistical and historical data considered useful in evaluating the condition of the ERS. All non-accounting data is taken from ERS' internal sources except for that information which is derived from the actuarial valuations.

Changes in Fiduciary Net Position

Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2008	2009	2010	2011	2012
Additions					
Employer Contributions	$ 488,770,028	$ 578,672,058	$ 547,669,675	$ 538,692,849	$ 548,353,394
Member contributions	163,375,639	177,781,610	360,047,068	232,880,063	182,401,324
Investment income (net of expense)	(461,063,080)	(1,937,317,469)	1,026,461,210	2,040,061,555	(57,798,410)
Total additions to plan net assets	191,082,587	(1,180,863,801)	1,934,177,953	2,811,634,467	672,956,308
Deductions					
Benefits	792,312,830	833,691,245	905,315,348	960,219,432	1,015,447,668
Refunds	3,668,857	3,937,464	7,573,619	7,901,509	7,187,606
Administrative expenses	10,728,801	13,011,283	12,406,339	13,325,781	11,634,197
Total deductions from plan net assets	806,710,488	850,639,992	925,295,306	981,446,722	1,034,269,471
Net increase (decrease) in net position	(615,627,901)	(2,031,503,793)	1,008,882,647	1,830,187,745	(361,313,163)
Net position restricted for pension benefits					
Beginning of year	11,462,416,866	10,846,788,965	8,815,285,172	9,824,167,819	11,654,355,564
End of year	$ 10,846,788,965	$ 8,815,285,172	$ 9,824,167,819	$ 11,654,355,564	$11,293,042,401

Fiscal Year Ended June 30,:	2013	2014 **	2015	2016	2017
Additions					
Employer Contributions	$ 581,447,213	$ 653,127,697	$ 717,792,981	$ 756,558,222	$ 781,244,218
Member contributions	185,837,186	206,127,337	223,505,419	236,801,861	250,704,067
Investment income (net of expense)	1,331,208,154	2,175,479,961	556,436,475	(169,368,110)	1,934,512,507
Total additions to plan net assets	2,098,492,553	3,034,734,995	1,497,734,875	823,991,973	2,966,460,792
Deductions					
Benefits	1,060,561,148	1,122,445,642	1,170,744,770	1,232,589,353	1,306,788,954
Refunds	7,204,411	8,475,969	10,507,888	12,927,672	16,340,290
Administrative expenses	11,941,446	12,626,030	14,032,964	13,960,587	14,986,159
Total deductions from plan net assets	1,079,707,005	1,143,547,641	1,195,285,622	1,259,477,612	1,338,115,403
Net increase (decrease) in net position	1,018,785,548	1,891,187,354	302,449,253	(435,485,639)	1,628,345,389
Net position restricted for pension benefits					
Beginning of year	11,293,042,401	12,311,827,949	14,203,015,303	14,505,464,556	14,069,978,917
End of year	$ 12,311,827,949	$ 14,203,015,303	$ 14,505,464,556	$ 14,069,978,917	$ 15,698,324,306

** For FYE June 30, 2014, ERS implemented GASB Statement No. 67 that requires Member Contributions "picked up" per Internal Revenue Code section 414(h)(2) as employer contributions to be classified for financial statement purposes as "Employer Contributions". This was subsequently changed effective with FYE June 30, 2015 with the implementation of GASB Statement No. 82.

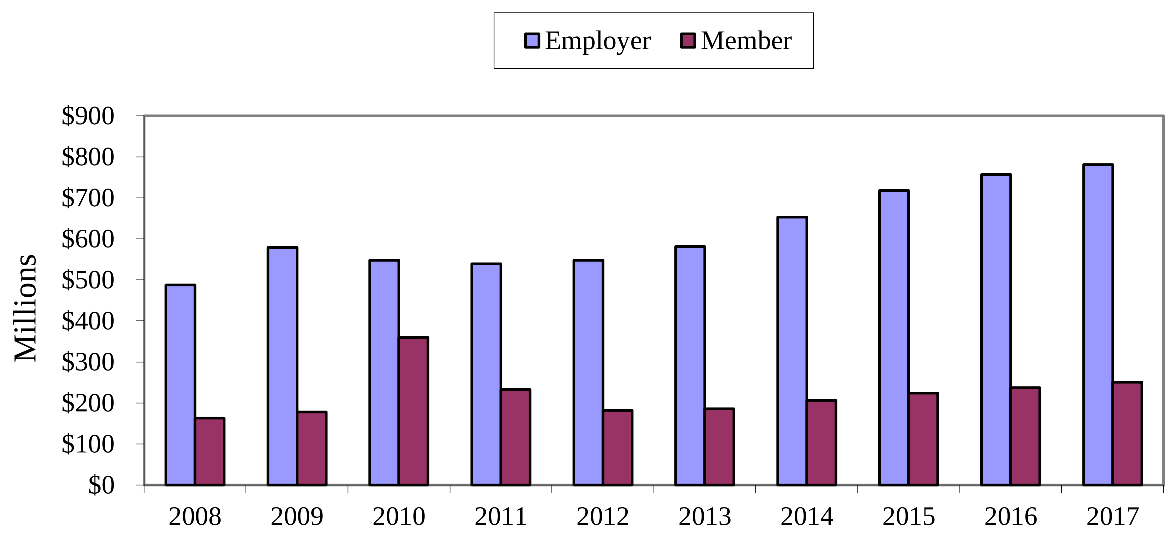
Contributions

Employer Contribution Rates as a Percentage of Payroll **

Fiscal Year		Police & Firefighters	All Other Employees	Composite Rate
2008		15.75%	13.75%	13.95%
2009		19.70%	15.00%	15.46%
2010		19.70%	15.00%	15.47%
2011		19.70%	15.00%	15.49%
2012		19.70%	15.00%	15.52%
2013		22.00%	15.50%	16.11%
2014	**	23.00%	16.00%	16.76%
2015		24.00%	16.50%	17.28%
2016		25.00%	17.00%	17.89%
2017		25.00%	17.00%	17.91%

** Excludes member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS for FY 2014.

Contributions **



*** Member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS are included in the Member Contributions for this chart, they are not included in Employer Contributions for FY 2014.

Deductions from Fiduciary Net Position for Benefit Payments by Type

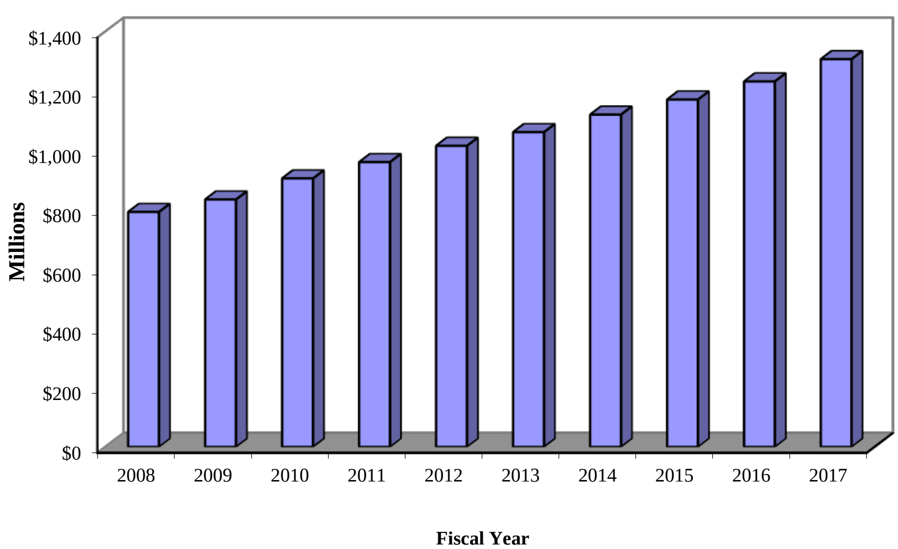
Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2008	2009 **	2010	2011	2012
Recurring benefit payments					
Service	$ 748,158,330	$ 754,432,615	$ 807,662,216	$ 859,915,959	$ 917,840,937
Disability	13,707,170	15,619,011	16,470,042	17,355,973	17,877,572
Death	2,293,557	34,201,206	36,993,685	40,173,678	43,053,039
subtotal	764,159,057	804,252,832	861,125,943	917,445,610	978,771,548
Refund Option payments (one-time)	28,153,773	29,438,413	44,189,405	42,773,822	36,676,120
Total benefit payments	$ 792,312,830	$ 833,691,245	$ 905,315,348	$ 960,219,432	$ 1,015,447,668

Fiscal Year Ended June 30,:	2013	2014	2015	2016	2017
Recurring benefit payments					
Service	$ 963,894,245	$1,016,912,124	$ 1,058,688,356	$ 1,111,416,262	$ 1,175,380,410
Disability	18,987,509	19,835,520	20,732,259	21,437,486	22,303,070
Death	45,948,656	53,324,252	59,238,051	65,568,232	71,889,117
subtotal	1,028,830,410	1,090,071,896	1,138,658,666	1,198,421,980	1,269,572,597
Refund Option payments (one-time)	31,730,738	32,373,746	32,086,104	34,167,373	37,216,357
Total benefit payments	$1,060,561,148	$1,122,445,642	$ 1,170,744,770	$ 1,232,589,353	$ 1,306,788,954

** From FYE 6/30/2009, death benefits includes payments to continuing beneficiaries.

Benefit Payments



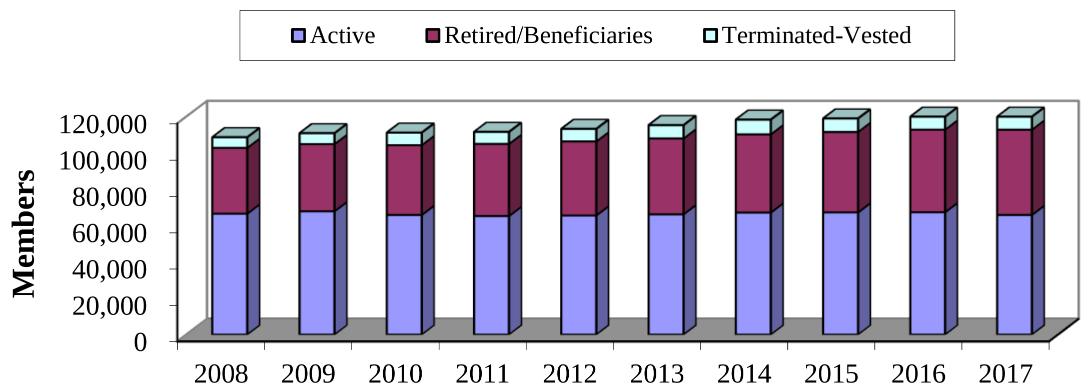
Participating Employers and Membership in ERS

Last Ten Fiscal Years

ERS Membership

As of March 31,:	Active	Retired/ Beneficiaries	Terminated- Vested	Inactive- Non-Vested	Totals
2008	66,589	36,260	5,847	na	108,696
2009	67,912	36,999	6,016	na	110,927
2010	65,890	38,441	6,895	na	111,226
2011	65,310	39,689	6,649	na	111,648
2012	65,599	40,774	6,909	na	113,282
2013	66,226	41,812	7,312	na	115,350
2014	67,206	43,087	8,105	11,247	129,645
2015	67,310	44,283	7,413	13,840	132,846
2016	67,377	45,506	7,741	14,554	135,178
2017	65,911	46,927	9,241	16,482	138,561

ERS Membership



Participating Employers and Active Members

As of March 31,:	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
State of Hawaii	51,719	52,704	50,789	50,268	50,604	51,176	51,875	51,791	51,723	50,288
City & County of Honlulu	8,512	8,640	8,519	8,485	8,451	8,457	8,625	8,727	8,807	8,740
- Board of Water Supply	526	554	526	516	505	532	551	558	558	572
Hawaii County	2,459	2,527	2,501	2,459	2,427	2,446	2,489	2,550	2,596	2,561
Kauai County	1,125	1,160	1,129	1,158	1,201	1,227	1,244	1,234	1,244	1,246
Maui County	2,248	2,327	2,426	2,424	2,411	2,388	2,422	2,450	2,449	2,504
Total	66,589	67,912	65,890	65,310	65,599	66,226	67,206	67,310	67,377	65,911

Benefit Payments by Retirement Type and Option

As of March 31, 2017

Retired Contributory Members

Monthly Benefit	Number of Recipients	Type of Retirement *					Retirement Option						
		1	2	3	4	5	Max	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Other
$ 1 - 400	1,004	756	12	11	1	224	209	215	158	59	157	205	1
401 - 800	1,666	1,289	69	21	8	279	190	135	134	56	561	588	2
801 - 1,200	1,761	1,392	37	40	12	280	186	108	133	46	740	545	3
1,201 - 1,600	1,906	1,574	27	67	8	230	191	98	113	50	838	613	3
1,601 - 2,000	1,907	1,650	13	39	10	195	162	67	118	52	872	628	8
2,001 - 2,400	1,823	1,637	7	30	6	143	139	59	107	35	797	682	4
2,401 - 2,800	1,990	1,845	3	17	5	120	156	47	91	33	857	802	4
2,801 - 3,200	2,023	1,893	3	13	6	108	171	60	103	52	907	725	5
3,201 - 3,600	1,779	1,689	1	6	5	78	182	51	76	50	964	452	4
3,601 - 4,000	1,395	1,316	-	6	1	72	146	35	77	52	821	264	-
4,001	4,726	4,545	-	8	10	163	665	126	395	242	2,757	540	1
	21,980	19,586	172	258	72	1,892	2,397	1,001	1,505	727	10,271	6,044	35

Retired Hybrid Members

Monthly Benefit	Number of Recipients	Type of Retirement *					Retirement Option						
		1	2	3	4	5	Max	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Other
$ 1 - 400	352	318	-	-	16	18	157	40	87	39	13	16	-
401 - 800	1,199	1,074	52	1	39	33	488	100	287	137	98	89	-
801 - 1,200	1,216	1,050	77	14	23	52	457	72	278	148	129	132	-
1,201 - 1,600	1,051	920	56	19	12	44	359	69	291	115	123	94	-
1,601 - 2,000	802	723	43	5	9	22	270	42	217	110	99	63	1
2,001 - 2,400	742	695	17	1	8	21	247	49	187	119	97	42	1
2,401 - 2,800	685	660	14	-	4	7	258	36	163	106	80	42	-
2,801 - 3,200	546	526	5	2	4	9	220	25	116	88	68	29	-
3,201 - 3,600	472	461	2	-	4	5	192	26	93	91	47	23	-
3,601 - 4,000	353	350	1	-	2	-	144	22	62	70	35	20	-
4,001	978	958	1	-	5	14	359	57	211	212	99	40	-
	8,396	7,735	268	42	126	225	3,151	538	1,992	1,235	888	590	2

Retired Noncontributory Members

Monthly Benefit	Number of Recipients	Type of Retirement *					Retirement Option				
		1	2	3	4	5	Max	Opt. A	Opt. B	Opt. C	Other
$ 1 - 400	1,591	1,041	72	31	128	319	581	376	442	70	122
401 - 800	3,665	2,799	280	57	88	441	1,757	666	990	172	80
801 - 1,200	2,733	2,233	164	50	45	241	1,365	546	657	130	35
1,201 - 1,600	1,854	1,593	92	17	12	140	895	367	503	82	7
1,601 - 2,000	1,426	1,250	60	5	5	106	651	293	404	78	-
2,001 - 2,400	1,272	1,171	17	3	5	76	637	258	293	83	1
2,401 - 2,800	1,317	1,253	11	2	3	48	766	236	210	105	-
2,801 - 3,200	1,019	986	4	-	1	28	643	181	136	59	-
3,201 - 3,600	647	619	3	1	5	19	397	124	102	24	-
3,601 - 4,000	397	381	-	-	2	14	242	81	58	16	-
4,001	630	601	-	-	7	22	364	135	112	19	-
	16,551	13,927	703	166	301	1,454	8,298	3,263	3,907	838	245

* Type of Retirement

1 – Normal retirement for age & service
2 – Ordinary disability retirement
3 – Occupational disability retirement
4 – Survivor payment – death in service
5 – Survivor payment – normal or disability retirement

Note: Refer to Plan Summary in the Introductory Section for descriptions of the types of retirements and benefit options selected by the members.

Average Monthly Service Pensions
by Years of Credited Service

As of March 31,		Years of Credited Service 0-9	10-14	15-19	20-24	25-29	30-34	35+	All
2008	Average Monthly Benefit	$291	$518	$882	$1,266	$2,119	$2,574	$2,853	$1,824
	Number of Active Retirants	1,137	3,981	3,481	4,034	7,560	8,511	3,737	32,441
2009	Average Monthly Benefit	$368	$548	$925	$1,319	$2,218	$2,672	$2,997	$1,906
	Number of Active Retirants	1,184	3,987	3,555	4,173	7,570	8,615	3,859	32,943
2010	Average Monthly Benefit	$336	$563	$948	$1,356	$2,289	$2,750	$3,097	$1,975
	Number of Active Retirants	1,143	4,062	3,719	4,373	7,775	8,926	4,268	34,266
2011	Average Monthly Benefit	$364	$583	$984	$1,397	$2,374	$2,849	$3,261	$2,059
	Number of Active Retirants	1,221	4,106	3,843	4,526	7,920	9,176	4,567	35,359
2012	Average Monthly Benefit	$388	$603	$1,012	$1,424	$2,446	$2,934	$3,361	$2,117
	Number of Active Retirants	1,292	4,222	3,929	4,705	8,030	9,361	4,769	36,308
2013	Average Monthly Benefit	$429	$622	$1,038	$1,449	$2,521	$3,009	$3,454	$2,171
	Number of Active Retirants	1,371	4,303	4,018	4,906	8,134	9,544	4,902	37,178
2014	Average Monthly Benefit	$451	$642	$1,061	$1,473	$2,574	$3,082	$3,531	$2,216
	Number of Active Retirants	1,478	4,430	4,080	5,092	8,216	9,675	5,133	38,104
2015	Average Monthly Benefit	$485	$650	$1,081	$1,487	$2,623	$3,141	$3,619	$2,269
	Number of Active Retirants	1,305	4,547	4,221	5,319	8,344	10,009	5,318	39,063
2016	Average Monthly Benefit	$522	$667	$1,111	$1,519	$2,680	$3,210	$3,725	$2,318
	Number of Active Retirants	1,383	4,676	4,379	5,483	8,467	10,195	5,474	40,057
2017	Average Monthly Benefit	$553	$687	$1,150	$1,563	$2,753	$3,278	$3,824	$2,375
	Number of Active Retirants	1,450	4,854	4,515	5,629	8,688	10,457	5,655	41,248

Retirees and Beneficiaries

(Recurring Benefit Payments)

Tabulated by Fiscal Year that Payments Started as of March 31, 2017

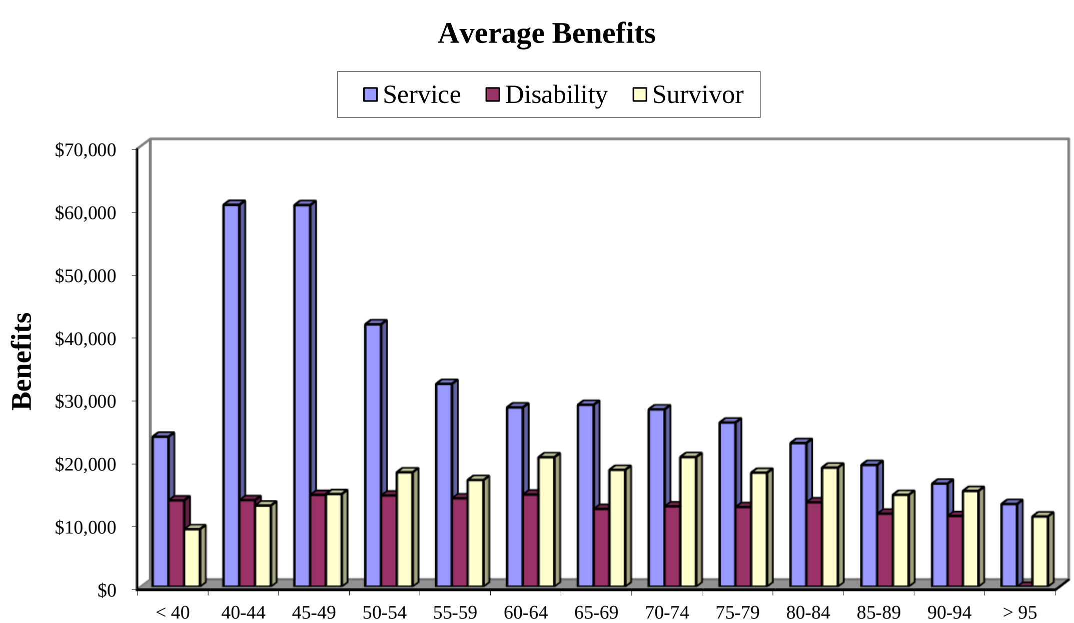
Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit	Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit
1944	1	$ 381	$32	1989	605	$ 13,163,206	$1,813
1959	1	4,458	$372	1990	650	15,704,771	$2,013
1960	1	699	$58	1991	773	18,957,651	$2,044
1961	2	1,317	$55	1992	751	19,936,434	$2,212
1962	1	5,930	$494	1993	789	22,766,974	$2,405
1963	1	14,386	$1,199	1994	836	23,606,078	$2,353
1964	4	34,963	$728	1995	1,632	54,979,773	$2,807
1966	3	14,831	$412	1996	1,626	52,494,759	$2,690
1967	3	30,639	$851	1997	631	15,230,116	$2,011
1968	2	20,408	$850	1998	654	16,015,288	$2,041
1969	4	35,563	$741	1999	933	24,947,646	$2,228
1970	4	38,336	$799	2000	1,170	32,891,288	$2,343
1971	5	39,708	$662	2001	1,372	38,199,957	$2,320
1972	13	171,770	$1,101	2002	1,161	32,554,378	$2,337
1973	16	169,594	$883	2003	1,528	46,762,324	$2,550
1974	19	215,625	$946	2004	1,501	42,901,054	$2,382
1975	24	315,385	$1,095	2005	1,590	46,486,096	$2,436
1976	40	574,866	$1,198	2006	1,589	44,359,259	$2,326
1977	60	816,265	$1,134	2007	1,723	47,039,831	$2,275
1978	68	1,072,375	$1,314	2008	1,711	45,267,606	$2,205
1979	100	1,563,672	$1,303	2009	1,627	42,651,857	$2,185
1980	140	2,298,821	$1,368	2010	2,343	73,245,096	$2,605
1981	198	3,153,416	$1,327	2011	2,135	67,553,544	$2,637
1982	229	3,918,925	$1,426	2012	2,077	57,992,794	$2,327
1983	256	4,903,861	$1,596	2013	2,115	54,990,700	$2,167
1984	324	6,274,086	$1,614	2014	2,195	56,038,065	$2,127
1985	379	7,891,067	$1,735	2015	2,448	60,867,191	$2,072
1986	478	10,588,479	$1,846	2016	2,499	62,275,849	$2,077
1987	758	17,690,394	$1,945	2017	2,672	68,778,981	$2,145
1988	457	9,053,811	$1,651				
				Total	46,927	$ 1,269,572,597	$2,255

Total Benefits Payable

(Recurring Benefit Payments)

Tabulated by Attained Ages of Benefit Recipients as of March 31, 2017

	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
Attained Ages	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20	-	-	-	-	59	$ 245,685	59	$ 245,685
20-24	-	-	-	-	12	170,600	12	170,600
25-29	-	-	-	-	31	254,134	31	254,134
30-34	-	-	1	$ 4,496	48	628,152	49	632,648
35-39	-	-	3	34,972	67	690,817	70	725,789
40-44	3	$ 71,724	8	110,151	99	1,219,252	110	1,401,127
45-49	50	3,033,676	37	510,831	128	1,656,148	215	5,200,655
50-54	241	14,612,309	121	1,771,767	173	2,556,379	535	18,940,455
55-59	1,395	58,223,836	242	3,520,568	267	4,871,596	1,904	66,616,000
60-64	4,718	152,345,006	380	5,356,573	412	7,007,967	5,510	164,709,546
65-69	9,585	273,781,221	336	4,938,303	531	10,964,947	10,452	289,684,471
70-74	9,258	268,211,836	242	3,001,808	625	11,649,565	10,125	282,863,209
75-79	6,074	171,601,625	110	1,409,208	486	10,046,550	6,670	183,057,383
80-84	4,566	119,473,470	53	672,968	454	8,251,417	5,073	128,397,855
85-89	3,308	75,784,792	49	659,641	401	7,616,315	3,758	84,060,748
90-94	1,584	30,749,264	20	232,867	209	3,061,873	1,813	34,044,004
95-99	414	6,805,865	7	78,917	58	885,717	479	7,770,499
100 & over	52	685,786	-	-	10	112,003	62	797,789
Total	41,248	$ 1,175,380,410	1,609	$ 22,303,070	4,070	$ 71,889,117	46,927	$ 1,269,572,597



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