EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

ANNUAL COMPREHENSIVE FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2020

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EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

ANNUAL COMPREHENSIVE FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2020

Prepared by the Staff of the:
Employees' Retirement System of the State of Hawaii
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THOMAS WILLIAMS, Executive Director
KANOE MARGOL, Deputy Executive Director
ELIZABETH BURTON, 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 9, 2021

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

Dear Board Members:

We present the Comprehensive Annual Financial Report (ACFR) of the Employees' Retirement System for the fiscal year ended June 30, 2020. 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, 2020 the ERS' total membership of 148,092 was comprised of 66,750 active members, 51,153 retirees and beneficiaries 9,204 inactive vested members and 20,985 inactive non-vested members. This compares to 127,107 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

City Financial Tower • 201 Merchant Street, Suite 1400 • Honolulu, Hawaii 96813-2980
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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 2020

"We're in this together." Often repeated during the COVID-19 health crisis during the second half of the FY 2020 the phrase resonates with us here at ERS. While the pandemic crisis has encircled each of us, ERS operationally continued efforts to seek constant improvement in our goals and operations month to month or year to year to includer more transparency, accountability, and security. We at ERS are fortunate that has successfully navigated these challenges having balanced concerns about personal and family health during FY 2020 with the knowledge that we provide essential functions, we have been able to continuously service our State and county members and employers, process retirement applications, and pay promised retirement benefits without interruption. Technically during the year, we continued emphasis was upgrading our administrative system and migrating our data and digital infrastructure to the cloud. These complex multi-year processes, that strengthen service delivery and information security, was successfully completed in Fall 2020.

The FY 2020 is a good example of why we diversify, when there were remarkable shifts in economic and financial market performance. During the first quarter of 2020, the U.S. stock market (equities) fell over 20 percent in 22 days and over 30 percent in 30 days – both the fastest declines in history. It was the worst first quarter in history. In contrast, the second quarter was one of the best second quarters. Many of you, our active members and retirees, have voiced concerns over whether your retirement benefits are secure during this period of severe economic swings and volatility. To answer their primary concern: Yes, the ERS benefits are secure, and the promised benefits are safe.

During FY 2020 the ERS continued transitioning the portfolio to the risk-based categorization first adopted by the Board in October 2014, of the deliberate portfolio construction designed for protection during an extreme negative equity shock, not sporadic negative volatility. This helps provide ERS the ability to react to world events that affect the investment portfolio over the long-term to weather any potential economic downturns, achieve higher returns, pay lower fees, and overall help improve the pension plan's sustainability. The ERS ended the fiscal year with net assets at $17.4 billion based on ERS' investment portfolio returns (combination of gross and net of fees, time weighted rate of return) 1.3% for the fiscal year. Although the ERS did not meet it's long-term 7.0% target rate of return in FY 2020, it exceeded ERS's Policy Benchmark of 0.7% in the fiscal year and has earned 7.8% on an inception to date basis. This is discussed in more detail later in the *Investment Section.*

As a result of the formal asset-liability study that began in fiscal year 2019 and completed in fiscal year 2020, the Board adopted a new long-term strategic allocation policy, effective July 1, 2020. It is expected that final implementation and allocations across the new long-term strategic allocation policy will be largely completed by the end of the 2022 fiscal year.

The ERS will utilize two high-level strategic classes (Broad Growth and Diversifying Strategies) for allocating assets and managing risk within the total portfolio (rather than four during FY2020). Both of these strategic classes contain sub-components that in-turn utilize asset classes and/or specific strategies for implementation. The Broad Growth class utilizes three sub-components (Public Growth, Private Growth, and Real Assets) which are ultimately invested in public equity, options-based equity, credit fixed income, private real assets, and private equity. The Diversifying Strategies class is designed to be uncorrelated to the Broad Growth class and it utilizes three sub-components (Liquid Defensive, Liquid Diversifying, and Illiquid Diversifying). The Diversifying Strategies class utilizes a multitude of asset classes and strategies, including US treasury and agency bonds, inflation-linked treasury bonds, systematic trend following, alternative risk premia, global macro, insurance-linked securities, relative value strategies, and niche private assets, among others. The ERS may also hold opportunities and other investments if they are determined to be additive to the portfolio's risk/return posture.

There was no significant legislation passed during the 2020 Legislative Session that impacted the ERS. We are thankful for the support of the Governor, Legislature, and department during these stressful times as everyone deals with the adverse impact of coronavirus pandemic.

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, in October 2014 ERS first adopted the risk-based, functional framework for allocating capital within the investment portfolio. This framework, with updates effective July 1, 2020, continues to use strategic/functional classes that in-turn utilize underlying asset classes and strategies that ERS will be implement in several phases through June 30, 2022. 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 https://ers.ehawaii.gov/.

Letter of Transmittal (continued)

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, 2020 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 $358.3 million in FY2020. This translates to an investment return of approximately 1.3% 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, 2020 report of the Fund's valuation our actuaries, Gabriel Roeder Smith & Company noted that that our unfunded actuarial accrued liability (UAAL) for funding purposes increased to $14.6 billion from $14.0 billion on June 30, 2019 based on the previous GASB reporting standards. Under the current market-based GASB standards effective in FY 2015, the Net Pension Liability increased to $15.3 billion on June 30, 2020 from $14.2 billion on June 30, 2019. On the market basis, this represents a decrease in funded position to 53.2% for FY 2020 from 54.9% for FY 2019. The ERS full funding period remained constant at 26 years at June 30, 2020 and June 30, 2019, primarily from the FY 2020 investment returns underperformance below the 7% benchmark, and a liability loss due to higher than expected salary increases for police and firefighters.

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. Meketa Group is the ERS' investment consultant, and their report on the ERS' investment program and performance results are 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

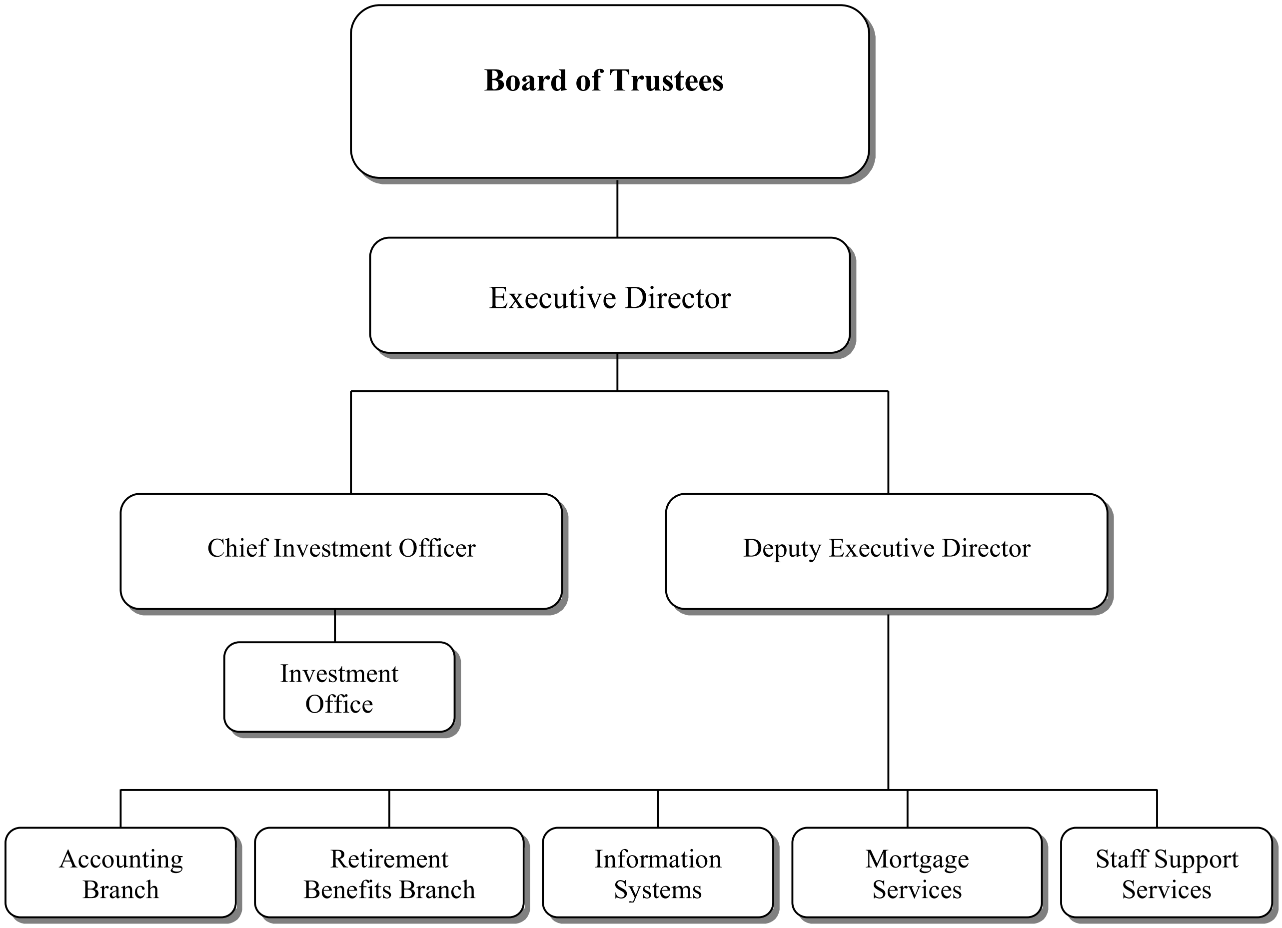
Board of Trustees

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.

	Date Current Term Began	Date Term Ends
Elected:		
Dr. Catherine Chan	January 2, 2016	January 1, 2022
Ms Genevieve Ley	January 2, 2018	January 1, 2024
Mr. Emmit A. Kane, Board Chair	January 2, 2020	January 1, 2026
Mr. Bennett Yap	January 2, 2020	January 1, 2026
Appointed:		
Mr. Jerry E. Rauckhorst	January 2, 2014	January 1, 2020
Mr. Vincent Barfield	January 2, 2017	January 1, 2023
Mr. Wesley K. Machida	January 2, 2019	January 1, 2025
Ex-Officio:		
Ms. Craig K. Hirai	December 16, 2019	January 1, 2023

Organizational Structure



Executive Director Thomas Williams
Deputy Executive Director Kanoe Margol
Chief Investment Officer Elizabeth Burton

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 ACFR.

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, 2020, 5,548 active employees were enrolled in the Contributory Class, or about 8.3% 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, 2020, the Hybrid Class had 50,011 members or about 74.9% 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, 2020, there were 11,191 active employees in the Noncontributory Class, which represents over 16.8% 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.		
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)] Membership 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

Summary of Retirement Benefit Plan Provisions (continued)

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 2020

There was no significant legislation (Acts) passed during the 2020 Legislative Session (including Special Sessions) and approved by the Governor that impacts the ERS Due to the coronavirus pandemic, lawmakers and the Governor focused on urgent matters affecting the State of Hawaii – the State budget, State appropriations for the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), State bonds, and capital improvement projects.

For more information on the 2020 Legislative Session, please refer to the capitol website at https://www.capitol.hawaii.gov/.

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, 2020 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, 2020, 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 77 through 86 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 administrative expenses and investment expenses, and the Introductory,

The Auditor
State of Hawaii

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 9, 2021 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 9, 2021

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, 2020. 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 (ACFR). 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 combining statement of fiduciary net position as of June 30, 2020, and the related statement of changes in fiduciary net position during the fiscal year from July 1, 2019 to June 30, 2020 (FY 2020). 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

- While the fiduciary net position restricted for pension benefits (or net assets) increased slightly during FY 2020 to $17.4 billion, the funded status of ERS decreased to 53.2% as of June 30, 2020. This represents an increase of $0.2 billion, 0.9%, from the fiduciary net position restricted for pension benefits of $17.2 billion as of June 30, 2019.

- The ERS investment return (net and gross of fees) was 1.3% for the 2020 fiscal year compared to a 6.0% return during the 2019 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 ACFR). The investment program underperformed its actuarial and investment goal of 7.0% that was effective June 30, 2020. Under GASB Statement No. 67, Financial Reporting for Pension Plans – an amendment of GASB Statement No. 25, the annual money-weighted return on ERS' pension plan investments, net of pension plan investment expense, was 2.1% and 5.7% for FY 2020 and FY 2019, 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 fourth year that the results of operations for these FY 2020 financial statements are prepared on the risk-based investment strategy since the portfolio was transitioned to the new policy during the 2017 fiscal year. Please refer to Note F1 later in Notes to Financial Statements and the Investment Section of this ACFR for more detailed information on the asset allocation policy.

- During 2020 and 2019, there was no significant legislation passed that significantly affects the operations or provisions of the pension trust. This was the third of four years that will have significant increases in employer contribution rates from 2017 legislation that is discussed below.

- Total pension liability as of June 30, 2020 increased to $32.7 billion from $31.4 billion as of June 30, 2019, while the corresponding net pension liability was $15.3 billion and $14.2 billion for June 30, 2020 and June 30, 2019, respectively. Covered payroll for the ERS increased in FY 2020 to $4.5 billion compared to FY 2019 to $4.4 billion, for a 3.0% increase.

- The fiduciary net position as a percentage of total pension liability decreased to 53.2% from 54.9% as of June 30, 2020 and June 30, 2019, respectively, while the funded ratio on an actuarial basis increased to 55.3 % from 55.2%, 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 $190.1 million during FY 2020, or 15.9% from FY 2019. The increase is due primarily to an increase in the statutory employer contribution rate; and to a lesser extent member pay increases, more active members being required to contribute, and new employees contributing at higher contribution rates. 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 $76.0 million, or 5.2%, to $1,545.6 million in FY 2020 from $1,469.6 million in FY 2019. Pension benefits continues to increase due to 2.5% more retirees and beneficiaries (51,153 in 2020 compared to 49,885 in 2019), an increase in the average pension benefit for new retirees, and the annual 2.5% postretirement increase.
- Administrative expenses increased by $4.0 million to $17.8 million in FY 2020 from $13.8 million in FY 2019. The increase in administrative expenses is primarily the result of timing of Information Technology related charges and, to a lesser extent, increases in payroll related items for salaries and the fringe benefit rate during FY 2020, and an increase in professional services for internal audit fees and the actuarial experience study conducted every three years. 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, 2020 and 2019
(Dollars in millions)

	2020	2019	FY 2020 % change
Assets:			
Cash and cash equivalents and short-term investments	$ 3,477.4	$ 2,319.2	49.9 %
Receivables	249.6	222.3	12.3
Investments	14,120.4	15,120.6	(6.6)
Invested securities lending collateral	992.6	1,021.7	(2.8)
Equipment	7.6	6.6	15.2
Total assets	18,847.6	18,690.4	0.8
Liabilities			
Securities lending liability	992.6	1,021.7	(2.8)
Investment accounts and other payables	469.6	441.7	6.3
Total liabilities	1,462.2	1,463.4	(0.1)
Fiduciary net position restricted for pensions	$ 17,385.4	$ 17,227.0	0.9

Summary of Changes in Fiduciary Net Position
June 30, 2020 and 2019
(Dollars in millions)

	2020	2019	FY 2020 % change
Additions:			
Contributions	$ 1,386.0	$ 1,195.9	15.9 %
Net investment income	358.3	932.7	(61.6)
Total additions	1,744.3	2,128.6	(18.1)
Deductions:			
Retirement benefit payments	1,545.6	1,469.6	5.2
Refund of contributions	22.4	16.6	34.9
Administrative expenses	17.8	13.8	29.0
Total deductions	1,585.8	1,500.0	5.7
Increase in fiduciary net position	$ 158.5	$ 628.6	(74.8)

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.

Investments for the risk-based allocation policy approved in FY 2015 based on the type of security for financial reporting are listed below. 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. Since 2016 the ERS has been transitioning towards these new targets. Following the 2019 Asset Liability Study, the long-term portfolio allocations were slightly amended to reduce the real return and private growth targets while the allocation to diversifying strategies target increased from 27% to 35% to allow for more uncorrelated and complimentary (to growth) strategies to be added to the portfolio. During the 2020 fiscal year, the ERS continued its focus on implementing these risk-based strategies.

The asset distribution of the ERS' investment securities for the pension trust, excluding pending trade settlements and securities lending collateral, at June 30, 2020 and 2019 is presented below at fair value. Fluctuations will occur based on the trading activity and timing of the settlements. 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 ACFR for a discussion on the risk-based methodology, asset allocation plan targets, and investments by investment strategy.

Asset Class
June 30, 2020 and 2019
(Dollars in millions)

	2020	%	2019	%
Short term investments and cash	$ 3,477.4	19.8 %	$ 2,319.2	13.3 %
Equity securities	6,257.2	35.6	7,252.4	41.6
Fixed income	4,131.9	23.5	4,740.4	27.2
Real estate	1,531.9	8.7	1,285.3	7.4
Alternative investments	2,199.5	12.4	1,842.5	10.5
Total investment assets	17,597.9	100.0	17,439.8	100.0
Less loans on real estate and alternative investments	190.7		142.8	
	$ 17,407.2		$ 17,297.0	

The rate of return (gross of fees time-weighted rate of returns) on the ERS investment portfolio during FY 2020 was 1.3% lead by returns in the crisis risk offset program, real return and principal protection, while there was underperformance or losses in the traditional equity markets and certain fixed income assets, down from 6.0% in FY 2019. Total net investment income was $358.3 million in FY 2020 versus $932.7 million in FY 2019.

The ERS earned positive returns during a volatile year with the crisis risk offset (+6.5%), real return (+6.6%) and principal protection (+4.5%) asset classes, compared to small losses in broad growth (-0.4%) assets. All asset classes underperformed the ERS's 7.0% benchmark during the year. The crisis risk offset program earned 6.5% on the strong performance within the long duration fixed income segment (+25.1%), followed by real return (+6.6%) and principal protection (+4.5%). Within the broad growth class, there was a mixture of gains and losses within sub-components, resulting in a slight overall loss for the class of (-0.4%). 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 ACFR.

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.

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 remained relatively consistent FY 2020 compared to FY 2019 due primarily from elimination of accrued performance fees on certain assets in FY 2020. Investment advisor fees may fluctuate each year due to certain equity and 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 for real estate managers are recognized on the accrual basis of accounting for 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.

Contributions

Contributions from employers and employees totaled $1,386.0 million and $1,195.9 million in FY 2020 and FY 2019, respectively. During FY 2020, total contributions increased by $190.1 million, or 15.9%, mainly due to an increase in the statutory employer contribution rate, member pay increases, more active members being required to contribute, and new employees contributing at higher contribution rates. Employer contribution rates will continue to increase over the next year as a result of 2017 legislation discussed below. Please refer to the Financial Section in the ERS 2020 and 2019 ACFR for more information.

Pension Plan Benefits and Expenses

Pension benefit payments continue to be the primary expense of the ERS with payments increasing to $1,545.6 million in FY 2020 from $1,469.6 million in FY 2019. 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 to $22.4 million in FY 2020 from $16.6 million in FY 2019.

Administrative expenses increased to $17.8 million from $13.8 million in FY 2019 due primarily from an increase for computer related costs for equipment and maintenance during the year. This was followed by an increase in payroll related costs for pay raises and an increase in the fringe benefit rate assessment, and to a lesser extent for professional services related to an actuarial experience study completed and increased internal audit activities.

Pension Plan Changes

There was no significant legislation passed in 2020 and 2019 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 ACFR.

Actuarial Valuations and Measurement of Net Pension Liability

The funding status decreased during FY 2020 on the fiduciary net position (market asset basis) to 53.2% as June 30, 2020 from 54.9% as of June 30, 2019, as a result of investment returns being lower than benchmark, an increase in liabilities with actual salary increases being larger than current expectations, and to a lesser extent the four-year phase-in of increased employer contribution rates.

During a volatile FY 2020 resulting from the global pandemic, the ERS's investment portfolio earned 1.3% based on the market value of assets, and was less than the target rate of 7.0%. This compares to rate of return for the actuarial value was 5.6% in FY 2020, which is different than the market return due to the smoothing methodology used in the determination of the actuarial value of assets. combined with the third year of scheduled contribution rate increases (of a four-year phase in period).

The total pension liability for fiscal year ended June 30, 2020 is based on the actuarial valuation performed as of June 30, 2020 and a measurement date of June 30, 2020.

Per the valuation as of June 30, 2020, the ERS's total pension liability was $32.7 billion, covered payroll totaled $4.5 billion, and the ERS's fiduciary net position of $17.4 billion resulting in a net pension liability of $15.3 billion. The June 30, 2019 valuation results include the ERS's total pension liability of $31.4 billion, covered payroll totaled $4.4 billion, and the ERS' fiduciary net position was $17.2 billion resulting in a net pension liability of $14.2 billion. The ERS' fiduciary net position as a percentage of total pension liability was 53.2% and 54.9% on June 30, 2020 and 2019, resulting in the net pension liability as a percentage of covered payrolls of 341.6% and 323.8%, 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, 2020, 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.)

The actuarial assumptions, and changes to the assumptions are discussed later in the *Note G., Pension Liability* to the financial statements and in the Required Supplementary Information – Unaudited section. The Actuarial Section of this ACFR contains for more information on changes to the Actuarial Section.

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 Firefighters 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, 2020

Assets		
Cash and cash equivalents and short-term investments		
Cash and cash equivalents	$	953,191,671
Short-term investments		2,524,206,530
		3,477,398,201
Receivables		
Accounts receivable and others		5,728,204
Investment sales proceeds		150,789,478
Accrued investment income		38,399,145
Employer and member contributions		54,670,412
		249,587,239
Investments, at fair value		
Equity securities		6,257,170,203
Fixed income securities		4,131,855,027
Real estate investments		1,531,902,816
Alternative investments		2,199,495,724
		14,120,423,770
Other		
Invested securities lending collateral		992,602,987
Equipment, at cost, net of depreciation		7,654,129
		1,000,257,116
Total assets		18,847,666,326
Liabilities		
Accounts and other payables		128,401,072
Payable for securities purchased		150,439,791
Securities lending collateral		992,602,987
Notes payable		190,742,000
Total liabilities		1,462,185,850
Commitments and contingencies		
Fiduciary net position restricted for pensions	$	17,385,480,476

See accompanying notes to financial statements

Financial Statements (continued)

Statement of Changes in Fiduciary Net Position

Year ended June 30, 2020

Additions		
Contributions		
Employers contributions	$	1,098,589,013
Members contributions		287,398,031
Total contributions		1,385,987,044
Investment income		
From investing activities:		
Net depreciation in fair value of investments		(39,409,286)
Interest on fixed income securities		157,681,571
Dividends on equity securities		117,277,446
Income on real estate investments		81,755,691
Interest on short-term investments		3,665,938
Alternative investment income		117,736,703
Miscellaneous		771,552
		439,479,615
Less investment expenses		86,461,633
Net investment income from investing activities		353,017,982
From securities lending activities:		
Securities lending income		19,006,966
Less: securities lending expenses, net		13,742,284
Net investment income from securities lending		5,264,682
Total net investment income		358,282,664
Total additions, net		1,744,269,708
Deductions		
Benefit payments		1,545,589,761
Refunds of member contributions		22,443,593
Administrative expenses		17,782,865
Total deductions		1,585,816,219
Net increase in fiduciary net position		158,453,489
Fiduciary net position restricted for pensions		
Beginning of year		17,227,026,987
End of year	$	17,385,480,476

See accompanying notes to financial statements.

Notes to Financial Statements

June 30, 2020

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. 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, 2020 are as follows:

Employers:	
State	1
County	4
Total employers	5
Pensioners and beneficiaries currently receiving benefits:	
Pensioners currently receiving benefits:	
Police and firefighters	3,971
All other employees	42,515
Total pensioners	46,486
Beneficiaries currently receiving benefits:	
Police and firefighters	346
All other employees	4,321
Total beneficiaries	4,667
Total pensioners and beneficiaries	51,153
Terminated vested members entitled to benefits but not yet receiving benefits:	
Police and firefighters	386
All other employees	8,818
Total terminated vested members	9,204
Inactive members	
Police and firefighters	788
All other employees	20,197
Total inactive members	20,985
Total terminated vested and inactive members	30,189
Active members:	
Vested:	
Police and firefighters	4,012
All other employees	43,758
Total vested members	47,770
Nonvested:	
Police and firefighters	928
All other employees	18,052
Total nonvested members	18,980
Total active members	66,750
Total membership	148,092

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 three 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 August 12, 2019 as recommended by Gabriel, Roeder, Smith and Company (GRS) (from the experience study as of June 30, 2018, with most of the assumptions based on the period from July 1, 2013, through June 30, 2018) 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 Firefighters 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 Firefighters 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 Firefighters increased to 28.00% on July 1, 2017; 31.00% on July 1, 2018;, and 36.00% on July 1, 2019; and increases to 41.00% on July 1, 2020; and the rate for All Other Employees increased to 18.00% on July 1, 2017; 19.00% on July 1, 2018; and 22.00% on July 1, 2019; and increases to; 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 Firefighters 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, 2020, 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. 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, Fair Value Measurement and Application.

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 are 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 as of June 30, 2018, with most of the assumptions based on the period from July 1, 2013, through June 30, 2018.

9. Recently Issued Accounting Policies

In January 2017, GASB issued Statement No. 84, Fiduciary Activities (Statement No. 84). 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. The requirements of Statement No. 84 are effective for reporting periods beginning after December 15, 2018, postponed by GASB Statement No. 95, Postponement of the Effective Dates of Certain Authoritative Guidance for one year. 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, 2020 are as follows:

		2020
Pension Accumulation Reserve	$	14,197,534,708
Annuity Savings Reserve		3,164,652,385
Expense Reserve		23,293,383
Total fiduciary net position restricted for pensions	$	17,385,480,476

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.

Note E – Contributions (continued)

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 decisions are further dictated by the Investment Policy Statement, 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 with 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.

Note F – Deposit and Investment Disclosures (continued)

1. Investment Policy (continued)

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.

At the end of the fiscal year, June 30, 2020, the ERS was strategically invested in the following classes:

	Strategic Allocation (functional/risk-based classes)
Broad Growth	68%
Principal Protection	8%
Real Return	8%
Crisis Risk Offset	16%
Total	100%

During FY 2020, the Broad Growth strategic asset class includes sub-asset classes or components of Active Public Equity, Passive Public Equity, Core Real Estate, Extended Global Credit, Low Volatility Equity, Options-based Equity, Non-Core Real Estate, and Private Equity. The Principal Protection asset class includes the Global Intermediate Fixed Income. The Real Return asset class includes components of Inflation-linked Fixed Income, Infrastructure, and Timber. The Crisis Risk Offset sub-asset classes are Alternative Return Capture Strategies, Trend Following Strategies, and Long Duration Fixed Income. The ERS may also hold Opportunities and Other Investments.

As a result of the formal asset-liability study that began in fiscal year 2019 and was completed in fiscal year 2020, the Board adopted a new long-term strategic allocation policy. As part of this new long-term strategic policy, the portfolio will transition to two major strategic classes (rather than four). Current classes and sub-classes will be remapped to the two major strategic classes where applicable. It is expected that final implementation and allocations across the new long-term strategic allocation policy will be largely completed by the end of the 2022 fiscal year.

The ERS will strategically invest in the following strategic 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%	7.9%	5.7%	14.7%
Diversifying Strategies	37%	3.7%	1.5%	6.7%
Total Portfolio	100%			

[1] Uses an expected inflation of 2.2%

Note F – Deposit and Investment Disclosures (continued)

1. Investment Policy (continued)

The ERS utilizes two high-level strategic classes (Broad Growth and Diversifying Strategies) for allocating assets and managing risk within the total portfolio. Both of these strategic classes contain sub-components that in-turn utilize asset classes and/or specific strategies for implementation. The Broad Growth class utilizes three sub-components (Public Growth, Private Growth, and Real Assets) which are ultimately invested in public equity, options-based equity, credit fixed income, private real assets, and private equity. The Diversifying Strategies class is designed to be uncorrelated to the Broad Growth class and it utilizes three sub-components (Liquid Defensive, Liquid Diversifying, and Illiquid Diversifying). The Diversifying Strategies class utilizes a multitude of asset classes and strategies, including US treasury and agency bonds, inflation-linked treasury bonds, systematic trend following, alternative risk premia, global macro, insurance-linked securities, relative value strategies, and niche private assets, among others. The ERS may also hold opportunities and other investments if they are determined to be additive to the portfolio's risk/return posture.

It is expected that the ERS's implementation of the new long-term strategic allocation, effective as of July 1, 2020, will be completed by the end of the FY 2022 as follows.

Implementation Plan for Long-term Strategic Policy				
	Current (6/30/2020)	7/1/2020	Long-Term 7/1/2021	Long-Term 7/1/2022
Broad Growth	68%	72%	67.5%	63%
Principal Protection	8%	--	--	--
Real Return	8%	--	--	--
Crisis Risk Offset	16%	--	--	--
Diversifying Strategies	--	28%	32.5%	37%
Total Portfolio	100%	100%	100%	100%

Rate of Return

For the year ended June 30, 2020, the annual money-weighted return on pension plan investments, net of pension plan investment expense, was 2.1%. 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.

Note F – Deposit and Investment Disclosures (continued)

2. Deposits (continued)

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, 2020, the carrying amount of deposits totaled approximately $953,191,671 and the corresponding bank balance was $958,208,278, all of which was exposed to custodial credit risk.

3. Investments and fair value

The following table shows the investments of the ERS by investment type as of June 30, 2020.

Investments at fair value		
Cash and short-term instruments		
Cash and cash equivalents	$	953,191,671
Short-term bills and notes		990,377,396
Pooled and others		1,536,720,819
Fixed income securities		
U.S. Treasury bonds and notes		2,506,352,362
U.S. government agencies bonds		6,224,640
U.S. government agency mortgage backed		305,453,520
U.S. government-sponsored agency mortgage backed		11,153,343
Asset backed securities		27,718,204
U.S. corporate bonds		800,431,457
Non-U.S. government / agency bonds		179,720,165
Non-U.S. corporate bonds		164,282,359
Pooled and Others		58,757,697
Derivatives		
Forwards - Cash and short-term instruments		(2,891,685)
Forwards - Debt securities		22,464,312
Futures - Debt securities		42,756,323
Options - Equities		(51,799,315)
Options - Debt securities		(14,890)
Swaps - Debt securities		6,555,535
Equities		6,308,969,518
Real estate		1,531,902,816
Alternative investments		2,199,495,724
Total investments	$	17,597,821,971
Short-term instruments for securities lending collateral pool	$	992,602,987

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. Short-term investments and 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, preferred shares, 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)

Preferred shares and fixed income securities classified in level 3 are private investments, thinly traded securities, 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 (direct investment) and Alternative Investments (direct investment) 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). 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 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.

<u>Investments measured at the net asset value (NAV)</u>
Short-Term Investment Funds, Pooled Equity (not publicly traded), and Fixed Income (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 (pooled or commingled funds) 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.

Notes to Financial Statements (continued)

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, 2020.

	Total	Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level 6/30/2020				
Short-term investments				
Short-term bills and notes	$ 990,377,396	$ 986,378,239	$ 3,999,157	$ -
Equity securities				
Common stocks	4,643,593,908	4,643,593,098	-	810
Preferred shares and other	349,381,895	317,695,214	7,065,100	24,621,581
Total equity securities	4,992,975,803	4,961,288,312	7,065,100	24,622,391
Fixed income securities				
U.S. Treasury bonds and notes	2,506,352,362	2,365,451,965	140,900,397	-
U.S. government agencies bonds	6,224,640	-	6,224,640	-
U.S. government agency mortgage backed	305,453,520	-	305,453,520	-
U.S. government-sponsored agency mortgage	11,153,343	-	11,153,343	-
Asset backed securities	27,718,204	-	27,718,204	-
U.S. corporate bonds	800,431,457	-	749,137,955	51,293,502
Non-U.S. government / agency bonds	179,720,165	-	179,419,013	301,152
Non-U.S. corporate bonds	164,282,359	-	138,600,381	25,681,978
Pooled and Others	3,406,252	-	3,392,155	14,097
Total fixed income securities	4,004,742,302	2,365,451,965	1,561,999,608	77,290,729
Real estate (direct investment)	581,211,501	-	-	581,211,501
Alternative investments (direct investment)	183,372,424	-	-	183,372,424
Total assets at fair value level	$ 10,752,679,426	$ 8,313,118,516	$ 1,573,063,865	$ 866,497,045
Liabilities				
Notes payable (on real estate-direct)	$ 190,742,000	$ -	$ -	$ 190,742,000
Total investments (excluding derivatives), net of notes payable measured by fair value level	$ 10,561,937,426	$ 8,313,118,516	$ 1,573,063,865	$ 675,755,045
Investment derivative instruments				
Currency purchases forwards	$ (2,891,685)	$ -	$ (2,891,685)	$ -
To Be Announced (TBAs) forwards	22,464,312	-	22,464,312	-
Bond futures	7,310,238	7,310,238	-	-
Commodity futures	6,762,878	6,762,878	-	-
Currency futures	4,713,434	4,713,434	-	-
Index fixed income futures	1,850,089	1,850,089	-	-
Interest rate futures	22,119,684	22,119,684	-	-
Options	(51,799,315)	(16,418,114)	(35,381,201)	-
Options on debt securities	(14,890)	-	(14,890)	-
Credit default swaps	(584,726)	-	(584,726)	-
Total return swaps	9,211,245	-	9,211,245	-
Interest rate swaps	(2,070,984)	-	(2,070,984)	-
Total investment derivative instruments	$ 17,070,280	$ 26,338,209	$ (9,267,929)	$ -

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)

	Total	Fair Value Measurement Using: 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				
Certificate of deposits	$ 133,068,479	$ -	$ 133,068,479	$ -
Repurchase agreements	154,709,802	-	154,709,802	-
Global commercial paper	215,402,162	-	215,402,162	-
Global asset backed notes	60,887,290	-	60,887,290	-
Global corporate notes	428,535,254	-	428,535,254	-
Total invested securities lending collateral	$ 992,602,987	$ -	$ 992,602,987	$ -

Investments and Derivative Instruments Measured at Fair Value (contnued)

Investments measured at net asset value (NAV)	
Short-term investments	$ 1,536,720,819
Equity securities	1,315,993,715
Fixed income	55,351,445
Real estate	950,691,315
Alternative investments	2,016,123,300
Total investments measured at NAV	5,874,880,594

	June 30, 2020	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Short-term investments (a)	$ 1,536,720,819	$ -	Daily	1 day
Equity securities (b)	1,315,993,715	-	Daily	2 days
Fixed income (c)	55,351,445	194,580,000	Various	Various
Real estate (d)	950,691,315	732,051,000	Not eligible	n/a
Alternative investments (e)	2,016,123,300	2,001,262,000	Not eligible	n/a
Total investments measured at NAV	$ 5,874,880,594	$ 2,927,893,000		

(a) Short-term investments primarily consist of three pooled funds to invest excess cash at the ERS' custodian, The Bank of New York Mellon and about 20 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) Fixed income consist of three private market limited partnerships or limited liability companies to capitalize in multiple strategies that target investments on a global basis including, but not limited to, obligations of leveraged, financially troubled, or liquidating businesses or entities, bank loans, high yield bonds, securitized credit (including debt issued by asset-backed security offerings), derivatives (such as swap agreements), etc. 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.

(d) Real estate consists of 51 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.

(e) Alternative investments consist of 221 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	$ 990,377,396	$ 1,536,720,819	$ (2,891,685)	$ -	$ 2,524,206,530
Equity securities	4,992,975,803	1,315,993,715	(51,799,315)	-	6,257,170,203
Fixed income securities	4,004,742,302	55,351,445	71,761,280	-	4,131,855,027
Real estate investments	581,211,501	950,691,315	-	-	1,531,902,816
Alternative investments	183,372,424	2,016,123,300	-	-	2,199,495,724
Invested securities lending collateral	-	-	-	992,602,987	992,602,987
	$ 10,752,679,426	$ 5,874,880,594	$ 17,070,280	$ 992,602,987	$ 17,637,233,287
Liabilities					
Notes payable	$ 190,742,000	$ -	$ -	$ -	$ 190,742,000
	$ 190,742,000	$ -	$ -	$ -	$ 190,742,000

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, 2020 is below. Securities below investment grade of Baa and non-rated issues (average rating by S&P, Moody's and/or Fitch) amounted to $792,987,736 or 19.2% 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, 2020

Ratings	US Govt Agency	US Govt sponsored-agency mortgage backed	US corporate bonds	Asset backed	Non-US corporate bonds	Non US-govt/agencies bonds	Pooled & others	Total
AAA	$ 6,224,640	$ 305,272,306	$ -	$ 3,501,830	$ 2,905,793	$ 15,840,580	$ -	$ 333,745,149
AA1	-	-	1,098,430	-	-	6,934,963	-	$ 8,033,393
AA2	-	-	1,452,185	-	896,605	18,659,412	-	$ 21,008,202
AA3	-	-	2,674,147	-	338,257	68,360,633	-	$ 71,373,037
A1	-	-	10,523,729	-	2,893,260	9,481,763	-	$ 22,898,752
A2	-	-	19,717,656	1,250,785	4,733,610	4,790,229	-	$ 30,492,280
A3	-	-	20,435,574	-	6,767,342	644,033	-	$ 27,846,949
BAA1	-	-	30,881,518	241,169	9,921,495	11,062,987	-	$ 52,107,169
BAA2	-	-	41,379,088	722,808	12,445,143	8,202,840	-	$ 62,749,879
BAA3	-	-	72,031,332	2,485,353	28,841,282	15,987,529	-	$ 119,345,496
BA1	-	-	18,295,586	1,056,664	12,786,420	2,044,895	755,398	$ 34,938,963
BA2	-	-	33,970,755	-	15,782,649	945,440	610,098	$ 51,308,942
BA3	-	-	26,161,754	1,546,137	11,001,126	1,271,051	-	$ 39,980,068
B1	-	-	66,558,328	-	13,042,003	-	-	$ 79,600,331
B2	-	-	152,581,757	-	8,931,716	1,438,345	-	$ 162,951,818
B3	-	-	87,383,304	3,749,245	6,883,027	-	1,175,834	$ 99,191,410
CAA1	-	-	43,319,873	-	3,236,184	-	-	$ 46,556,057
CAA2	-	-	32,245,397	1,047,089	2,323,174	-	-	$ 35,615,660
CAA3	-	-	9,748,819	-	676,200	485,550	-	$ 10,910,569
CA	-	-	5,379,939	-	-	1,478,356	-	$ 6,858,295
DEF	-	-	1,788,069	-	1,391,717	192,705	-	$ 3,372,491
Not rated	-	181,214	122,804,217	12,117,124	18,485,356	11,898,854	56,216,367	$ 221,703,132
	$ 6,224,640	$ 305,453,520	$ 800,431,457	$ 27,718,204	$ 164,282,359	$ 179,720,165	$ 58,757,697	1,542,588,042
US Treasury Bonds and Notes								2,506,352,362
US Government agency - Government National Mortgage Association (GNMAs) mortgage backed								11,153,343
subtotal								$ 4,060,093,747
Derivatives (debt securities)								71,761,280
Total fixed income securities in Investments								$ 4,131,855,027

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 $953,191,671 in cash and securities exposed to custodial credit risk as of June 30, 2020.

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, 2020, 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, 2020, 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	$	2,506,352,362	6.4
U.S. government agencies bonds		6,224,640	4.8
U.S. government agency mortgage backed		305,453,520	21.9
U.S. government-sponsored agency mortgage backed		11,153,343	19.8
Asset backed securities		27,718,204	10.2
U.S. corporate bonds		800,431,457	4.4
Non-U.S. government / agency bonds		179,720,165	13.7
Non-U.S. corporate bonds		164,282,359	5.0
Pooled and Others		58,757,697	6.9
Total	$	4,060,093,747	7.8

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, 2020. (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	$ 62,289	$ 360,240	$ -	$ -	$ -	$ -	$ 422,529
Australian dollar	330,892	6,591,418	81,763,914	69,116,000	-	-	157,802,224
Brazilian real	294,713	569,676	(5,030,663)	24,450,595	-	-	20,284,321
Canadian dollar	(5,380,879)	25,798,125	(75,008,986)	132,903,652	-	-	78,311,912
Chilean peso	5,368	-	(16,741,862)	44,817	-	-	(16,691,677)
Chinese Yuan Renminbi	1,622	-	(27,340,088)	13,831,146	-	-	(13,507,320)
Colombian peso	35,988	-	6,479,413	21,432	-	-	6,536,833
Czech koruna	12,444	-	(6,187,220)	1,488,454	-	-	(4,686,322)
Danish krone	184,152	431,040	(588,559)	38,882,783	-	-	38,909,416
Euro currency unit	2,631,239	94,494,357	(135,494,980)	366,768,836	-	-	328,399,452
Hong Kong dollar	808,705	-	(1,099,131)	162,243,324	-	-	161,952,898
Hungarian forint	8,204	-	(30,288,933)	933,013	-	-	(29,347,716)
Indian Rupee	-	-	6,282,639	-	-	-	6,282,639
Indonesian rupiah	7,105	1,104,649	26,359,512	2,260,977	-	-	29,732,243
Israeli shekel	58,602	-	(23,437,137)	6,284,214	-	-	(17,094,321)
Japanese yen	5,181,917	11,095,536	(27,553,489)	358,719,042	-	-	347,443,006
Malaysian ringgit	671,984	-	(71,015)	8,503,062	-	-	9,104,031
Mexican peso	242,398	-	28,126,000	6,842,334	-	-	35,210,732
New Taiwan dollar	685,499	-	15,161,081	119,970,859	-	-	135,817,439
New Zealand dollar	84,545	925,442	17,499,981	10,227,475	-	-	28,737,443
Norwegian krone	165,142	-	(53,193,784)	7,111,611	-	-	(45,917,031)
Philippine peso	-	-	6,337,063	1,823,214	-	-	8,160,277
Polish zloty	(5,032)	-	(25,242,207)	1,787,655	-	-	(23,459,584)
Pound sterling	1,275,442	175,671,835	(168,691,376)	196,252,735	-	-	204,508,636
Russian ruble (new)	-	2,189,845	(2,273,092)	2,190,843	-	-	2,107,596
Singapore dollar	204,225	-	(40,440,462)	26,136,449	-	-	(14,099,788)
South African rand	637,001	-	493,126	30,975,124	-	-	32,105,251
South Korean won	222,940	-	(43,544,227)	30,989,193	-	-	(12,332,094)
Swedish krona	24,274	1,178,636	48,726,761	28,546,659	-	-	78,476,330
Swiss franc	(58,356)	-	100,566,480	116,382,734	-	-	216,890,858
Thai baht	1,516,013	-	(2,326,643)	15,417,111	-	-	14,606,481
Turkish lira	422,302	-	(6,939,595)	2,586,624	-	-	(3,930,669)
Urugayan peso	335,195	-	-	-	-	-	335,195
Various Countries	-	-	-	1,315,992,660	-	-	1,315,992,660
Total	$ 10,665,933	$ 320,410,799	$ (353,697,479)	$ 3,099,684,627	$ -	$ -	$ 3,077,063,880

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, 2020 was 90 days.

At June 30, 2020, 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	$ 718,360,969	$ 462,161,002	$ 290,371,384
U.S. equities	512,428,457	485,770,053	39,700,146
International equities	243,682,341	43,353,592	227,195,702
International fixed income	5,919,056	1,318,340	4,852,370
	$ 1,480,390,823	$ 992,602,987	$ 562,119,602

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, 2020 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, 2020 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	$ -	$ (2,891,685)	0.0 yrs
	To Be Announced (TBAs)	-	22,464,312	30.1 yrs to 30.2 yrs
	Total forwards	-	19,572,627	
Futures	Bond contracts	1,948,552,490	7,310,238	0.3 yrs
	Commodity contracts	23,360,877	6,762,878	0.2 yrs to 1.5 yrs
	Currency contracts	(217,981,449)	4,713,434	0.1 yrs to 0.3 yrs
	Index contracts	126,801,775	1,850,089	0.1 yrs to 0.5 yrs
	Interest rate contracts	5,047,182,757	22,119,684	0.1 yrs to 4.3 yrs
	Futures total	6,927,916,450	42,756,323	
Options	Options	-	(51,799,315)	0.0 yrs to 0.2 yrs
	Options on debt securities	-	(14,890)	0.0 yrs to 0.7 yrs
	Options total	-	(51,814,205)	
Swaps	Credit default swaps	-	(584,726)	0.5 yrs to 41.2 yrs
	Total return swaps	-	9,211,245	0.0 yrs
	Interest rate swaps	-	(2,070,984)	0.3 yrs to 30.5 yrs
	Swaps total	-	6,555,535	
	Grand Total	$ 6,927,916,450	$ 17,070,280	

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, 2020.

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, 2020, the ERS had credit default, total return, inflation, and interest rate 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. 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. 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, total return swaps, and credit default swaps, are a tool or instrument used to manage 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, 2020, 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 Corp	A-	A2	15,701
Bank of America Merrill Lynch	A-	A2	(1,730,173)
Barclays PLC	BBB	Baa2	(12,650)
BNP Paribas SA	A+	Aa3	(905)
Citibank NA	A+	Aa3	83,416
Citigroup Inc	BBB+	A3	(126,498)
CME Group Inc	AA-	Aa3	(2,083,127)
Credit Suisse Group AG	BBB+	(blank)	(5,606)
Credit Suisse Securities (USA) LLC	BBB+	Baa2	6,939,485
Deutsche Bank Securities Inc	BBB+	A3	2,231,739
Goldman Sachs & Co LLC	BBB+	A3	7,039,228
HSBC Holdings PLC	A-	(blank)	(46,525)
Intercontinental Exchange Inc	A	A2	(375,743)
JP Morgan	A-	A2	423,109
JPMorgan Chase & Co	A-	A2	(35,915)
London Stock Exchange Group PLC	A	A3	12,145
Morgan Stanley	BBB+	A3	654,438
Morgan Stanley & Co LLC	BBB+	A3	3,103,698
SG Americas Securities LLC	A	A1	14,099,671
UBS Securities	A-	A3	(407,384)
UBS Securities LLC	A-	A3	185,150
Exchange traded derivatives			(12,892,974)
Total			$ 17,070,280

Note G – Pension Liability

1. Net Pension Liability

The components of the net pension liability of the ERS at June 30, 2020 were as follows:

Total Pension Liability	$32,691,755,844
Plan Fiduciary Net Position	17,385,480,476
Net Pension Liability	$15,306,275,368
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	53.2%
Net Pension Liability as a Percentage of Covered Payroll	341.6%

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.*

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, 2020. These GASB rules only define pension liability for financial reporting purposes. The actuarial assumptions were based on the results of an experience study as of June 30, 2018, with most of the assumptions based on the period from July 1, 2013, through June 30, 2018. 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, 2020 follows:

Valuation date	June 30, 2020
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 Firefighters	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%

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions (continued)

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

Pre-retirement mortality rates are:

Multiples of the Pub-2010 mortality table for active employees based on the occupation of the member as follows:

	General Employees	Teachers	Police and Firefighters
Type	Male & Female	Male & Female	Male & Female
Ordinary	94%	92%	83%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	6%	8%	17%

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions (continued)

Post-Retirement Mortality rates are:

Healthy Retirees: The 2019 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2019 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2019 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Firefighters	
Age	Males	Females	Males	Females	Males	Females
50	0.2901%	0.2376%	0.2640%	0.1980%	0.3394%	0.2376%
55	0.4195%	0.3042%	0.3817%	0.2535%	0.4908%	0.3042%
60	0.5773%	0.3175%	0.5253%	0.2646%	0.6754%	0.3175%
65	0.8603%	0.3175%	0.7829%	0.2646%	1.0066%	0.3175%
70	1.2866%	0.7022%	1.1708%	0.5852%	1.5053%	0.7022%
75	2.0370%	1.3340%	1.8537%	1.1117%	2.3833%	1.3340%
80	3.4486%	2.2177%	3.1382%	1.8481%	4.0349%	2.2177%
85	6.2716%	3.9579%	5.7072%	3.2982%	7.3378%	3.9579%
90	11.8489%	7.7873%	10.7825%	6.4895%	13.8632%	7.7873%
Multiplier	100%	108%	91%	90%	117%	108%
Setback	---	---	---	---	---	---

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	2025	2030	2035	2040	2045
General Retirees					
Male	23.8	24.2	24.7	25.2	25.6
Female	26.8	27.2	27.5	27.9	28.2
Teachers					
Male	24.5	25.0	25.4	25.9	26.3
Female	28.2	28.5	28.8	29.1	29.5
Police and Firefighters					
Male	22.5	23.0	23.5	24.0	24.5
Female	26.8	27.2	27.5	27.9	28.2

Disabled retirees: Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2019. 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 rate of return on pension plan investments was determined using a "top down approach" of the Client-Constrained Simulation-based Optimization Model (a statistical technique known as "re-sampling with replacement" that directly keys in on specific plan-level risk factors as stipulated by the ERS Board) in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are then combined to produce the long-term expected rate of return by weighting the expected future nominal rates of return (real returns + inflation) by the target asset allocation percentage. The rate of returns based on ERS's investment consultant as of June 30, 2020, are summarized in the following table:

Classes	Strategic class weights	Long-term expected geometric rate of return
Broad growth:		
Private Equity	13.5%	8.45%
Global Equity	20.0%	7.35%
Low Volatility Equity	4.0%	6.60%
Global Options	4.0%	6.25%
Credit	6.0%	6.65%
Core Real Estate	6.0%	5.70%
Non-Core Real Estate	4.5%	8.45%
Timber/Agriculture/Infrastructure	5.0%	5.40%
Diversifying Strategies:		
TIPs	2.0%	3.40%
Global Macro	4.0%	5.90%
Reinsurance	4.0%	6.00%
Alternative Risk Premia	8.0%	4.90%
Long Treasuries	5.0%	3.20%
Intermediate Government	4.0%	3.00%
Systematic Trend Following	10.0%	5.30%

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions (continued)

The ERS utilizes two high-level strategic classes (Broad Growth and Diversifying Strategies) for allocating assets and managing risk within the total portfolio. Both of these strategic classes contain sub-components that in-turn utilize asset classes and/or specific strategies for implementation. The Broad Growth class utilizes three sub-components (Public Growth, Private Growth, and Real Assets) which are ultimately invested in public equity, options-based equity, credit fixed income, private real assets, and private equity. The Diversifying Strategies class is designed to be uncorrelated to the Broad Growth class and it utilizes three sub-components (Liquid Defensive, Liquid Diversifying, and Illiquid Diversifying). The Diversifying Strategies class utilizes a multitude of asset classes and strategies, including US treasury and agency bonds, inflation-linked treasury bonds, systematic trend following, alternative risk premia, global macro, insurance-linked securities, relative value strategies, and niche private assets, among others. The ERS may also hold opportunities and other investments if they are determined to be additive to the portfolio's risk/return posture.

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%)
$19,732,216,656	$15,306,275,368	$11,657,505,156

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, 2020. 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 $3,354,844,000 as of June 30, 2020, consisting of $621,531,000 in fixed income, $732,051,000 in real estate investments, and $2,001,262,000 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.

Required Supplementary Information - Unaudited

Schedule of Changes in the Employers' Net Pension Liability and Related Ratios
Fiscal Years Ended June 30, 2020, 2019, 2018, 2017, 2016, 2015 and 2014

	2014	2015	2016	2017	2018	2019	2020
A. Total pension liability							
1. Service Cost	$ 421,956,129	$ 437,901,029	$ 484,278,499	$ 576,724,568	$ 584,470,193	$ 619,504,278	$ 626,699,489
2. Interest on the Total Pension Liability	1,618,917,776	1,693,252,684	1,748,619,873	1,894,622,190	1,976,275,120	2,063,885,936	2,164,804,653
3. Changes of benefit terms	-	-	-	-	-	-	-
4. Difference between expected and actual experience of the Total Pension Liability	66,400,876	(192,816,757)	297,534,219	61,179,390	124,753,379	221,473,495	71,837,371
5. Changes of assumptions	-	261,213,541	2,915,922,677	-	-	60,320,037	-
6. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)	(1,416,727,842)	(1,486,137,444)	(1,568,033,354)
7. Net change in total pension liability	$ 976,353,170	$ 1,018,297,839	$ 4,200,838,243	$ 1,209,396,904	$ 1,268,770,850	$ 1,479,046,302	$ 1,295,308,159
8. Total pension liability – beginning	21,243,744,377	22,220,097,547	23,238,395,386	27,439,233,629	28,648,630,533	29,917,401,383	31,396,447,685
9. Total pension liability – ending	$ 22,220,097,547	$ 23,238,395,386	$ 27,439,233,629	$ 28,648,630,533	$ 29,917,401,383	$ 31,396,447,685	$ 32,691,755,844
B. Plan fiduciary net position							
1. Contributions – employer	$ 653,127,697	$ 717,792,981	$ 756,558,222	$ 781,244,218	$ 847,595,466	$ 922,635,334	$ 1,098,589,013
2. Contributions – employer (picked-up employee contributions)	$ 204,821,010	221,909,859	235,079,968	249,211,751	257,294,033	270,764,670	284,142,994
2. Contributions – employee	1,306,327	1,595,560	1,721,893	1,492,316	2,133,901	2,458,908	3,255,037
3. Net investment income	2,175,479,960	556,436,475	(169,368,110)	1,934,512,507	1,225,572,599	932,696,412	358,282,664
4. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)	(1,416,727,842)	(1,486,137,444)	(1,568,033,354)
5. Pension Plan Administrative Expense	(12,626,030)	(14,032,964)	(13,960,587)	(14,986,159)	(15,784,490)	(13,798,866)	(17,782,865)
6. Other	-	-	-	-	-	-	-
7. Net change in plan fiduciary net position	$ 1,891,187,353	$ 302,449,253	($ 435,485,639)	$ 1,628,345,389	$ 900,083,667	$ 628,619,014	$ 158,453,489
8. Fiduciary net position – beginning	12,311,827,950	14,203,015,303	14,505,464,556	14,069,978,917	15,698,324,306	16,598,407,973	17,227,026,987
9. Fiduciary net position – ending	$ 14,203,015,303	$ 14,505,464,556	$ 14,069,978,917	$ 15,698,324,306	$ 16,598,407,973	$ 17,227,026,987	$ 17,385,480,476
C. Net pension liability	$ 8,017,082,244	$ 8,732,930,830	$ 13,369,254,712	$ 12,950,306,227	$ 13,318,993,410	$ 14,169,420,698	$ 15,306,275,368
D. Fiduciary net position as a percentage of the total pension liability	63.92%	62.42%	51.28%	54.80%	55.48%	54.87%	53.18%
E. Covered-employee payroll	$ 3,829,002,983	$ 3,995,447,345	$ 4,112,227,306	$ 4,243,521,876	$ 4,256,052,840	$ 4,376,216,753	$ 4,481,443,808
F. Net pension liability as a percentage of covered employee payroll	209.38%	218.57%	325.11%	305.18%	312.94%	323.78%	341.55%

* 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, 2014 to June 30, 2020*

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
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%
2018	$29,917,401,383	$16,598,407,973	$13,318,993,410	55.48%	$4,256,052,840	312.94%
2019	$31,396,447,685	$17,227,026,987	$14,169,420,698	54.87%	$4,376,216,753	323.78%
2020	$32,691,755,844	$17,385,480,476	$15,306,275,368	53.18%	$4,481,443,808	341.55%

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

Schedule of Employer Contributions
2011 to 2020
(In thousands)

Fiscal year ended June 30,:	Statutory Contributions	Covered Employee Payroll	Contributions as a Percentage of Covered Payroll
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%
2018	847,595	4,256,053	19.9%
2019	922,635	4,376,217	21.1%
2020	1,098,589	4,481,444	24.5%

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 2020

For fiscal year ended June 30,:	Annual Money-Rate of Return
2014	17.9%
2015	4.0%
2016	-1.2%
2017	13.7%
2018	7.8%
2019	5.7%
2020	2.1%

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

June 30, 2020

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 employees in the Police and Firefighters category 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, 2020. 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, 2020
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 Firefighters
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%

Notes to Required Supplementary Information - Unaudited

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

	General Employees		Teachers		Police and Firefighters	
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)	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)
1	3.00%	6.50%	2.00%	5.75%	2.00%	7.00%
2	3.00%	6.50%	1.75%	5.50%	2.00%	7.00%
3	2.00%	5.50%	1.75%	5.50%	1.00%	6.00%
4	1.50%	5.00%	1.50%	5.25%	1.00%	6.00%
5	1.50%	5.00%	1.00%	4.75%	1.00%	6.00%
6	1.25%	4.75%	1.00%	4.75%	0.75%	5.75%
7	1.25%	4.75%	0.75%	4.50%	0.75%	5.75%
8	1.00%	4.50%	0.75%	4.50%	0.75%	5.75%
9	1.00%	4.50%	0.50%	4.25%	0.50%	5.50%
10	1.00%	4.50%	0.50%	4.25%	0.50%	5.50%
11	0.75%	4.25%	0.50%	4.25%	0.50%	5.50%
12	0.75%	4.25%	0.50%	4.25%	0.50%	5.50%
13	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
14	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
15	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
16	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
17	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
18	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
19	0.50%	4.00%	0.25%	4.00%	0.25%	5.25%
20	0.25%	3.75%	0.25%	4.00%	0.25%	5.25%
21	0.25%	3.75%	0.25%	4.00%	0.25%	5.25%
22	0.25%	3.75%	0.25%	4.00%	0.25%	5.25%
23	0.25%	3.75%	0.25%	4.00%	0.25%	5.25%
24	0.25%	3.75%	0.25%	4.00%	0.25%	5.25%
25 or more	0.00%	3.50%	0.00%	3.75%	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:

e Type	General Employees Male & Female	Teachers Male & Female	Police and Firefighters Male & Female
Ordinary	94%	92%	83%
% of Ordinary Choosing Annuity	41%	52%	24%
Duty Related	6%	8%	17%

Post-retirement mortality rates are:

Healthy Retirees:

The 2019 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2019 and with multipliers based on plan and group experience.

The following are sample rates of the base table as of 2019 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Firefighters	
Age	Males	Females	Males	Females	Males	Females
50	0.2901%	0.2376%	0.2640%	0.1980%	03394%	0.2376%
55	0. 4195%	0.3042%	0.3817%	0.2535%	0.4908%	0.3042%
60	0.5773%	0.3175%	0.5253%	0.2646%	0.6754%	0.3175%
65	0.8603%	0.3175%	0.7829%	0. 2646%	1. 0066%	0.3175%
70	1.2866%	0.7022%	1.1708%	0.5852%	1.5053%	0.7022%
75	2.0370%	1.3340%	1.8537%	1.1117%	2.3833%	1.3340%
80	3.4486%	2.2177%	3.1382%	1.8481%	4.0349%	2.2177%
85	6.2716%	3.9579 %	5.7072%	3.2982%	7.3378%	3.9579%
90	11.8489%	7.7873%	10.7825%	6.4895%	13.8632%	7.7873%
Multiplier	100%	108%	91%	90%	117%	108%
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 2025	2030	2035	2040	2045
General Retirees					
Male	23.8	24.2	24.7	25.2	25.6
Female	26.8	27.2	27.5	27.9	28.2
Teachers					
Male	24.5	25.0	25.4	25.9	26.3
Female	28.2	28.5	28.8	29.1	29.5
Police and Firefighters					
Male	22.5	23.0	23.5	24.0	24.5
Female	26.8	27.2	27.5	27.9	28.2

Disabled Retirees:

Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2019. Minimum mortality rate of 3.5% for males and 2.5% for females.

Change of Assumptions

- There was no change in the 2020 assumptions.

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

Note B – Significant Factors Affecting Trends in Actuarial Information

2019 Changes in Actuarial Assumptions

The following changes were made to the actuarial assumptions as of June 30, 2018 to June 30, 2019:

- The assumed salary increase schedules continues to include an ultimate component for general wage inflation that may add on additional increases for individual merit (which would include promotions) and then an additional component for step rates based on service. There were no changes for General Employees and Teachers. The overall impact increased for salary rate increase rates received for most Police and Firefighters over their career due to extending the 2-year step schedule to 25-years.
- Mortality rates generally decreased due to the continued improvements in using a fully generational approach and Scale BB (published by the Society of Actuaries), although mortality rates increased in certain age groups across all employment groups.
- The rates of disability of active employees increased for all General Employees and Teachers, and for Police and Firefighters from duty-related reasons.
- There were minor increases in the retirement rates for members in certain groups based on age, employment group and/or membership class.

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 and Firefighters. The service based component generally increased for most General Employees, decreased for most Teachers, and remain unchanged for most Police and Firefighters. The overall impact decreased assumed salary rate increase rates for all General Employees and Teachers, while remaining unchanged for almost all Police and Firefighters.
- 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 Firefighters 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 and Firefighters 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 and Firefighters. 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.

Other Supplementary Information

Schedule 1

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

Year ended June 30, 2020

	2020			
	Pension Accumulation Reserves	**Annuity Savings Reserves**	**Expense Reserves**	**Total**
Additions				
Appropriations and contributions:				
Employers	$ 1,098,589,013	$ -	$ -	$ 1,098,589,013
Members	-	287,398,031	-	287,398,031
Net investment income	358,282,664	-	-	358,282,664
Total additions	1,456,871,677	287,398,031	-	1,744,269,708
Deductions				
Benefit payments	1,545,589,761	-	-	1,545,589,761
Refunds of member contributions	-	22,443,593	-	22,443,593
Administrative expenses	-	-	17,782,865	17,782,865
Total deductions	1,545,589,761	22,443,593	17,782,865	1,585,816,219
Other changes in net position restricted for pension benefits:				
Transfer due to retirement of members	189,800,493	(189,800,493)	-	-
Transfer of interest allocation	(120,411,283)	120,411,283	-	-
Transfer to pay administrative expenses	(20,427,078)	-	20,427,078	-
Return of unrequired funds due to savings in administrative expenses	-	-	-	-
	48,962,132	(69,389,210)	20,427,078	-
Net increase	(39,755,952)	195,565,228	2,644,213	158,453,489
Fiduciary net position restricted for pensions:				
Beginning of year	14,237,290,660	$ 2,969,087,157	$ 20,649,170	17,227,026,987
End of year	$ 14,197,534,708	$ 3,164,652,385	$ 23,293,383	$ 17,385,480,476

See accompanying independent auditors' report.

Schedule 2

Social Security Contribution Fund

Statement of Changes in Assets and Liabilities

Year ended June 30, 2020

	2020			
	Beginning Balance	**Additions**	**Deductions**	**Ending Balance**
Assets				
Receivable from employers	$ -	$ 245,961,789	$ 245,961,789	$ -
Total assets	$ -	$ 245,961,789	$ 245,961,789	$ -
Liabilities				
Due to employers	$ -	$ 245,961,789	$ 245,961,789	$ -
Total liabilities	$ -	$ 245,961,789	$ 245,961,789	$ -

See accompanying independent auditors' report.

Other Supplementary Information (continued)

Schedule 3

Schedule of Administrative Expenses

Year ended June 30, 2020

		2020
Personnel services		
Salaries and wages	$	6,853,075
Fringe benefits		4,227,943
Net change in unused vacation credits		110,159
Total personnel services		11,191,177
Professional services		
Actuarial		220,322
Auditing and tax consulting		448,448
Disability hearing expenses		81,092
Legal services		575,543
Medical		372,904
Other services		135,872
Total professional services		1,834,181
Communication		
Postage		160,160
Printing and binding		84,821
Telephone		69,034
Travel		105,678
Total communication		419,693
Rentals		
Rental of equipment		73,716
Rental of premises		36,711
Total rentals		110,427
Other		
Armored car service		1,405
Computer and office automation systems		337,490
Repairs and maintenance		2,380,785
Stationery and office supplies		28,327
Miscellaneous		109,643
Total other		2,857,650
Depreciation		1,369,737
	$	17,782,865

See accompanying independent auditors' report.

Schedule 4

Schedule of Investment Expenses

Year ended June 30, 2020

		2020
Real estate and alternative investment expenses		
Operating expenses	$	31,940,863
Mortgage interest		6,083,257
Total real estate and alternative investment expenses		38,024,120
Investment expenses		
Investment manager/advisor fees	$	40,294,367
Bank custodian fees		300,971
Other investment expenses		7,842,175
Total investment expenses		48,437,513
Securities lending expenses		
Borrower rebates		12,933,322
Management fees		808,962
Total securities lending expenses		13,742,284
	$	100,203,917

See accompanying independent auditors' report.

Employees' Retirement System

of the State of Hawaii

INVESTMENT SECTION

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 9, 2021

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 ("ACFR") for the fiscal year ending June 30, 2020.

- ERS's Fiduciary net position was valued at $17.4 billion as of June 30, 2020
    - The ERS investment portfolio outperformed its one-year, three-year, and five-year Policy Benchmark returns by an annualized 0.6%, 0.7% and 0.6%,, respectively.[1] The portfolio's return for the fiscal year was 1.3%,[2] while the Policy Benchmark[3] only returned 0.6% The ERS investment portfolio continued to exceed its long-term 7.0% target rate of return by 0.6% on an inception-to-date basis.

- The outperformance over the Policy Benchmark for the fiscal year was led by positive returns within the diversifying strategies class (+6.5%). Although the broad growth portfolio was negative overall (-0.4%), the traditional equity component (+1.8%) contributed positively as did components of private growth (+0.1%), notably noncore real estate (+2.3%). The real return class (+6.6%) outperformed its benchmark return by nearly 300 basis points.
    - On an asset class basis, broad growth—which is tied to US growth risk--experienced negative performance for the fiscal year (-0.3%), due largely to the coronavirus-related equity market selloffs in February and March. During the first half of the fiscal year (July 2019 – December 2019) broad growth returned +6.2% but realized -6.6% in the second half (January 2020 – June 2020). Broad growth lost 14.2% between January and March 2020 but rebounded 8.9% from April through June. Private growth ended the fiscal year positive (+0.1%), outperforming the benchmark by 1,073 basis points.

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[1] Outperformance is based on a mix of gross and net returns.
[2] A mix of gross and net returns.
[3] The Policy Benchmark is the Total Investment Portfolio Evaluation Benchmark (see Section C of the Investment Policy Statement), a custom benchmark constructed to measure the target mix. It is based on Plan's broad benchmarks and evolving asset allocation targets.

- Within private growth, the private equity portfolio generated a return of -0.6% for the fiscal year, beating its benchmark return of -10.7% by over 1000 basis points. For the 5-year period, the portfolio generated a return of 11.3%, beating its benchmark return of 4.5% by 680 basis points.

- Additionally, within private growth, non-core real estate had positive absolute returns (+2.3%) but lagged the benchmark (+5.0%).

- Within public growth, credit (-1.0%) and stabilized equity (-2.3%) detracted from performance, but managers within the traditional equity component produced positive returns (+1.8%). Core real estate, a sub-component of stabilized growth, exhibited positive absolute returns (+2.3%) but lagged the benchmark (+3.9%).

- The real return class contributed positively to the portfolio: returning (+6.6%) and outperformed its benchmark return (+3.7%) by +2.9%. Infrastructure investments returned +32.0%, significantly above benchmark return of +4.7%. Timber detracted from the portfolio returning -0.7%. Global Inflation-Linked Securities (GILS) contributed positively to performance, returning +8.0%.

- The crisis risk offset portfolio[4] once again proved its role as portfolio protection agent and positive return contributor in periods of market stress. In particular, treasury duration capture (+25.1%) and systematic trend following (+1.2%) components added positive return and portfolio protection during February and March. The alternative return capture component (-0.6%) detracted slightly from performance but over the prior three years has been additive to the portfolio (+9.2% annualized three year return), reconfirming our belief that "diversifying our diversifiers" is a core tenet of our investment strategy.

ECONOMIC & CAPITAL MARKET CONDITIONS

Markets began the 2020 fiscal year with uncertainty about a resolution to the U.S. – China trade dispute, the extent and magnitude of the slowdown in global economic growth and corporate earnings, and the timing, magnitude and effectiveness of Central Bank interventions to stimulate their respective economies. At the end of July the Fed ended its balance sheet roll off two months earlier than planned and cut the Fed Funds rate by 25 bps, but the markets feared that this might be a "one and done" action, triggering a mild sell-off in U.S. equities. By the end of August U.S. equity markets were flat for the fiscal year, while international equity markets were down with concerns growing about a negotiated (soft landing) Brexit deal between the U.K. and E.U. and the Argentine equity market experiencing a one-day collapse of -38% (a 15 standard deviation move). For U.S. investors the decline in overseas equities was worsened by the strong U.S. dollar. Also, in August the U.S. Treasury curve inverted as the long end dropped 50 – 60 bps while the short dropped less than 20 bps. This inversion caused fears of a coming recession in the U.S. September saw the markets shake off their concerns, with global equities rallying about 3% and volatility declining as U.S. labor remained very strong with only a 3.5% unemployment rate. Central Banks were actively intervening in their capital markets or expressed their intentions to stimulate their respective economies as necessary to avoid a recession. The Fed cut rates again and intervened to provide liquidity in the overnight repurchase agreement market, while the

[4] As of new 2019 asset allocation study this is now housed under diversifying strategies.

European Central Bank cut deposit rates to -50 bps and announced a new round of bond purchases. India slashed its corporate tax rate by nearly 30%. The rising U.S. dollar and declining U.S. Treasury rates took a pause in September.

The second quarter of the fiscal year looked like an extension of September with the markets optimistic about U.S. – China relations, Brexit, and the effectiveness of Central Bank policies and actions to cut rates and supply liquidity as necessary to keep capital markets functioning smoothly. Bolstering the confidence in the U.S. was the strength of the economy, no signs of inflation, very low unemployment, low interest rates, and ample capital. Macro factors dominated in returns across nearly all markets – equities, fixed income, commodities, and currencies. The euphoria in the markets lasted until the end of January with global equity markets retreating sharply from historical highs on concerns over the economic impact of the coronavirus outbreak centered in Wuhan, China and beginning to spread globally. The Chinese government extended the Chinese New Year equity market closure through the end of January due the severity and spread of the virus within China; on reopening, Chinese stock s dropped about 8%. January was also notable for the impeachment of U.S. President Donald Trump and the formal departure of the U.K. from the European Union, and the signing of the Phase One trade agreement between the U.S. and China and negotiations for Phase Two set to start soon. February saw a brief rebound in global equity markets to new highs with strong economic data from the U.S. and encouraging news that slowing growth internationally had bottomed out. But by February month-end, alarm set in about the spread of the virus and its impacts as 54 countries reported cases and authorities in many of these nations began lockdown measures to contain the virus that caused massive contractions of their economies. On February 19th the U.S. equity market, and global equity markets as well, ended the longest bull market in their histories, brought down by governments around the world seriously curtailing economic activity and human face-to-face interaction in response to combatting the spread of the virus. What should have been a rosy outlook for global economic and corporate earnings growth turned quickly to coronavirus fears as traders quickly took defensive measures, with systematic and hedging strategies following, to sell equities and commodities and buy safe-haven currencies and U.S. government securities. As a result, the U.S. Treasury yield curve from six months out to 30 years dropped roughly 40 bps, bringing the two-month drop in yields to about 80 bps. By the end of February, the target Fed Funds rate was 1.50% to 1.75% while U.S. Treasury yields between on and five years were all below 1%, indicating the markets expected the Fed to cut rates 50 bps to 75 bps at their next meeting.

The pandemic catalyst took nearly everyone by surprise, and it led to the swiftest decline in the S&P 500 Index (-35% in lightly more than four weeks) before beginning a nearly equally historic rebound in late March. March saw equity index volatility, dispersion, and correlation soar across the world, creating abundant opportunities for stock pickers to distinguish themselves. S&P 500 volatility soared to its highest-ever level in March, even surpassing the level of the crash of 1929. Annualized, realized volatility exceeded 100% in U.S. mid-cap and small-cap indices and several international markets registered their largest ever single-day declines. Coupled with the decline in economic activity was the precipitous drop in energy prices brought on by the oil production dispute between Saudi Arabia and Russia. The U.S. government took the unprecedented fiscal policy actions at the end of March, passing a massive $2 trillion relief and economic stimulus package (CARES Act) and two other acts to provide funds to assist medical facilities and workers engaged in treating coronavirus patients, to individuals suffering financially, and to small businesses to survive and keep workers employed. The U.S. Treasury yield curve by the end of March had dropped about 100 bps in three months as the Fed cut the target Fed Funds rate all the way down to 0 to 25 bps.

The final quarter of the fiscal year experienced one of the strongest quarters in history for global equity markets, after one of the very worst. During April, a fourth stimulus package totaling an additional half billion dollars was enacted to support small businesses, a coronavirus testing program, and hospitals. By the end of June, markets were expecting Congress and the President to reach an agreement to spend another $1.5 trillion over the summer on stimulus and support programs. As a result of all these U.S. stimulus programs and very accommodative monetary authority actions, the U.S. money supply has increased substantially. Overseas, the European Union Commission proposed a 750-billion-euro recovery fund made up of grants and loans for every EU member state, which would supplement the 540-billion-euro rescue package. As we start the next fiscal year, many concerns remain – notably, rising tensions between the U.S. and China over repression in Hong Kong as well as U.S. national security concerns regarding China's dominance of key components of the U.S. supply chain, extended negotiations on Brexit with little headway, and the never-ending lockdowns imposed by government leaders to suppress the virus and the resultant adverse health, economic, social and political fallout.

PORTFOLIO RESTRUCTURING ACTIVITY

Fiscal year 2020 continued the progress of refining, streamlining, and diversifying the portfolio. In addition, we made marginal changes to the asset allocation based on the results of the Fiscal Year 2020 Asset Liability Study conducted by the General Consultant, Meketa Investment Group. In 2015, the ERS Board of Trustees approved a new long-term strategic allocation based on the 2015 Asset-Liability Study that incorporated risk-based functional classes. Since 2016 the ERS has been transitioning towards the new targets. The 2019 Asset-Liability Study represented an extension to this transition. Based on the modeling during the 2019 Asset Liability Study, there was no need to materially alter the long-term portfolio allocations. Therefore, the recommendations were relatively minor:

- There were no major changes to the broad growth or real return strategic classes. The crisis risk offset portfolio was consolidated under a new portfolio—diversifying strategies—but kept its underlying components. Within diversifying strategies there were two key changes: first, principal protection—previously a standalone strategic class—was consolidated under diversifying strategies to streamline the management of all U.S. Treasury-based mandates; second, diversifying strategies was expanded from just the CRO component to include other diversifiers in order to continue to increase our odds of portfolio protection in a crisis. The first half of 2020 proved that both moves were positive changes for the portfolio given their strong performance during the coronavirus selloff.

- The real return and private growth class long-term targets were reduced, while the allocation to diversifying strategies was increased from 27% to 35% to allow for more uncorrelated and complimentary (to growth) strategies to be added to the portfolio.

Highlights of portfolio-level changes throughout Fiscal Year 2020 are:

- Real Estate: Committed roughly $0.24 billion of additional capital to the real estate program. This is in line with its long-term target allocation.

- Public Equities and Credit: Continued restructuring the global credit portfolio by committing $0.6 billion to two new managers, terminating one legacy manager, and began the process of winding-down another manager. At fiscal year-end, the global credit portfolio was 5.7% of total ERS assets. Replaced one global equity mid/large cap equity manager due to key personnel changes. Traditional equity and stabilized equity portfolios represented roughly 29% and 21% of total ERS assets respectively.

- Private Equity: Committed roughly $0.5 billion of additional capital to the private equity program. This is in line with increasing private equity from a 9.4% allocation at the beginning of the fiscal year to its long-term target allocation of 13.5% by 2022. This pacing is in line with the buildout of this risk category that was initiated in fiscal year 2016, one year after the Board approval of the new risk-based asset allocation, at which time the target allocation to private equity was 4%.

- Diversifying Strategies: Continued to employ the overlay account to securitize uninvested cash and rebalance/reallocate the portfolio. In its fourteen months since inception the overlay added 8 basis points to 2019 fiscal year performance and 10 basis points to fiscal year 2020 performance.

PORTFOLIO ANALYSIS & CONCEPTUAL REDESIGN

The ERS investment staff continues to focus on (1) achieving the 7.0% target rate of return over the long term and (2) staying on the path toward the Plan becoming fully funded fiscal year 2046. To accomplish this, ERS is diversifying the risks in the portfolio; increasing the proportion of return that comes from income (particularly in credit) rather than capital gains; refining processes for securitizing uninvested cash, rebalancing strategies, managing risks, and transitioning capital that lead to higher returns; acquiring research and market insights that lead to selecting better strategies and managers; negotiating favorable fee arrangements with managers and service providers; and cost-effectively expanding resources and internal investment staff who will take on responsibilities currently performed by higher cost external managers and service providers. The benefits of increasing investment staff in fiscal year 2014 and 2019 has far outweighed the cost through significant improvements in manager selection, fee reductions from negotiations with managers and service providers, and improved capital utilization. Future staff additions will extend cost savings and increase returns. The changes already made and being planned will result in the portfolio being able to stay close to the full funding path over a wide range of market scenarios. For example, both stress and historical scenario testing indicate the portfolio would sustain a 21% drawdown in a scenario similar to the credit crisis, a significant improvement from the 35% decline of the ERS portfolio during the 2008-2009 financial crisis. Furthermore, as designed, crisis risk offset strategies and stabilized growth strategies have reduced risk and trimmed losses during the equity market corrections that have occurred since they were implemented.

- The capital allocation among the risk classes on June 30, 2020 was slightly overweight Broad Growth (+6.1%) and underweight Crisis Risk Offset/Diversifying strategies and Real Return. This was in part due to the new evolving policy targets that took effect January 1, 2019. The overlay program assisted the portfolio in staying closer to policy targets without forcing capital into the markets. From a risk allocation standpoint, growth risk accounted for about 85% of the volatility in the portfolio, down from 95% the prior fiscal year.[5]

[5] Total sums to 97.3%. Board of Trustees Discretionary Account and the Overlay account for the remaining 2.7%.

- In November 2019, the Board of Trustees approved a new strategic allocation that made modest changes to the portfolio, mostly by more efficiently recharacterizing asset classes and expanding the asset classes within diversifying strategies in order to add more defensive positions to the portfolio (see chart below). The intent of the long-term strategic allocation update is to keep ERS closer to its progress on the funding path. As part of this reorganization, Principal Protection was folded into diversifying strategies.

Long-Term Strategic Allocation

STRATEGIC CLASS	COMPONENT	PRIOR LONG-TERM ALLOCATION	CURRENT LONG-TERM ALLOCATION
BROAD GROWTH	**PRIVATE GROWTH**	**18.3%**	**18%**
	TRADITIONAL GROWTH	**22.3%**	**20%**
	STABILIZED GROWTH	**22.3%**	**20%**
REAL RETURN		**10%**	**7%**
DIVERSIFYING STRATEGIES		**27%**	**35%**

Office Development

The 2020 fiscal year was the sixth complete year for the investment team in the Investment Office. In November 2019 the team was able to add an additional member dedicated to the portfolio's credit investments. The addition of the new investment officer has enabled more focus and attention on that part of the portfolio, which was a source of alpha for the portfolio in fiscal year 2020. In addition, the Investment Specialist was reassigned to risk management which has strengthened and quickened our risk budgeting process and oversight. The team now consists of five Investment Officers, one Investment Specialist, one Chief Investment Officer (CIO), and one Administrative Assistant. In July 2018 the Board of Trustees completed its search for a new Chief Investment Officer (CIO). CIO Ms. Burton joined the ERS officially in October 2018, and fiscal year 2020 marks her first full fiscal year as CIO. In 2020 CIO Burton built upon her 2019 effort of implementing a new business plan for the Investment Office including recommending improvements to the Governance model that would complement the new investment strategies. It is expected that the actions taken during the next few years to continue to strengthen Investment Office with respect to talent, tools, and governance support will greatly increase the potential for the overall pension plan to remain a sustainable program.

Letter from Chief Investment Officer (continued)

OUTLOOK

"This time is different." That is almost always true of any scenario, however in the case of the 2020 recession this is certainly the case. Although definitionally the U.S. did in fact enter a recession (technically defined by two consecutive quarters of a fall in GDP—5% and 33% respectively in Q1 and Q2 2020), it would have been easy to miss if one had merely focused on stocks and the housing market. Part of the difference was that this recession was both induced and intercepted by the government. Regardless of a booming housing market, a rebounding stock market and retail frenzy, unemployment remains elevated and shutdowns continue in various forms throughout the country. That said, an accommodative Federal Reserve, a Democratic government supportive of an accommodative Federal Reserve, a Democratic government, and gradual reopening are supportive of higher valuations in equities, lower bond yields, and upside in commodities as businesses come back online. At the same time, the ongoing pandemic and reopening response is different not only at the country level across the globe but also at the city level across the United States, leading to lingering uncertainty about what the long lasting effects will eventual be.

Some of the more pressing concerns for asset allocation are: the role of fixed income in the portfolio as bond yields hover near zero, how much more room there is in the equity market run-up, and how vulnerable portfolios may be in the future to rising rates or surprise inflation. The Federal Reserve continues to pledge to keep rates low for the foreseeable future, however a few consecutive quarters of negative indicators could force their hand in another direction—or even just a spastic response from the market, as we have seen in recent history. While inflationary outcomes are not our base case, they remain a concern as they are deeply embedded into our asset allocation assumptions. To that end, we must construct a portfolio that can weather any outcome. In our credit portfolio, that means seeking out investments that can provide income through coupon-like structures. In equities, we are looking to add exposure to those geographies that may benefit from the post-coronavirus era. In real estate, we are placing more emphasis on seeking strong infrastructure partners, as a democrat-controlled government should be supportive of infrastructure spending. Finally, we continue to look for idiosyncratic sources of return in diversifying strategies, that should be uncorrelated to our largest risk driver—US growth risk.

As we cannot predict the future, we continue to believe that prudently building a diversified portfolio is our best hedge against uncertain market outcomes. We continue to maintain a very liquid portfolio, which was an advantage for us the second half of 2019 and should continue to be an advantage to us moving forward.

In fiscal year 2020 the investment office was able to secure some of the critical tools it needs to fulfill its responsibilities and capabilities. Although we were not able to add staff, the office was also able to expand its quantitative and qualitative third-party tools to aid in due diligence. Nevertheless, the investment office remains lean in terms of staff and will continue to seek the resources necessary to execute on its new asset allocation plan, particularly considering impending market turbulence and a challenging return environment for institutional portfolios. Out of necessity for the specific needs of our Plan, the staff, with the oversight of the Trustees and assistance of the three ERS consultants, has constructed a "risk aware" portfolio that will be better able to withstand the episodic market downturns we are sure to face in the future. Our goal is also to position the ERS to take advantage of the valuation displacements that these crises create by allowing staff to redeploy ERS capital to these opportunities. We have a sophisticated, intricate plan that requires sophisticated tool and analysis for proper execution.

Letter from Chief Investment Officer (continued)

It is an honor to serve the members and beneficiaries of the System as your Chief Investment Officer. I would like to thank the Board of Trustees and staff for their support and dedication as we endeavor to manage the assets of the plan as prudently and efficiently as possible.

Respectfully yours,

Elizabeth T. Burton

Elizabeth T. Burton
Chief Investment Officer

Letter from Investment Consultant

MEKETA INVESTMENT GROUP

2175 NW Raleigh Street
Suite 300A
Portland, OR 97210

503.226.1050
Meketa.com

March 19, 2021

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, 2020, as requested by the Government Financial Officers' Association (GFOA).

Hawaii ERS - Total Fund Performance

The total assets of the Retirement System were approximately $17.2 billion as of June 30, 2020, a decrease of roughly ($20) million for the fiscal year. The ERS Total Fund generated positive 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 +1.3% for the 2020 fiscal year compared to the benchmark's return of +0.7% and the Investment Metrics Public Funds Greater than $1 Billion Database (which includes the previously utilized BNY Mellon >$1B Database) peer median return of +1.3%. For the three-year period ending June 30, 2020, the Total Fund returned 5.0% per annum versus the benchmark's return of +4.3% and the Investment Metrics Public Funds Greater than $1 Billion Database peer median return of +4.9%. For the trailing five-year period ending June 30, 2020, the Total Fund returned +5.5% per annum versus the benchmark's return of +4.9% and the Investment Metrics Public Funds Greater than $1 Billion Database peer median return of +5.4%. 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 and declining global interest rates.

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. During the 2018 fiscal year, the ERS completed the remapping of all of the prior asset classes 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.

As calculated by BNY Mellon, the ERS's custodial bank, the Broad Growth class produced a -0.4% return for the fiscal year versus the Broad Growth benchmark's return of -1.8%. At fiscal year end, the Broad Growth class utilized three sub-components: 1) Traditional Growth, 2) Stabilized Growth,

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and 3) Private Growth. The Traditional Growth sub-component generated a +1.8% return for the fiscal year, the Stabilized Growth sub-component produced a -1.8% return for the fiscal year, and the Private Growth sub-component generated an +0.1% return for the fiscal year. The Principal Protection class produced a +4.5% return for the fiscal year. The Real Return class produced a return of +6.6% for the year ending June 30, 2020. The Crisis Risk Offset ("CRO") class produced a return of +6.5% for the fiscal year.

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

Furthermore, as a result of the 2019 Asset-Liability Study that was finalized in the 2020 fiscal year, it is expected that the ERS's implementation of its long-term strategic allocation will be largely completed by the end of the 2022 fiscal year.

Market Conditions

The past year has seen remarkable shifts in economic and financial market performance. Fiscal year 2020 began with uncertainty regarding the path of fiscal and monetary policies, elevated valuations, declining growth in China, a general slowdown in global growth, the potential for additional trade issues, and political uncertainty in Europe (Italy, Greece, Brexit).

The start of the fiscal year was characterized by widespread concerns regarding slowing global growth. This backdrop of uncertainty prompted major central banks to continue their pivot toward more accommodative policies. In the U.S., ongoing concerns regarding a decline in growth and the trade standoff between the U.S. and China played a key role in the U.S. Federal Reserve's decision to cut rates several times and eventually settle at a range of 1.50-1.75% by December 2019. Outside of the U.S., major central banks, notably the European Central Bank (ECB) and the Bank of Japan, affirmed similar accommodative policy stances. The 2019 calendar year finished strong, as a result of broadly accommodative policy stances, coupled with optimism about the passthrough of easier monetary policy to better economic prospects.

In January of 2020 the first case of COVID-19 was acknowledged by Chinese authorities. By March, as the virus began to spread globally, particularly in Europe, with Italy and Spain reporting massive spikes in infections and sadly, mortality rates, markets changed course. In March, in an effort to contain the spread, countries responded by enacting stringent lockdowns, or "stay at home orders" leading to an abrupt halt in production and consumption. Layoffs expanded dramatically and swiftly, as businesses were forced to close down in an effort to stop the disease from spreading.

The impact on financial markets was extreme. Global equity markets rapidly entered bear market territory, and continued their path downward throughout the month of March, as market participants attempted to price in the impact of a cessation of a large portion of global economic activity.

Letter from Investment Consultant (continued)

Memorandum
March 19, 2021
Page 3 of 9

After ending calendar year 2019 below 14, the VIX spiked above its prior peak during the Global Financial Crisis, briefly breaching 80 in early March. In the U.S., circuit breakers were triggered at the New York Stock Exchange, with markets' opening limit down, on March 9 and March 16. At the depth of the drawdown from January 1, 2020, to March 23, 2020, the Russell 3000 was down -31.6%, the MSCI EAFE Index (developed market equities) was down -33.2%, and the MSCI Emerging Markets Index (emerging market equities) was down -31.8%. The perception of acute stress in credit markets, both in the U.S. and abroad, led to solvency fears: the Barclays High Yield index fell -19.8%. Investors universally fled risk assets, in all forms, during the selloff in favor of perceived safer assets like U.S. Treasuries. The rapid unwind of risk in early 2020, one of the fastest market selloffs in modern financial history, reinforced the importance of diversification.

U.S. equities, as represented by the Russell 3000 Index, closed out the fiscal year with a 6.53% return. Non-U.S. equity markets did not fare as well. Emerging markets finished the fiscal year with a negative (3.05%) return. The MSCI EAFE Index, representing foreign developed markets, followed behind returning negative (4.73%).

The trend of U.S. growth stocks outperforming value stocks persisted throughout the drawdown, with growth holding a 31.36% lead over value, as the Russell 3000 Growth Index closed out the year with a 21.94% return, versus negative (9.42%) for the Russell 3000 Value Index.

While equity and credit markets fell precipitously, bonds provided an offset for investors. The Bloomberg Barclays U.S. Aggregate generated a return of 8.74% over the fiscal year, and long-term treasuries, measured by the Bloomberg Barclays Long U.S. Treasury index, generated a return of 25.40%. High yield bonds returned 0.03%, and TIPS returned 8.28%. Emerging market bonds (as represented by the JPM GBI-EM Global Diversified Index) posted a negative (2.82%) return for the fiscal year.

Within other asset classes, natural resource stocks (S&P Global Natural Resources Index) returned negative (17.36%), commodities (Bloomberg Commodity Index) return negative (6.75%), and REITs (MSCI U.S. REIT Index) fell by (12.87%).

The volatility of the pandemic was exacerbated by volatility in oil prices, which experienced a rapid collapse early in 2020. The COVID-19 related restrictions weighed heavily on demand, with Saudi Arabia's untimely decision to flood the market with oil to gain market share, which created further stress on prices. Oil futures briefly traded at negative price levels during the depths of the crisis, as demand collapsed and storage capacity dwindled. The May WTI futures contract briefly exchanged hands at nearly -$40 per barrel. Commodity and natural resource asset classes both participated in the broader market selloff; the Bloomberg Commodity Index and the S&P Global Natural Resources Index were down (23.4%) and (44.6%) at the trough, respectively.

Sincerely,

Neil Rue, CFA
Managing Principal

Colin Bebee, CFA
Managing Principal

Memorandum
March 19, 2021
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Report on Investment Activity for the Employees' Retirement System of the State of Hawaii
Prepared by Meketa Investment Group, Inc. June 2020

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 the Plan's target level of 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 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 are pursued primarily by cash flow on a long-term basis and 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 2019 that was completed during fiscal year 2020. As a result of the 2019 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. In addition, the strategic class framework has experienced modest naming convention changes. It is expected that the ERS's implementation of the new long-term strategic allocation will be largely completed by the end of the 2022 fiscal year.

Strategic Allocation Policy (as of 6/30/2020)[1]

At the end of the fiscal year, the Plan was strategically invested in the following classes:

	Strategic Allocation[2] (functional/risk-based classes)
Broad Growth	**68%**
Principal Protection	**8%**
Real Return	**8%**
Crisis Risk Offset	**16%**
Other	**0%**
Total	**100%**

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

[2] Actual allocations varied.

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Long-Term Strategic Allocation Policy

As a result of the formal asset-liability study that began in fiscal year 2019 and was completed in fiscal year 2020, the Board adopted a new long-term strategic allocation policy. As part of this new long-term strategic policy, the portfolio will transition to two major strategic classes (rather than four). Current classes and sub-classes will be remapped to the two major strategic classes where applicable. It is expected that final implementation and allocations across the new long-term strategic allocation policy will be largely completed by the end of the 2022 fiscal year.

Expected Annualized Return and Risk

Based on Meketa's custom mid-year 2020 capital market assumptions, the long-term target allocation classes are expected to achieve the long-term (e.g., 20+ years) geometric average returns as shown in the following table. The annual nominal returns will vary on a year-by-year basis but are expected to approach the long-term annualized return expectations over time.

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%	7.9%	5.7%	14.7%
Diversifying Strategies	37%	3.7%	1.5%	6.7%
Total Portfolio	**100%**			

[1] Uses an expected inflation of 2.2%

Evolving Strategic Allocation Policy

Implementation Plan for Long-term Strategic Policy				
	Current (6/30/2020)	7/1/2020	Long-Term 7/1/2021	Long-Term 7/1/2022
Broad Growth	68%	72%	67.5%	63%
Principal Protection	8%	--	--	--
Real Return	8%	--	--	--
Crisis Risk Offset	16%	--	--	--
Diversifying Strategies	--	28%	32.5%	37%
Total Portfolio	***100%***	***100%***	***100%***	***100%***

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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. Private and/or specialized markets managers are measured against public market proxies, relevant peer groups, and/or specialized indices (when applicable). 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

Historically, the full Employees' Retirement System of the State of Hawaii Investment Policy, Guidelines, and Procedures Manual (Manual) described, 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 eight fiscal years and will continue to transpire throughout the evolution of the Plan. Subsequent to the end of the 2020 fiscal year, a major revision occurred to this document and it has been reconstituted as an Investment Policy Statement ("IPS"). This modification occurred in order to update the document to align with industry best practices and to better reflect the current governance structure of the system's investment portfolio. A current version of the IPS is located on the ERS's website.

All rates of return are calculated using methodologies that are generally in-line with 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. The ERS's custodian bank is the primary entity responsible for performance reporting.

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Investment Results as of June 30, 2020 (Risk-based Classes):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2020	2019	2018	2017	2016	6/2020	6/2020
Broad Growth *	**(0.38%)**	**6.09%**	**9.76%**	**17.42%**	**(2.62%)**	**5.07%**	**5.81%**
Broad Growth Blended Index[1]	(1.86%)	4.78%	9.50%	14.39%	(2.17%)	4.03%	4.73%
Principal Protection	**4.50%**	**5.44%**	**0.94%**	**1.94%**	**3.11%**	**3.61%**	**3.17%**
Principal Protection Blended Index[2]	5.77%	6.04%	0.63%	-0.02%	4.24%	4.05%	3.26%
Crisis Risk Offset**	**6.54%**	**6.83%**	**4.20%**	**---**	**---**	**5.85%**	**---**
Crisis Risk Offset Blended Index[3]	5.62%	4.38%	1.58%	---	---	3.85%	---
Real Return	**6.62%**	**6.30%**	**6.63%**	**2.60%**	**5.33%**	**6.52%**	**5.48%**
CPI + 3%	3.73%	4.71%	5.88%	4.70%	4.05%	4.80%	4.64%
Total Fund	**1.28%**	**6.00%**	**7.85%**	**13.68%**	**(0.78%)**	**5.00%**	**5.48%**
Composite Benchmark[4]	0.65%	4.65%	7.67%	11.87%	(0.04%)	4.29%	4.87%
Median Fund***	1.3%	5.9%	8.7%	12.6%	0.4%	4.9%	5.4%

* 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 by Investment Metrics and/or BNY Mellon. Total Fund universe is the Public Funds > $1 billion.

[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 through 12/31/17;

43.0% Stabilized Growth Blended Benchmark, 43.0% Traditional Growth Blended Benchmark, and 14.0% Private Growth Blended Benchmark through 12/31/18;

41.0% Stabilized Growth Blended Benchmark, 41.0% Traditional Growth Blended Benchmark, and 18.0% Private Growth Blended Benchmark thereafter.

[2] 100% BC Aggregate Index through 6/30/08;

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

100% BC Global Intermediate Aggregate ex. Credit (hedged) Index through 12/31/17;

55% BBg BC US Intermediate Aggregate ex. Credit Index and 45% BBg 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 through 3/31/19;

40% 90-Day T-Bill +2.5%, 35.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index thereafter.

[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% Principal Protection Blended Benchmark, 5.0% CPI + 3%, and 10% Crisis Risk Offset Blended Benchmark through 12/31/17;

72.0% Broad Growth Blended Benchmark, 8.0% Principal Protection Blended Benchmark, 7.0% CPI + 3%, and 13% Crisis Risk Offset Blended Benchmark through 12/31/18;

68.0% Broad Growth Blended Benchmark, 8.0% Principal Protection Blended Benchmark, 8.0% CPI + 3%, and 16% Crisis Risk Offset Blended Benchmark thereafter.

Report on Investment Activity by Investment Consultant (continued)

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Investment Results as of June 30, 2020 (Risk-Based Classes – Sub-Components):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2020	2019	2018	2017	2016	6/2020	6/2020
Broad Growth*	**(0.38%)**	**6.09%**	**9.76%**	**17.42%**	**(2.62%)**	**5.07%**	**5.81%**
Broad Growth Blended Index[1]	(1.86%)	4.78%	9.50%	14.39%	(2.17%)	4.03%	4.73%
Traditional Growth	**1.79%**	**4.78%**	**12.46%**	**21.98%**	**(4.82%)**	**6.25%**	**6.85%**
Traditional Growth Blended Index[2]	1.17%	4.56%	11.14%	19.01%	(3.87%)	5.55%	6.11%
Active Public Equity* **	**0.87%**	**3.32%**	**12.50%**	**23.68%**	**---**	**5.45%**	**---**
Active Public Equity Index[3]	(0.14%)	3.08%	11.67%	19.31%	---	4.75%	---
Passive Public Equity* **	**2.60%**	**6.07%**	**12.10%**	**19.87%**	**---**	**6.85%**	**---**
MSCI ACWI ND	2.11%	5.74%	10.73%	18.78%	---	6.14%	---
Stabilized Growth*	**(1.79%)**	**4.48%**	**5.24%**	**10.85%**	**4.24%**	**2.60%**	**4.53%**
Stabilized Growth Blended Index[4]	(2.68%)	5.58%	5.60%	9.21%	4.56%	2.76%	4.38%
Core Real Estate**	**2.34%**	**4.13%**	**6.19%**	**8.68%**	**14.86%**	**4.21%**	**7.15%**
NCREIF Blended Index[5]	3.93%	6.55%	7.11%	7.27%	11.84%	5.85%	7.48%
Extended Global Credit*	**(1.06%)**	**8.18%**	**0.69%**	**8.06%**	**4.74%**	**2.52%**	**4.05%**
Ext Global Credit Blended Index[6]	2.07%	8.27%	1.53%	7.12%	4.83%	3.92%	4.73%
Low Volatility Equity******	**(3.30%)**	**4.91%**	**8.99%**	**---**	**---**	**3.40%**	**---**
MSCI ACWI Min Volatility Index	(2.50%)	13.00%	7.33%	---	---	5.75%	---
Options-Based Equity*	**(1.90%)**	**3.39%**	**5.24%**	**12.19%**	**3.57%**	**2.20%**	**4.40%**
Options-Based Blended Index[7]	(6.48%)	1.85%	5.82%	11.51%	3.99%	0.26%	3.02%
Private Growth	**0.13%**	**14.94%**	**15.36%**	**18.60%**	**5.17%**	**9.92%**	**10.62%**
Private Growth Blended Index[8]	(10.73%)	3.89%	17.03%	17.37%	(2.36%)	2.77%	4.46%
Non-Core Real Estate**	**2.35%**	**9.55%**	**10.86%**	**12.09%**	**14.98%**	**7.57%**	**9.92%**
Private Growth Blended Index[8]	(10.73%)	3.89%	17.03%	17.37%	(2.36%)	2.77%	4.46%
Private Equity**	**(0.64%)**	**16.55%**	**16.57%**	**20.29%**	**5.26%**	**10.52%**	**11.32%**
Private Growth Blended Index[8]	(10.73%)	3.89%	17.03%	17.37%	(2.36%)	2.77%	4.46%

*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.

***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 through 12/31/17;
43.0% Stabilized Growth Blended Benchmark, 43.0% Traditional Growth Blended Benchmark, and 14.0% Private Growth Blended Benchmark through 12/31/18
41.0% Stabilized Growth Blended Benchmark, 41.0% Traditional Growth Blended Benchmark, and 18.0% Private Growth Blended Benchmark thereafter.

[2] 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 through 12/31/18; NCREIF Property Index (quarter lagged) replaced with NCREIF ODCE Net (quarter lagged) thereafter.

[5] 100.0% NCREIF Property Index (quarter lagged); through 12/31/18; NCREIF ODCE Net (quarter lagged) thereafter

[6] 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.

[7] 100% CBOE BXM Index though 9/30/16; 6.7% 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 thereafter.

[8] 100.0% Russell 3000 (lagged) +3.5% through 9/30/14; 100.0% MSCI ACWI IMI (lagged) +2% thereafter.

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Investment Results as of June 30, 2020 (Risk-Based Classes – Sub-Components) [continued]:

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2020	2019	2018	2017	2016	6/2020	6/2020
Principal Protection (Global Int. Fixed Income)	**4.50%**	**5.44%**	**0.94%**	**1.94%**	**3.11%**	**3.61%**	**3.17%**
Principal Protection Blended Index[1]	5.57%	6.04%	0.63%	-0.02%	4.24%	4.05%	3.26%
Crisis Risk Offset*	**6.54%**	**6.83%**	**4.20%**	**---**	**---**	**5.85%**	**---**
Crisis Risk Offset Blended Index[2]	5.62%	4.38%	1.58%	---	---	3.85%	---
Alternative Return Capture*	**(0.61%)**	**15.39%**	**13.62%**	**---**	**---**	**9.22%**	**---**
90-Day T-Bill + 2.5%[3]	4.17%	6.78%	6.43%	---	---	5.79%	---
Systematic Trend Following*	**1.70%**	**0.20%**	**1.74%**	**---**	**---**	**1.21%**	**---**
MLM Global Index LT 15V	(6.03%)	(2.10%)	(0.87%)	---	---	(3.03%)	---
Long Duration Fixed Income*	**25.13%**	**11.94%**	**(2.36%)**	**---**	**---**	**11.00%**	**---**
BBg BC US Treasury Long Term	25.40%	12.30%	(0.13%)	---	---	12.04%	---
Real Return	**5.59%**	**6.30%**	**6.63%**	**2.60%**	**5.33%**	**6.17%**	**5.28%**
CPI + 3%	3.73%	4.71%	5.88%	4.70%	4.05%	4.80%	4.64%
Global Inflation-Linked Securities	**7.96%**	**6.91%**	**4.37%**	**2.20%**	**6.42%**	**6.40%**	**5.55%**
BBg BC World Govt Inflation-	7.95%	6.63%	3.44%	1.93%	7.39%	5.99%	5.44%
Infrastructure**	**31.96%**	**13.63%**	**10.26%**	**12.29%**	**11.13%**	**18.24%**	**13.88%**
CPI + 4%	4.74%	5.73%	6.91%	5.71%	5.06%	5.82%	5.66%
Timber**	**(0.72%)**	**3.76%**	**9.63%**	**2.66%**	**2.92%**	**4.14%**	**3.48%**
NCREIF Timberland Index**	1.30%	2.38%	3.64%	2.90%	10.64%	2.48%	2.80%
Opportunities**	**(23.33%)**	**3.21%**	**1.02%**	**6.04%**	**---**	**(7.19%)**	**---**
Other[4]	**3.90%**	**(1.20%)**	**6.13%**	**6.29%**	**(1.19%)**	**2.90%**	**2.73%**

*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 through 12/31/17;
55% BBg BC US Intermediate Aggregate ex. Credit Index and 45% 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 through 3/31/19.
40.0% 90-Day T-Bill +2.5%, 35.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index thereafter.
[3] Previously 90-day T-Bill + 5% through 3/31/19.
[4] 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)
AllianceBernstein
Longview
Wasatch
Wellington

PASSIVE PUBLIC EQUITY (BROAD GROWTH)
Blackrock
Legal and General Investment Management

CORE REAL ESTATE (BROAD GROWTH)
Cabot Industrial
Heitman Capital Management
Invesco Realty Advisors

EXTENDED GLOBAL CREDIT (BROAD GROWTH)
Carval Credit
HPS Credit
Pacific Investment Management Company
Silverrock Credit
Western Asset Management Company

LOW VOLATILITY EQUITY (BROAD GROWTH)
Robeco
TOBAM

OPTIONS-BASED EQUITY (BROAD GROWTH)
AQR
Gateway
Geode
Neuberger Berman

NON-CORE REAL ESTATE (BROAD GROWTH)
Angelo Gordon
Almanac
Blacksand Capital
Blackrock
Blackstone Realty
CB Richard Ellis
Cerebus
DRA
EJF
Fortress Japan
H/2
Kayne Anderson
Kohlberg Kravis Roberts
LaSalle Investment Management
Lone Star
Mesa West Capital
Prudential
Torchlight
Starwood

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Investment Professionals (continued)

INVESTMENT MANAGERS (CONTINUED)

GLOBAL INTERMEDIATE FIXED INCOME (PRINCIPAL PROTECTION)
Bank of Hawaii
First Hawaiian Bank
Neuberger

INFLATION-LINKED FIXED INCOME (REAL RETURN)
Blackrock

INFRASTRUCTURE (REAL RETURN)
Kohlberg Kravis Roberts

TIMBER (REAL RETURN)
Hancock Timber Resource Group

PRIVATE EQUITY (BROAD GROWTH)
Hamilton Lane
I Squared
Landmark
Stafford Partners

OPPORTUNITIES (OPPORTUNITIES)
Lowe Enterprises

OTHER
Parametric

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INVESTMENT MANAGERS *(CONTINUED)*

ALTERNATIVE RETURN CAPTURE STRATEGIES (CRO)
ARP Americas
Graham Capital Management
Lombard Odier
P E Global

LONG DURATION FIXED INCOME (CRO)
Ryan Labs Asset Management

TREND FOLLOWING STRATEGIES (CRO)
AlphaSimplex
Aspect Capital
Campbell & Company Investment Adviser
Crabel Capital Management
Mount Lucas Management

OTHER CRO (CRO)
Alliance Bernstein TALF
Pillar Enso
Wellington TALF

(Note: Crisis Risk Offest is being renamed Diversifying Strategies)

OTHER SERVICE PROVIDERS

INVESTMENT ADVISOR
Meketa Investment Group
AON Hewitt
Hamilton Lane

CUSTODIAL BANK
Bank of New York Mellon

PLATFORM SERVICE MANAGER (CRO)
FRM Investment Management (USA) LLC

Investment Schedules

List of Assets Directly Held (by fair value)*

as of June 30, 2020 (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	65,715,000	U S TREASURY BOND	2.750%	8/15/2047	AAA	$ 85,863,219
2	76,000,000	U S TREASURY NOTE	2.375%	3/15/2021	AAA	77,172,680
3	76,100,000	U S TREASURY NOTE	1.875%	12/15/2020	AAA	76,688,253
4	69,200,000	U S TREASURY NOTE	2.625%	6/15/2021	AAA	70,816,512
5	70,000,000	U S TREASURY NOTE	1.375%	9/15/2020	AAA	70,172,900
6	60,300,000	U S TREASURY NOTE	2.625%	12/15/2021	AAA	62,448,489
7	60,300,000	U S TREASURY NOTE	2.750%	9/15/2021	AAA	62,170,506
8	58,400,000	U S TREASURY NOTE	2.375%	3/15/2022	AAA	60,585,328
9	58,600,000	U S TREASURY NOTE	1.750%	6/15/2022	AAA	60,413,084
10	49,400,000	U S TREASURY NOTE	1.500%	9/15/2022	AAA	50,854,830
International Fixed Income						
1	8,925,000	PROV OF ONTARIO	3.500%	6/2/2024	AA3	7,251,726
2	416,000,000	JAPAN GOVERNMENT TEN YEAR BOND	0.100%	12/20/2028	A1	3,900,764
3	4,715,000	WESTERN AUSTRALIAN TREASURY CO	6.000%	10/16/2023	AA1	3,835,939
4	1,042,824	UNITED KINGDOM GILT INFLA REGS	1.250%	11/22/2055	AA3	3,770,216
5	987,836	UNITED KINGDOM GILT INFLA REGS	0.125%	3/22/2068	AA3	3,692,981
6	3,040,000	ITALY BUONI POLIENNALI DE REGS	0.350%	2/1/2025	-	3,376,476
7	4,095,000	CANADA HOUSING TRUST NO.1	2.900%	6/15/2024	AAA	3,285,140
8	942,959	UNITED KINGDOM GILT INFLA REGS	0.375%	3/22/2062	AA3	3,232,428
9	1,273,166	UNITED KINGDOM GILT INFLA REGS	1.125%	11/22/2037	AA3	2,899,202
10	1,055,773	UNITED KINGDOM GILT INFLA REGS	0.500%	3/22/2050	AA3	2,875,213
Domestic Equities						
1	414,130	MICROSOFT CORP				$ 84,279,596
2	179,585	APPLE INC				65,512,608
3	43,844	ALPHABET INC-CL C				61,978,316
4	149,321	UNITEDHEALTH GROUP INC				44,042,229
5	14,872	AMAZON.COM INC				41,029,171
6	154,096	ANTHEM INC				40,524,166
7	151,578	FACEBOOK INC				34,418,817
8	256,637	FIDELITY NATIONAL INFORMATION				34,412,455
9	66,957	CHARTER COMMUNICATIONS INC				34,150,748
10	175,151	VISA INC				33,833,919
International Equities						
1	407,689	SANOFI				$ 41,508,263
2	299,800	SECOM CO LTD				26,185,432
3	1,882,806	COMPASS GROUP PLC				25,869,513
4	275,947	HENKEL AG & CO KGAA				25,686,988
5	476,800	SOFTBANK GROUP CORP				24,086,388
6	68,727	ROCHE HOLDING AG				23,815,641
7	497,388	KONINKLIJKE PHILIPS NV				23,194,788
8	338,600	TENCENT HOLDINGS LTD				21,782,730
9	116,674	NASPERS LTD				21,240,443
10	491,637	JULIUS BAER GROUP LTD				20,572,431

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, 2020	Percentage
Equity securities			
Common stock	$	4,643,594	32.89%
Pooled funds		1,315,993	9.32%
Preferred shares and others		297,583	2.11%
		6,257,170	44.32%
Fixed income securities			
US treasury / government / agencies		2,818,029	19.96%
US mortgage-backed		38,871	0.28%
US corporate		800,431	5.67%
Non-US government / agencies		179,720	1.27%
Non-US corporate		164,282	1.16%
Pooled and others		130,522	0.92%
		4,131,855	29.26%
Others			
Real estate investments		1,531,903	10.85%
Alternative investments		2,199,495	15.58%
		3,731,398	26.43%
Total, investments at fair value	$	14,120,423	100.01%

Investment Schedules (continued)

Schedule of Investment Fees
by Asset Class Allocation

(Dollar values expressed in thousands)

	Fair value as of June 30, 2020	Total FY 2020 Investment Fees	Basis Points
Broad Growth			
Active Public Equity	$ 3,082,962	$ 10,557	34 bp
Passive Public Equity	1,978,256	245	1
Core Real Estate	614,301	(1,171)	(19)
Extended Global Credit	980,689	3,192	33
Low Volatility Equity	992,996	2,264	23
Options-based Equity	2,578,090	3,956	15
Non-Core Real Estate	628,578	-	-
Private Equity	1,870,941	1,674	9
	12,726,813	20,717	16
Principal Protection			
Intermediate Fixed Income	778,484	939	12
Crisis Risk Offset			
Alternative Return Capture Strategies	1,044,334	9,886	95
Trend Following Strategies	881,531	5,071	58
Long Duration Fixed Income	481,468	74	2
	2,407,333	15,031	62
Real Return			
Inflation-linked Fixed Income	201,767	132	7
Infrastructure	32,972	-	-
Timber	185,980	1,588	85
	420,719	1,720	
Opportunities	23,137	92	40
Other	803,795	365	5
Subtotal on investments	17,160,281	38,864	23
Other Investment Services			
Custodian fees		1,431	n/a
Investment consultant fees		304	n/a
Total including consultant and custodian	$ 17,160,281	$ 40,599	24

Investment Schedules (continued)

Schedule of Broker Commissions

The following is a list of brokers who received commissions from equity trades during Fiscal Year 2020.

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
ABN AMRO CLEARING BANK N.V., AMSTERDAM	59	$ 7,514	$ 6	$ 0.102
ALLEN & COMPANY LLC, JERSEY CITY	1,500	52,983	45	0.030
BAIRD, ROBERT W & CO INC, MILWAUKEE	5,969,779	790,095,483	90,263	0.015
BANCO ITAU, SAO PAULO	6,400	36,327	36	0.006
BANCO SANTANDER CENTRAL HISPANO, LONDON	336,100	1,747,922	1,048	0.003
BANCO SANTANDER, NEW YORK	929,958	2,423,732	5,049	0.005
BANK OF NEW YORK JAMES CAPEL ADR, NY	128,104	1,298,910	1,208	0.009
BANQUE PARIBAS, PARIS	497,161	9,283,145	2,098	0.004
BARCLAYS BANK IRELAND PLC, DUBLIN	6,886,293	43,117,334	11,335	0.002
BARCLAYS CAPITAL INC./LE, NEW JERSEY	1,178,582	95,712,874	11,541	0.010
BARCLAYS CAPITAL LE, NEW YORK	823,590	37,993,771	22,533	0.027
BARCLAYS CAPITAL, LONDON (BARCGB33)	1,054,472	21,905,979	6,484	0.006
BARCLAYS CAPITAL, NEW YORK	12,917	707,135	195	0.015
BERENBERG GOSSLER & CIE, HAMBURG	188,013	10,609,186	14,534	0.077
BERNSTEIN SANFORD C & CO, NEW YORK	2,294,784	119,820,703	15,557	0.007
BMO CAPITAL MARKETS CORP, NEW YORK	714,942	52,790,023	6,854	0.010
BNP PARIBAS SEC SRVS SA, SINGAPORE	1,931,191	25,825,856	15,186	0.008
BNP PARIBAS SECS SERVS, SYDNEY	402,482	1,610,965	1,609	0.004
BNP PARIBAS, JERSEY CITY	3,100	336,625	50	0.016
BNY CONVERGEX EXECUTION SOL, NEW YORK	378,480	5,651,271	5,517	0.015
BNY CONVERGEX, NEW YORK	2,858	161,428	57	0.020
BNYMELLON/RE BARCLAYS BANK IRE, NEW YORK	1,550,092	57,263,777	11,453	0.007
BOFA SECURITIES EUROPE S.A., PARIS	2,683,843	27,870,547	5,775	0.002
BOFA SECURITIES, INC, NEW YORK	472,774	6,605,182	6,998	0.015
BRADESCO S.A. CTVM, SAO PAULO	1,249,453	8,782,789	4,878	0.004
BRASIL PLURAL CCTVM SA, SAO PAULO	266,200	1,470,427	927	0.003
BTIG LLC, NEW YORK	472,044	19,772,478	17,708	0.038
CALYON SECURITIES, NEW YORK	1,016,600	3,092,238	1,367	0.001
CANACCORD GENUITY (AUSTRALIA) LTD,MELBOU	4,302	24,433	20	0.005
CANTOR FITZGERALD & CO INC, NEW YORK	105,601	8,969,869	2,981	0.028
CANTOR FITZGERALD & CO/AQUA SECS LP, NY	12,579	181,385	252	0.020
CANTOR FITZGERALD EUROPE, LONDON	453	37,259	7	0.015
CARNEGIE SECS LTD, HELSINKI (CASFFIH1)	12,653	728,424	1,023	0.081
CHINA INTL CAP CORP HK SECS, HONG KONG	1,004,000	826,031	1,455	0.001
Amounts carried forward	32,591,359	1,356,814,005	266,049	

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	32,591,359	$ 1,356,814,005	$ 266,049	
CIBC WORLD MKTS INC, TORONTO (WGDB)	504,314	26,311,688	3,287	$ 0.007
CIMB GK SECURITIES PTE LTD, SINGAPORE	1,600	11,217	9	0.006
CITADEL SECURITIES INSTL LLC, CHICAGO	140,731	7,101,218	704	0.005
CITATION GROUP BCC CLRG, NEW YORK	242,767	13,881,678	1,214	0.005
CITIBANK NA, LONDON	2,862	120,095	24	0.008
CITIBANK NY (MER)	78,429	88,106	44	0.001
CITIGROUP GBL MKTS INC, TAIPEI	1,293,000	3,842,957	1,435	0.001
CITIGROUP GBL MKTS/SALOMON, NEW YORK	15,788,157	56,781,549	23,636	0.001
CITIGROUP GLOBAL MARKETS LTD, LONDON	21,413,222	107,451,004	31,692	0.001
CITIGROUP GLOBAL MARKETS U.K., LONDON	865	8,551	2	0.002
CITIGROUP GLOBAL MARKETS, INC., NEW YORK	7,230,736	544,897,835	90,650	0.013
CLSA AUSTRALIA PTY LTD, SYDNEY	4,567,986	35,492,745	7,519	0.002
CLSA SECURITIES, KUALA LUMPUR	32,900	26,008	7	0.000
COWEN AND CO LLC, NEW YORK	2,686,757	160,060,589	39,866	0.015
COWEN AND COMPANY LLC, NEW YORK	1,800	77,660	14	0.008
CRAIG HALLUM, NEW YORK	1,737	73,278	35	0.020
CREDIT LYONNAIS SEC, SEOUL	71,372	4,488,952	2,156	0.030
CREDIT LYONNAIS SECS (ASIA), HONG KONG	8,382,773	25,125,277	7,086	0.001
CREDIT LYONNAIS SECS ASIA LTD, TAIPEI	3,251,061	10,578,034	6,202	0.002
CREDIT LYONNAIS SECS, SINGAPORE	18,258,036	98,687,990	34,786	0.002
CREDIT SUISSE (DEUTSCHLAND), FRANKFURT	598,400	817,836	328	0.001
CREDIT SUISSE (EUROPE), LONDON	15,011,167	149,936,652	39,229	0.003
CREDIT SUISSE (EUROPE), SEOUL	30,479	1,369,466	1,303	0.043
CREDIT SUISSE (HK) LIMITED, HONG KONG	1,126,900	13,485,771	2,773	0.002
CREDIT SUISSE SECURITIES (USA) LLC, NY	2,050	16,463	12	0.006
CREDIT SUISSE, NEW YORK (CSUS)	70,554,600	561,236,144	113,627	0.002
CREDIT SUISSE, TAIPEI	292,000	1,080,386	379	0.001
D CARNEGIE AB, STOCKHOLM	38,481	790,288	787	0.020
DAIWA SEC SMBC EUROPE LTD, LONDON	10,100	187,152	150	0.015
DAIWA SECS (HK) LTD, HONG KONG	270,025	10,340,206	7,226	0.027
DAIWA SECS AMER INC, NEW YORK	467,929	10,350,738	14,810	0.032
DAIWA SECS SMBC CATHAY CO, TAIPEI	176,000	2,335,514	525	0.003
DEUTSCHE BK INTL EQ, LONDN (DEUTGB22EEQ)	13,700	122,907	44	0.003
DEUTSCHE BK SECS INC, NY (NWSCUS33)	48,801	730,946	976	0.020
DNB NOR MARKETS CUSTODY, OSLO	6,391	147,128	206	0.032
EXANE, PARIS (EXANFRPP)	5,283,105	36,598,027	8,330	0.002
FIDELITY CAPITAL MARKETS, NEW YORK	174,192	16,475,966	1,219	0.007
FIDELITY CLEARING CANADA ULC, TOR (FIDC)	7,226	584,008	110	0.015
GOLDMAN SACHS & CO, NY	10,183,204	311,129,092	114,632	0.011
GOLDMAN SACHS AUSTRALIA PTY LTD,MELBOURN	45,239	371,764	606	0.013
GOLDMAN SACHS INTL, LONDON (GSILGB2X)	5,968,319	86,134,910	30,568	0.005
GOLDMAN SACHS INTL, NY	219,702	18,616,179	1,947	0.009
Amounts carried forward	227,070,474	3,674,777,979	856,204	

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	227,070,474	$ 3,674,777,979	$ 856,204	
GOODBODY STOCKBROKERS, DUBLIN	375,888	1,331,655	1,112	$ 0.003
GUGGENHEIM CAPITAL MARKETS LLC, NEW YORK	67,500	2,629,063	1,846	0.027
HAITONG INTL SEC CO LTD, HONG KONG	253,153	1,040,068	1,556	0.006
HONG KONG & SHANGHAI BKG CORP, HONG KONG	22,200	158,927	40	0.002
HSBC BANK PLC (MIDLAND BK)(JAC), LONDON	4,619,127	64,562,072	17,797	0.004
HSBC BANK PLC (MIDLAND BK)(XXX), LONDON	106,818	1,536,723	2,137	0.020
HSBC BANK USA, NEW YORK	244,013	106,787	68	0.000
HSBC SECS INC, NEW YORK	4,110,087	15,206,278	6,733	0.002
HSBC SECURITIES (USA) INC, NEW YORK	843,398	65,945,160	6,887	0.008
ICBC FINCL SVCS, NEW YORK	114,600	3,446,377	4,045	0.035
INSTINET AUSTRALIA CLEARING SERV, SYDNEY	820,053	919,246	265	0.000
INSTINET CLEARING SER INC, NEW YORK	1,592,033	94,867,937	9,116	0.006
INSTINET CORP, NEW YORK	1,354,901	101,655,792	11,826	0.009
INSTINET EUROPE LIMITED, LONDON	9,082,519	128,433,354	41,625	0.005
INSTINET PACIFIC LTD, HONG KONG	28,546,613	72,687,700	22,984	0.001
INSTINET, SINGAPORE	10,400	44,318	29	0.003
INVESTMENT TECH GROUP INC, NEW YORK	539,633	31,074,246	5,148	0.010
INVESTMENT TECHNOLOGY GR INC	1,219	102,232	20	0.016
INVESTMENT TECHNOLOGY GROUP LTD,DUBLIN	10,023,381	140,758,436	37,630	0.004
INVESTMENT TECHNOLOGY GROUP, NEW YORK	942	38,591	8	0.008
ISI GROUP INC, NEW YORK	376,078	13,087,071	3,915	0.010
ITG AUSTRALIA LTD, MELBOURNE	560,900	10,140,895	2,629	0.005
ITG CANADA CORP, TORONTO	2,923	215,727	24	0.008
ITG INC, NEW YORK	36,548	2,531,423	534	0.015
J P MORGAN SEC LTD/STOCK LENDING, LONDON	420,042	21,996,978	5,886	0.014
J P MORGAN SEC, SYDNEY	12,382,982	35,249,691	12,209	0.001
J P MORGAN SECS INC, NEW YORK	7,413	559,278	112	0.015
J P MORGAN SECS LTD, LONDON	17,344,654	172,258,915	68,636	0.004
J P MORGAN SECURITIES INC, BROOKLYN	818	163,335	33	0.040
J.P MORGAN SECURITIES INC, NEW YORK	4,131,278	180,473,415	56,061	0.014
J.P. MORGAN SECURITIES LLC, NEW YORK	6,174,914	393,432,130	50,519	0.008
J.P. MORGAN SECURITIES, HONG KONG	46,784,213	57,534,220	20,515	0.000
J.P.MORGAN AG, FRANKFURT	608,832	20,844,898	4,224	0.007
JANE STREET EXECUTION SERVICES, NEW YORK	930	274,674	5	0.005
JANNEY MONTGOMERY SCOTT, PHILADELPHIA	302,563	4,169,294	6,051	0.020
JEFFERIES & CO INC, NEW YORK	2,705,194	127,853,971	28,698	0.011
JEFFERIES & CO LTD, LONDON	881,356	10,545,567	3,963	0.004
JMP SECURITIES, SAN FRANCISCO	53,123	2,407,206	1,112	0.021
JONESTRADING INST SVCS LLC, NEW YORK	96,184	3,327,363	3,507	0.036
JP MORGAN BROKING (HK) LTD, HONG KONG	2,497,937	8,677,235	4,341	0.002
JP MORGAN SECS (FAR EAST) LTD, SEOUL	569,049	21,511,148	9,755	0.017
JP MORGAN SECS (TAIWAN) LTD, TAIWAN	10,947,930	22,262,977	9,824	0.001
Amounts carried forward	396,684,813	5,510,840,352	1,319,629	

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	396,684,813	$ 5,510,840,352	$ 1,319,629	
JP MORGAN SECS, SINGAPORE	14,992,200	11,899,584	8,368	$ 0.001
JPMORGAN SECURITIES INC, NEW YORK	3,696,095	25,854,365	9,647	0.003
KEB SALOMON SMITH BARNEY SECS, SEOUL	102	15,059	5	0.049
KEEFE BRUYETTE + WOODS INC, NEW YORK	88,945	4,031,634	2,668	0.030
KEPLER EQUITIES, PARIS	1,096	75,978	61	0.056
KEYBANC CAPITAL MARKETS INC, NEW YORK	221,703	4,215,592	7,749	0.035
KIM ENG SEC LTD, HONG KONG	34,000	926,584	1,849	0.054
KNIGHT EQUITY MARKETS LP, NEW YORK	288,952	22,373,025	1,956	0.007
LIQUIDNET ASIA LTD, HONG KONG	2,444,600	2,466,143	1,392	0.001
LIQUIDNET EUROPE LIMITED, LONDON	571,591	986,078	910	0.002
LIQUIDNET INC, NEW YORK	933,252	87,242,497	10,317	0.011
LOOP CAPITAL MARKETS, JERSEY CITY	345,318	20,313,293	2,417	0.007
LUMINEX TRADING AND ANALYTICS, BOSTON	309,934	30,449,710	1,550	0.005
MACQUARIE BANK LIMITED, SYDNEY	674,013	6,569,156	1,424	0.002
MACQUARIE BANK LTD, HONG KONG	2,858,052	25,862,745	30,792	0.011
MACQUARIE CAPITAL (USA) INC., NEW YORK	700	56,709	14	0.020
MACQUARIE CAPITAL LTD, LONDON	124,548	4,576,719	4,640	0.037
MACQUARIE SECS USA INC, NEW YORK	9,700	684,983	337	0.035
MACQUARIE SECURITIES LIMITED, HONG KONG	158,600	126,351	35	0.000
MACQUARIE SECURITIES LTD, SEOUL	534	96,848	29	0.054
MAINFIRST BANK AG,FRANKFURT AM MAIN	700	93,742	94	0.134
MERRILL LYNCH & CO INC ATLAS GLOBAL, NY	336,413	2,665,763	3,997	0.012
MERRILL LYNCH GILTS LTD, LONDON	174,710	9,516,421	2,858	0.016
MERRILL LYNCH INTERNATIONAL, DUBAI	571	117,165	23	0.040
MERRILL LYNCH INTL LONDON EQUITIES	10,289,321	108,160,981	40,601	0.004
MERRILL LYNCH PIERCE FENNER SMITH INC NY	3,588,523	297,343,129	44,028	0.012
MERRILL LYNCH PIERCE FENNER, TAIWAN	1,414,000	14,437,834	3,970	0.003
MERRILL LYNCH PIERCE FENNER, WILMINGTON	839,242	2,352,994	4,867	0.006
MERRILL LYNCH, SYDNEY	938,000	3,579,308	5,362	0.006
MIRAE ASSET SEC USA, NEW YORK	7,500	150,379	225	0.030
MIRAE ASSET SECURITIES, SEOUL	76,029	1,514,981	417	0.005
MITSUBISHI UFJ SECS INTL PLC, LONDON	7,700	119,932	96	0.012
MITSUBISHI UFJ SECURITIES, NEW YORK	327,098	9,058,667	8,816	0.027
MIZUHO INTERNATIONAL PLC, LONDON	21,800	87,676	70	0.003
MIZUHO SECURITIES USA INC, NEW YORK	965	131,867	19	0.020
MIZUHO SECURITIES USA INC. NEW YORK	328,159	6,613,977	6,725	0.020
MIZUHO SECURITIES USA, INC., NEW YORK	20,693	375,108	559	0.027
MKM PARTNERS LLC, GREENWICH	13,914	352,687	392	0.028
MORGAN STANLEY & CO INC, NY	69,217,939	483,035,723	119,783	0.002
MORGAN STANLEY & CO INTL (FXO), LONDON	2,115	20,823	4	0.002
MORGAN STANLEY & CO INTL LTD, SEOUL	468,361	20,490,052	8,476	0.018
MORGAN STANLEY & CO INTL LTD, TAPEI	4,876,000	15,356,407	6,214	0.001
Amounts carried forward	517,388,501	6,735,239,021	1,663,385	

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	517,388,501	$ 6,735,239,021	$ 1,663,385	
MORGAN STANLEY & CO, LONDON (MSLNGB2X)	10,856,062	143,901,861	34,046	$ 0.003
MORGAN STANLEY DW INC, JERSEY CITY	1,334	58,601	12	0.009
MORGAN STANLEY EUROPE SE, FRANKFURT	13,184,779	30,670,763	6,903	0.001
NATIONAL FINL SVCS CORP, NEW YORK	149,307	11,406,931	747	0.005
NBCN INC, TORONTO (NBCS)	1,222	25,497	18	0.015
NEEDHAM & CO, NEW YORK	127,544	5,031,975	2,551	0.020
NESBITT BURNS, TORONTO (NTDT)	1,557,606	27,973,657	20,212	0.013
NORDEA BK PLC, HELSINKI (NDEAFIHH030)	251	5,994	6	0.024
NUMIS SECURITIES LTD, LONDON	45,757	228,379	137	0.003
ODDO ET CIE, PARIS	116,061	2,876,967	4,252	0.037
OLIVETREE SECURITIES LTD, LONDON	48,853	254,322	153	0.003
OPPENHEIMER & CO INC, NEW YORK	146,651	1,306,444	3,026	0.021
PAREL, PARIS	4,318	44,457	36	0.008
PERSHING LLC, JERSEY CITY	2,083,934	87,349,979	32,450	0.016
PERSHING SECURITIES LTD, LONDON	1,046,093	15,919,400	10,245	0.010
PIPER JAFFRAY & CO., JERSEY CITY	144,334	5,156,006	4,980	0.035
PULSE TRADING LLC, BOSTON	2,795	264,276	56	0.020
RAYMOND JAMES & ASSOC INC, ST PETERSBURG	62,226	3,240,678	1,553	0.025
RBC CAPITAL MARKETS LLC, NEW YORK	934,057	66,795,909	8,230	0.009
RBC DOMINION SECS INC, TORONTO (DOMA)	2,104,126	53,655,985	26,944	0.013
REDBURN PARTNERS LLP, LONDON	318,999	5,590,687	1,989	0.006
ROYAL BANK OF CANADA EUROPE LTD, LONDON	222,527	5,737,261	1,156	0.005
S G WARBURG, SEOUL	78,940	5,021,569	2,512	0.032
SAMSUNG SECS, SEOUL	22,437	3,674,559	5,516	0.246
SANFORD C BERNSTEIN & CO INC, LONDON	881,592	11,849,822	6,749	0.008
SCOTIA CAPITAL (USA) INC, NEW YORK	293,680	11,258,510	4,117	0.014
SCOTIA CAPITAL INC, NEW YORK	748,613	3,258,596	4,347	0.006
SCOTIA CAPITAL MKTS, TORONTO	406,523	16,379,627	2,073	0.005
SG AMERICAS SECURITIES LLC, NEW YORK	7,501,199	109,124,029	14,661	0.002
SG SEC (LONDON) LTD, LONDON	323,287	5,777,956	3,802	0.012
SG SEC (LONDON) LTD, TAIPEI	11,088,000	31,157,392	12,467	0.001
SG SECURITIES, HONG KONG	46,261,965	92,076,296	36,850	0.001
SIDOTI AND COMPANY LLC, NEW YORK	116,008	6,503,581	2,320	0.020
SKANDINAVISKA ENSKILDA BANKEN, COPENHAGE	41,344	1,469,455	1,237	0.030
SMBC NIKKO SECURITIES LTD, WAN CHAI	4,000	70,772	57	0.014
SMBC SECURITIES, INC NEW YORK	112,300	5,601,684	5,601	0.050
SOCIETE GENERALE LONDON BRANCH, LONDON	1,276,579	14,833,718	9,301	0.007
SOCIETE GENERALE, LONDON	1,900	18,133	4	0.002
SOCIETE GENERALE, PARIS	10,721,500	108,238,217	41,552	0.004
STEPHENS INC, LITTLE ROCK	34,756	4,423,343	695	0.020
STIFEL NICOLAUS	63,970	2,718,645	1,835	0.029
STUART FRANKEL & CO. INC, JERSEY CITY	16,414	452,252	259	0.016
Amounts carried forward	630,542,344	7,636,643,206	1,979,042	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	630,542,344	$ 7,636,643,206	$ 1,979,042	
SVENSKA HANDELSBANKEN, STOCKHOLM	6,351	217,915	240	$ 0.038
TORONTO DOMINION SEC, TORONTO	408,943	18,154,218	2,200	0.005
UBS AG LONDON BRANCH, LONDON	192,161	15,572,188	3,809	0.020
UBS AG, LONDON	121	9,417	2	0.017
UBS EQUITIES, LONDON	38,756,668	58,118,597	27,744	0.001
UBS EUROPE SE, FRANKFURT AM MAIN	21,566,485	80,599,074	26,395	0.001
UBS SECURITIES CANADA, TORONTO (BWIT)	25,602	1,301,017	194	0.008
UBS SECURITIES LLC, STAMFORD	8,566,483	444,593,706	84,892	0.010
UBS WARBURG ASIA LTD, HONG KONG	8,642,027	27,901,759	28,789	0.003
UBS WARBURG AUSTRALIA EQUITIES, SYDNEY	627,322	5,432,426	1,465	0.002
UBS WARBURG SEC,TAIWAN	700,000	2,736,905	1,286	0.002
UNION BANK SWITZERLAND SECS, LONDON	729,400	199,274	94	0.000
VALEURS MOBILIERES, MONTREAL (VMDM)	1,230	24,489	19	0.015
VIRTU AMERICAS LLC, JERSEY CITY	1,311,756	103,660,357	16,556	0.013
WALL ST ACCESS, NEW YORK	78,239	3,931,234	475	0.006
WALL STREET ACCESS, JERSEY CITY	419,896	14,392,412	3,139	0.007
WEEDEN & CO, NEW YORK	80,410	5,186,595	563	0.007
WELLS FARGO SECURITIES LLC, CHARLOTTE	1,419,111	100,222,334	9,938	0.007
WELLS FARGO SECURITIES, LLC, NEW YORK	131,002	7,605,799	4,760	0.036
WILLIAM BLAIR & CO, CHICAGO	54,677	3,640,951	1,094	0.020
WILLIAMS CAPITAL GROUP LP, JERSEY CITY	31,078	2,678,381	615	0.020
WOORI INVESTMENT & SECURITIES, SEOUL	7,305	146,736	191	0.026
XP INVESTIMENTOS CCTVM SA,RIO DE JANEIRO	72,661	555,263	333	0.005
OTHER	1,019,086	45,218,561	9,188	0.009
Total trades	715,390,358	$ 8,578,742,814	$ 2,203,023	$ 0.003

Employees' Retirement System

of the State of Hawaii

ACTUARIAL SECTION

GASB STATEMENT NO. 67 REPORT

P: 469.524.0000 | www.grsconsulting.com

April 15, 2021

The 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 ACFR.

- 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 29, 2021, 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, 2020 (located later in this section of the ERS' ACFR) 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 GASB Statement No. 67 report and actuarial valuation report, as of June 30, 2020, are 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

Lewis Ward
Consultant

By Jo Newton

Joseph P. Newton
FSA, EA, MAAA

GABRIEL, ROEDER, SMITH & COMPANY

GASB STATEMENT NO. 67 REPORT (continued)

EXECUTIVE SUMMARY ***
as of June 30, 2020

	2020	2019
Actuarial Valuation Date	June 30, 2020	June 30, 2019
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	June 30, 2020	June 30, 2019
Membership		
Number of		
- Retirees and beneficiaries	51,153	49,885
- Inactive, nonretired members **	30,189	28,854
- Active members	66,750	66,383
- Total	148,092	145,122
Reported Payroll for Fiscal Year	$4,481,443,808	$4,376,216,753
Net Pension Liability		
Total Pension Liability	$32,691,755,844	$31,396,447,685
Plan Fiduciary Net Position	17,385,480,476	17,227,026,987
Net Pension Liability	$15,306,275,368	$14,169,420,698
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	53.18%	54.87%
Net Pension Liability as a Percentage of Covered Payroll	341.55%	323.78%
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*	2.45%	3.13%
Last year ending June 30 in the 2020 to 2119 projection period for which projected benefit payments are fully funded (and 2020 to 2119)	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, 2020 and June 28, 2019. 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.

** Inactive, nonretired members for GASB 67 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, 2020 Actuarial Valuation Report information that follows this section beginning on page 125.

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 ACFR. 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, 2020 and a measurement date of June 30, 2020.

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 2.45% (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

P: 469.524.0000 | www.grsconsulting.com

January 29, 2021

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, 2020

We certify that the information contained in the 2020 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, 2020. 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 and consultants. 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.

This report was prepared at the request of the Board and is intended for use by the ERS and those designated or approved by the Board. This report may be provided to parties other than the ERS only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. (The entire GASB Statement No. 67 report and actuarial valuation report, as of June 30, 2020, are available on the ERS website at ers.ehawaii.gov.)

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.)

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Board of Trustees
January 29, 2021
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Valuations are prepared annually, as of June 30th of each year, the last day of ERS's plan year and fiscal year.

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 costs of the ERS and 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 ERS (in aggregate) is 26 years. This is the same as the prior year's funding period of 26 years. Normally, we would expect the funding period to decrease by one each year if all assumptions are exactly met. Therefore, this year's funding period is one year larger than expected. This result is due to losses on both the liabilities and investments of the ERS. However, 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 2017 Legislature passed legislation that made significant changes to the future employer contribution rates. This is the final year of four scheduled increases. The employer contribution rate for Police and Fire employees increased to 41% for FY2021, and the employer contribution rate for All Other Employees increased to 24% for FY2021. The 26 year funding period assumes all of the currently scheduled contribution increases occur and remain in effect throughout the period. Under current law, the contribution rates are expected to stay at these levels until the ERS is fully funded.

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 55.3% which is a small increase over the 55.2% funded ratio in the previous valuation. The funded ratio did not improve more due to actuarial losses on both investments and liabilities.

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.

Letter from the Actuary (continued)

Board of Trustees
January 29, 2021
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The actuarial accrued liability (AAL), the unfunded actuarial accrued liability (UAAL), and the determination of the resulting funding period illustrate the progress toward the realization of financing objectives. The ERS had a liability experience loss which was caused by individual salary increases (for Police and Fire employees) being larger than expected by the assumptions. The ERS also experience a loss on the actuarial value of assets which further increased the UAAL. In addition, the ERS currently experiences negative amortization (interest on the UAAL is greater than the contributions towards the elimination of the UAAL). As a result, the UAAL grew (in dollars) based on this actuarial valuation as of June 30, 2020 and ERS's underfunded status as measured by the UAAL is now $14.607 billion.

Because of the less than favorable investment performance in FY2020, the ERS is now deferring $699 million in investment losses, compared with $95 million in deferred investment losses last year. If there are no significant investment gains or other actuarial gains, the funded status of the ERS would be expected to decrease in the near future before increasing over the long term.

Thus, given the plan's current and future 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 2026, 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 again note that these statements are based on the actual experience meeting the current assumptions. 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 ERS and the expectation on when the ERS will reach a 100% funded level.

This valuation assumed the continuing ability of the plan sponsors to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

Benefit provisions and Legislative changes

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

Letter from the Actuary (continued)

Board of Trustees
January 29, 2021
Page 4

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 ACFR for more details on the benefit provisions for members of the ERS. However, the 2017 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 ERS's funded status should improve and the ERS 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 August of 2019 based on the recommendations provided by an Experience Study performed by GRS. The actuarial assumptions and methods are the same as used in the prior valuation.

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

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.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Gabriel Roeder Smith & Company

Letter from the Actuary (continued)

Board of Trustees
January 29, 2021
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Data

Member data for retired, active, and inactive participants was supplied as of March 31, 2020, 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.

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 (ACFR). Information with respect to years prior to 2000 was supplied by ERS.

Tables and schedules in the Actuarial Section of the ACFR 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	Lewis Ward	Linna Ye, ASA, MAAA
Pension Market Leader & Actuary	Consultant	Actuary

Gabriel Roeder Smith & Company

Executive Summary

The following table summarizes the key results of the June 30, 2020 actuarial valuation of the Employees' Retirement System of the State of Hawaii (ERS).

Item	**2020**	**2019**
Membership		
• Number of		
- Active members	66,750	66,383
- Retirees and beneficiaries	51,153	49,885
- Inactive, vested	9,204	9,321
- Total	127,107	125,589
• Covered payroll for active members	$4,523 million	$4,393 million
• Actual benefit payments and refunds	$1,568 million	$1,486 million
Assets		
• Actuarial (smoothed) value	$18,084 million	$17,322 million
• Market value	$17,385 million	$17,227 million
• Return on actuarial value	5.6%	6.8%
• Return on market value	2.1%	5.7%
• Employer contributions during fiscal year	$1,099 million	$922,635,334
• External cash flow %	(1.1%)	(1.8%)
Actuarial Information		
• Total normal cost % (employee + employer)	14.12%	14.13%
• Unfunded actuarial accrued liability (UAAL)	$14,607 million	$14,074 million
• Funded ratio (based on smoothed assets)	55.3%	55.2%
• Funded ratio (based on market assets)	53.2%	54.9%
• Funding period (years) *	26	26
• Employer contribution rate % of projected payroll ** For FY beginning July 1	26.00%	23.61%

* 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 41.00% Contribution Rate for Police and Firefighters and 24.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2020.

Weighted average of 36.00% Contribution Rate for Police and Firefighters and 22.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2019.

Actuarial Certification Statement

		Police and Firefighters June 30, 2020	All Other Employees June 30, 2020	All Employees June 30, 2020
1. Gross normal cost as a percentage of pay		26.38%	12.44%	14.12%
2. Present value of future benefits				
a. Active employees	$	4,195,196,544	15,281,150,289	19,476,346,833
b. Inactive members		79,482,769	920,479,464	999,962,233
c. Pensioners and beneficiaries		3,473,676,818	14,247,263,100	17,720,939,918
d. Total	$	7,748,356,131	30,448,892,853	38,197,248,984
3. Present value of future employee and employer contributions				
a. Present value of future normal costs	$	1,328,565,986	4,176,927,154	5,505,493,140
b. Present value of future employee contributions		679,510,147	2,068,032,535	2,747,542,682
c. Present value of future employer normal cost (Item 3a - Item 3b)	$	649,055,839	2,108,894,619	2,757,950,458
4. Actuarial accrued liability (Item 2d - Item 3a)	$	6,419,790,145	26,271,965,699	32,691,755,844
5. Actuarial value of assets				
a. Annuity Savings Fund	$	1,244,568,885	1,920,083,500	3,164,652,385
b. Pension Accumulation Fund		2,527,929,604	12,391,800,910	14,919,730,514
c. Total	$	3,772,498,489	14,311,884,410	18,084,382,899
6. Unfunded actuarial accrued liability	$	2,647,291,656	11,960,081,289	14,607,372,945
7. Adequacy of contribution rates				
a. Statutory Contribution Rate for Fiscal Year 2020		41.00%	24.00%	26.00%
B. Funding period in years as of June 30, 2019 *		28	25	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.

Gabriel Roeder Smith & Company

Actuarial Certification Statement (continued)

The actuarial valuation as of June 30, 2020 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 August 12, 2019 based on the actuary's actuarial experience investigation report for the period ending June 30, 2018. 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.

Joe Newton

Joseph P Newton,, FSA, EA, MAAA
Pension Market Leader & Actuary

Gabriel Roeder Smith & Company

Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions

The determination of the accrued liability and an actuarially determined contribution (or funding period) requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and an actuarially determined contribution (or funding period) that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;

2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;

3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;

4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;

5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;

6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions (continued)

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Several generally accepted plan maturity measures are described below and are followed by a table showing a 10-year history of the measurements for ERS.

RATIO OF MARKET VALUE OF ASSETS TO PAYROLL

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher/lower or increasing/decreasing level of this maturity measure generally indicates a higher/lower or increasing/decreasing volatility in plan sponsor contributions as a percentage of payroll.

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll (5 to 2 ratio), a change in liability 2% other than assumed would equal 5% of payroll. A higher/lower or increasing/decreasing level of this maturity measure generally indicates a higher/lower or increasing/decreasing volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions (continued)

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

DURATION OF ACTUARIAL ACCRUED LIABILITY

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

ADDITIONAL RISK ASSESSMENT

Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. While a robust measurement of additional risk assessment is outside the scope of the annual actuarial valuation, some scenario tests and sensitivity tests are included in the valuation summary PowerPoint presentation presented to the Board at the Board's January Board Meeting (is available on the ERS website at: https://ers.ehawaii.gov/resources/financials).

In addition an annual stress test as prescribed by state law is conducted each year. Please see the stress test report dated December 31, 2020, which was conducted in conjunction with this valuation (is available on the ERS website at: https://ers.ehawaii.gov/resources/reports-to-legislature).

(continued)

Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions (continued)

	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Ratio of the market value of assets to payroll	3.75	3.81	3.79	3.68	3.30	3.48	3.56	3.16	2.90	2.97
Ratio of actuarial accrued liability to payroll	7.06	6.95	6.82	6.72	6.44	5.57	5.57	5.44	5.32	5.13
Ratio of actives to retirees and beneficiaries	1.30	1.33	1.36	1.40	1.48	1.52	1.56	1.58	1.61	1.65
Ratio of net cash flow to market value of assets	-1.1%	-1.8%	-2.0%	-2.0%	-1.9%	-1.8%	-2.0%	-2.5%	-2.7%	-1.9%
Duration of the actuarial accrued liability*	15.03	15.11	NA	NA	NA	NA	NA	NA	NA	NA

*Duration measure not available prior to 2019

Gabriel Roeder Smith & Company

Summary of 2020 Actuarial Valuation

Exhibit 1
Development of Employer Cost

	Police and Firefighters June 30, 2020	All Other Employees June 30, 2020	All Employees June 30, 2020
1. Projected FY 2021 payroll for contribution purposes	$ 544,830,476	$ 4,085,399,815	$ 4,630,230,291
2. Gross normal cost (Exhibit 3)	26.38%	12.44%	14.13%
3. Employer normal cost rate (Exhibit 3)	13.78%	6.90%	7.89%
4. Present value future benefits (Exhibit 2)	$ 7,748,356,131	$ 30,448,892,853	$ 38,197,248,984
5. Present value future employer normal cost	$ 649,055,839	$ 2,108,894,619	$ 2,757,950,458
6. Present value future employee contributions	$ 679,510,147	$ 2,068,032,535	$ 2,747,542,682
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 6,419,790,145	$ 26,271,965,699	$ 32,691,755,844
8. Actuarial value of assets	$ 3,772,498,489	$ 14,311,884,410	$ 18,084,382,899
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,647,291,656	$ 11,960,081,289	$ 14,607,372,945
10. Funding period *	28	25	26

	Police and Firefighters June 30, 2019	All Other Employees June 30, 2019	All Employees June 30, 2019
1. Projected FY 2020 payroll for contribution purposes	$ 519,202,297	$ 4,000,491,950	$ 4,519,694,247
2. Gross normal cost (Exhibit 3)	26.55%	12.46%	14.13%
3. Employer normal cost rate (Exhibit 3)	14.02%	7.07%	7.89%
4. Present value future benefits (Exhibit 2)	$ 7,330,373,403	$ 29,407,679,596	$ 36,738,052,999
5. Present value future employer normal cost	$ 637,639,225	$ 2,119,482,767	$ 2,757,121,992
6. Present value future employee contributions	$ 640,268,219	$ 1,944,215,103	$ 2,584,483,322
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 6,052,465,959	$ 25,343,981,726	$ 31,396,447,685
8. Actuarial value of assets	$ 3,551,743,411	$ 13,770,450,696	$ 17,322,194,107
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,500,722,548	$ 11,573,531,030	$ 14,074,253,578
10. Funding period *	28	25	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.
Please refer to Exhibit 7 for the full projection.

Gabriel Roeder Smith & Company

Summary of 2020 Actuarial Valuation (continued)

Exhibit 2
Actuarial Present Value of Future Benefits

	Police and Firefighters June 30, 2020	All Other Employees June 30, 2020	All Employees June 30, 2020
1. Active members			
a. Service retirement benefits	$ 4,026,844,092	$ 13,965,295,501	$ 17,992,139,593
b. Termination benefits	114,838,599	870,432,213	985,270,812
c. Survivor benefits	19,508,421	129,364,833	148,873,254
d. Disability retirement benefits	34,005,432	316,057,742	350,063,174
e. Total	$ 4,195,196,544	$ 15,281,150,289	$ 19,476,346,833
2. Retired members			
a. Service retirement	$ 3,265,083,643	$ 13,156,827,978	$ 16,421,911,621
b. Disability retirement	36,232,215	282,943,658	319,175,873
c. Beneficiaries	172,360,960	807,491,464	979,852,424
d. Total	$ 3,473,676,818	$ 14,247,263,100	$ 17,720,939,918
3. Inactive members			
a. Vested terminations	$ 73,308,524	$ 790,006,745	$ 863,315,269
b. Nonvested terminations	6,174,245	130,472,719	136,646,964
c. Total	$ 79,482,769	$ 920,479,464	$ 999,962,233
4. Total actuarial present value of future benefits	$ 7,748,356,131	$ 30,448,892,853	$ 38,197,248,984

	Police and Firefighters June 30, 2019	All Other Employees June 30, 2019	All Employees June 30, 2019
1. Active members			
a. Service retirement benefits	$ 3,859,043,305	$ 13,596,788,804	$ 17,455,832,109
b. Termination benefits	110,568,937	845,427,012	955,995,949
c. Survivor benefits	18,791,799	126,515,261	145,307,060
d. Disability retirement benefits	32,201,533	303,820,751	336,022,284
e. Total	$ 4,020,605,574	$ 14,872,551,828	$ 18,893,157,402
2. Retired members			
a. Service retirement	$ 3,040,786,559	$ 12,614,610,560	$ 15,655,397,119
b. Disability retirement	34,619,141	263,829,249	298,448,390
c. Beneficiaries	156,594,832	760,677,866	917,272,698
d. Total	$ 3,232,000,532	$ 13,639,117,675	$ 16,871,118,207
3. Inactive members			
a. Vested terminations	$ 72,308,757	$ 783,113,393	$ 855,422,150
b. Nonvested terminations	5,458,540	112,896,700	118,355,240
c. Total	$ 77,767,297	$ 896,010,093	$ 973,777,390
4. Total actuarial present value of future benefits	$ 7,330,373,403	$ 29,407,679,596	$ 36,738,052,999

Gabriel Roeder Smith & Company

Summary of 2020 Actuarial Valuation (continued)

Exhibit 3
Analysis of Normal Cost

	Police and Firefighters June 30, 2020	All Other Employees June 30, 2020	All Employees June 30, 2020
1. Normal cost as a percent of pay			
a. Service retirement benefits	23.38%	9.19%	10.90%
b. Deferred termination benefits	1.18%	0.83%	0.87%
c. Refunds	0.87%	1.47%	1.40%
d. Disability retirement benefits	0.41%	0.47%	0.46%
e. Survivor benefits	0.19%	0.13%	0.14%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	26.38%	12.44%	14.12%
2. Employee contribution rate	12.60%	5.54%	6.39%
3. Effective employer normal cost rate (Item 1g – Item 2)	13.78%	6.90%	7.73%

	Police and Firefighters June 30, 2019	All Other Employees June 30, 2019	All Employees June 30, 2019
1. Normal cost as a percent of pay			
a. Service retirement benefits	23.54%	9.24%	10.93%
b. Deferred termination benefits	1.19%	0.84%	0.88%
c. Refunds	0.87%	1.44%	1.37%
d. Disability retirement benefits	0.41%	0.46%	0.46%
e. Survivor benefits	0.19%	0.13%	0.14%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	26.55%	12.46%	14.13%
2. Employee contribution rate	12.53%	5.39%	6.24%
3. Effective employer normal cost rate (Item 1g – Item 2)	14.02%	7.07%	7.89%

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Summary of 2020 Actuarial Valuation (continued)

Exhibit 4
Development of Actuarial Value of Assets

1. Actuarial value of assets, beginning of year	$	17,322,194,107
2. Net new investments		
a. Contributions	$	1,385,987,044
b. Benefits paid and Refunds	$	(1,568,033,354)
c. Administrative expenses	$	(17,782,865)
d. Subtotal	$	(199,829,175)
3. Market value of assets at end of year	$	17,385,480,476
4. Expected return on actuarial value of assets	$	1,205,559,566
5. Expected actuarial value of assets, end of year	$	18,327,924,498
6. Excess/(shortfall) return (Item 3-Item 5)	$	(942,444,022)

7. Development of amounts to be recognized as of June 30, 2020:

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)
2017	-	-	-	1	-	-
2018	-	-	-	2	-	-
2019	(95,167,120)	-	(95,167,120)	3	(31,722,373)	(63,444,747)
2020	(847,276,902)	-	(847,273,902)	4	(211,819,226)	(635,454,676)
Total	$ (942,444,022)	$ -	$ (942,441,022)		$ (243,541,599)	$ (698,899,423)

8. Actuarial value of assets as of June 30, 2020 (Item 3 - Item 7)	$	18,084,382,899
9. Ratio of actuarial value to market value		104.0%
10. Asset gain/(loss) for year (Item 8 - Item 5)	$	(243,541,599)

Gabriel Roeder Smith & Company

Summary of 2020 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, 2020	$ 2,500,722,548	$ 11,573,531,030	$ 14,074,253,578
2. Normal cost for the year (employer and employee)	$ 147,045,443	$ 497,436,911	$ 644,482,354
3. Less: contributions and assessments for the year	$ (282,267,107)	$ (1,103,719,937)	$ (1,385,987,044)
4. Interest at 7.00%			
a. On UAAL	$ 175,050,578	$ 810,147,172	$ 985,197,750
b. On normal cost	5,146,591	17,410,292	22,556,883
c. On contributions	(9,879,349)	(38,630,198)	(48,509,547)
d. Total	$ 170,317,820	$ 788,927,266	$ 959,245,086
5. Expected UAAL as of June 30, 2020 (Sum of Items 1– 4)	$ 2,535,818,704	$ 11,756,175,270	$ 14,291,993,974
6. Actual UAAL as of June 30, 2020	$ 2,647,291,656	$ 11,960,081,289	$ 14,607,372,945
7. Total gain (loss) for the year (Item 5 – Item 6)	$ (111,472,952)	$ (203,906,019)	$ (315,378,971)
B. Source of gains and losses			
8. Asset gain (loss) for the year (Exhibit 6)	$ (50,775,431)	$ (192,766,168)	$ (243,541,599)
9. Gain (loss) due to change in payment timing	-	-	-
10. Other liability gain (loss)	$ (60,697,521)	$ (11,139,851)	$ (71,837,372)
11. Change in benefit provisions	-	-	-
12. Total gain (loss) for the year	$ (111,472,952)	$ (203,906,019)	$ (315,378,971)

Summary of 2020 Actuarial Valuation (continued)

Exhibit 6
Investment Experience Gain or Loss

Item	June 30, 2020	June 30, 2019
1. Actuarial assets, beginning of year	$ 17,322,194,107	$ 16,512,744,474
2. Total contributions during year	$ 1,385,987,044	$ 1,195,858,912
3. Benefits and refunds paid	$ (1,568,033,354)	$ (1,486,137,444)
4. Administrative expenses paid	$ (17,782,865)	$ (13,798,866)
5. Assumed net investment income at 7.00%		
a. Beginning of year assets	$ 1,212,553,586	$ 1,155,892,113
b. Contributions	$ 48,509,547	$ 41,855,062
c. Benefits and refunds paid	$ (54,881,167)	$ (52,014,811)
d. Benefits and refunds paid	$ (622,400)	$ (482,960)
e. Total	$ 1,205,559,566	$ 1,145,249,404
6. Expected actuarial assets, end of year (Sum of Items 1 through 5)	$ 18,327,924,498	$ 17,353,916,480
7. Actual actuarial assets, end of year	$ 18,084,382,899	$ 17,322,194,107
8. Asset gain (loss) for year (Item 7– Item 6)	$ (243,541,599)	$ (31,722,373)
9. Asset gain (loss) as a percent of actuarial value of assets, end of year (Item 8 / Item 7)	(1.35%)	(0.18%)

Summary of 2020 Actuarial Valuation (continued)

Exhibit 7
Projection Results Based on June 30, 2020 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)
2020	26.00%	$ 4,630	$ 1,204	$ 32,692	$ 18,084	$ 14,608	55.3%
2021	25.99%	4,747	1,234	33,931	19,176	$ 14,755	56.5%
2022	25.99%	4,878	1,268	35,170	20,291	$ 14,879	57.7%
2023	25.98%	5,014	1,303	36,411	21,434	$ 14,977	58.9%
2024	25.97%	5,155	1,339	37,652	22,605	$ 15,047	60.0%
2025	25.96%	5,302	1,377	38,891	23,808	$ 15,083	61.2%
2026	25.95%	5,456	1,416	40,128	25,044	$ 15,084	62.4%
2027	25.92%	5,616	1,456	41,361	26,317	$ 15,044	63.6%
2028	25.92%	5,784	1,499	42,590	27,629	$ 14,961	64.9%
2029	25.92%	5,960	1,545	43,816	28,989	$ 14,827	66.2%
2030	25.92%	6,142	1,592	45,041	30,402	$ 14,639	67.5%
2031	25.92%	6,334	1,642	46,264	31,875	$ 14,389	68.9%
2032	25.92%	6,533	1,693	47,487	33,413	$ 14,074	70.4%
2033	25.92%	6,740	1,747	48,710	35,025	$ 13,685	71.9%
2034	25.92%	6,957	1,803	49,934	36,719	$ 13,215	73.5%
2035	25.92%	7,185	1,862	51,163	38,505	$ 12,658	75.3%
2036	25.92%	7,416	1,922	52,397	40,393	$ 12,004	77.1%
2037	25.92%	7,660	1,986	53,640	42,395	$ 11,245	79.0%
2038	25.92%	7,915	2,052	54,897	44,523	$ 10,374	81.1%
2039	25.92%	8,182	2,121	56,171	46,794	$ 9,377	83.3%
2040	25.92%	8,460	2,193	57,468	49,224	$ 8,244	85.7%
2041	25.92%	8,751	2,268	58,796	51,831	$ 6,965	88.2%
2042	25.92%	9,053	2,347	60,159	54,633	$ 5,526	90.8%
2043	25.92%	9,367	2,428	61,564	57,651	$ 3,913	93.6%
2044	25.92%	9,693	2,513	63,018	60,906	$ 2,112	96.6%
2045	25.92%	10,032	2,601	64,527	64,419	$ 108	99.8%
2046	25.92%	10,383	2,692	66,098	68,212	$ (2,114)	103.2%
2047	25.92%	10,748	2,786	67,736	72,311	$ (4,575)	106.8%
2048	25.92%	11,127	2,884	69,448	76,741	$ (7,293)	110.5%
2049	25.92%	11,518	2,986	71,242	81,529	$ (10,287)	114.4%

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

Summary of 2020 Actuarial Valuation (continued)

Exhibit 8
Highlights of Last Five Annual Actuarial Valuations
2016 through 2020

Item	Valuation Date: June 30 2016	2017	2018	2019	2020
Number of active members	67,377	65,911	66,271	66,383	66,750
Number of inactive members	7,741	9,241	9,249	9,321	9,204
Number of pensioners	41,654	42,857	44,305	45,440	46,486
Number of beneficiaries	3,852	4,070	4,264	4,445	4,667
Average monthly contributory plan pension amount	$ 2,730	$ 2,854	$ 2,994	$ 3,136	$ 3,293
Average monthly noncontributory plan pension amount	$ 1,637	$ 1,669	$ 1,702	$ 1,736	$ 1,773
Average monthly hybrid plan pension amount	$ 2,139	$ 2,178	$ 2,238	$ 2,285	$ 2,345
Average monthly beneficiary amount	$ 1,419	$ 1,472	$ 1,515	$ 1,558	$ 1,610
Total actuarial value of assets ($millions)	$ 14,999	$ 15,721	$ 16,513	$ 17,322	$ 18,084
Unfunded actuarial accrued liability ($millions)	$ 12,440.5	$ 12,928.0	$ 13,404.7	$ 14,074.3	$ 14,607.4
Funding Period (in years) (1)	66	26	25	26	26

Item (Dollar amounts in millions (2))	Fiscal Year 2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Employers contributions (2)	$ 756.6	$ 781.2	$ 847.6	$ 922.6	$ 1098.6

(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 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, 2016, 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.
Beginning July 1, 2018, the percentages increased to 31.0% for Police and Fire, 19.0% for All Others.
Beginning July 1, 2019, the percentages increased to 36.0% for Police and Fire, 22.0% for All Others.

Summary of Actuarial Methods and Assumptions

Basis for assumption setting: The actuarial assumptions were adopted by the Board on August 12, 2019. Rationale for the recommendations are in the most recent experience study dated July 30, 2019.

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 this table for a description of the new entrant profile used in the open group projection.

Summary of Actuarial Methods and Assumptions (continued)

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
15-19	2	$54,605
20-24	175	67,871
25-29	418	67,484
30-34	285	66,402
35-39	136	66,933
40-44	51	69,181
45-49	13	69,063
50-54	2	66,592
55-59	3	76,214
Total	1,085	67,290

It is assumed that 89.2% of new hires will be male.

Summary of Actuarial Methods and Assumptions (continued)

New Entrant Profile for All Other Employees		
Entry Age	# of Employees	Average Salary
15-19	17	$38,029
20-24	1,490	46,860
25-29	3,976	50,043
30-34	3,265	52,785
35-39	2,730	53,415
40-44	2,190	52,444
45-49	1,877	52,641
50-54	1,576	52,497
55-59	1,216	53,769
60-64	633	55,860
65-69	88	63,781
Total	19,058	51,966

It is assumed that 41.8% 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)

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)

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	1.00%	6.00%
4	1.00%	6.00%
5	1.00%	6.00%
6	0.75%	5.75%
7	0.75%	5.75%
8	0.75%	5.75%
9	0.50%	5.50%
10	0.50%	5.50%
11	0.50%	5.50%
12	0.50%	5.50%
13	0.25%	5.25%
14	0.25%	5.25%
15	0.25%	5.25%
16	0.25%	5.25%
17	0.25%	5.25%
18	0.25%	5.25%
19	0.25%	5.25%
20	0.25%	5.25%
21	0.25%	5.25%
22	0.25%	5.25%
23	0.25%	5.25%
24	0.25%	5.25%
25 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
Type	Male & Female	Male & Female	Male & Female
Ordinary	94%	92%	83%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	6%	8%	17%

Healthy Retirees: The 2019 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2019 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2019 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	0.2901%	0.2376%	0.2640%	0.1980%	0.3394%	0.2376%
55	0.4195%	0.3042%	0.3817%	0.2535%	0.4908%	0.3042%
60	0.5773%	0.3175%	0.5253%	0.2646%	0.6754%	0.3175%
65	0.8603%	0.3175%	0.7829%	0.2646%	1.0066%	0.3175%
70	1.2866%	0.7022%	1.1708%	0.5852%	1.5053%	0.7022%
75	2.0370%	1.3340%	1.8537%	1.117%	2.3833%	1.3340%
80	3.4486%	2.2177%	3.1382%	1.8481%	4.0349%	2.2177%
85	6.2716%	3.9579%	5.7072%	3.2982%	7.3378%	3.9579%
90	11.8489%	7.7873%	10.7825%	6.4895%	13.8632%	7.7873%
Multiplier	100%	108%	91%	90%	117%	108%
Setback	0	0	0	0	0	0

Summary of Actuarial Methods and Assumptions (continued)

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

Gender	2025	2030	2035	2040	2045
			Year of Retirement		
General Retirees					
Male	23.8	24.2	24.7	25.2	25.6
Female	26.8	27.2	27.5	27.9	28.2
Teachers					
Male	24.5	25.0	25.4	25.9	26.3
Female	28.2	28.5	28.8	29.1	29.5
Police and Fire					
Male	22.5	23.0	23.5	24.0	24.5
Female	26.8	27.2	27.5	27.9	28.2

Disabled retirees: Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2019. 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:

	General Employees	Teachers	Police & Fire
Type	Male & Female	Male & Female	Male & Female
Ordinary	240%	85%	70%
Accidental	40%	7%	100%

Summary of Actuarial Methods and Assumptions (continued)

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:

Years of Service	Expected Terminations per 1000 Lives (Male & Female)		
	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)

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

Contributory Members

	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	13.5
46	0	0	0	0	0	0	0	0	13.5
47	0	0	0	0	0	0	0	0	13.5
48	0	0	0	0	0	0	0	0	13.5
49	0	0	0	0	0	0	0	0	13.5
50	0	0	0	0	0	0	1	0	16.0
51	0	0	2	1	0	0	1	1	16.0
52	0	0	2	1	0	0	1	1	16.0
53	0	0	2	1	0	0	2	2	16.0
54	0	0	3	2	0	0	3	3	16.0
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)

Noncontributory Members

Expected Retirements per 100 Lives

	General Employees						Teachers			
	Unreduced Retirement		25 & Out		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
55	20	11	15	11	1	1	10	13	1	2
56	18	11	23	11	1	1	10	7	1	2
57	13	11	18	11	1	1	10	8	1	2
58	10	11	15	11	1	1	10	10	2	2
59	10	11	15	11	2	2	10	20	3	3
60	10	14	15	14	3	3	10	11	5	5
61	11	18	16	18	4	4	10	16	7	5
62	20	20	25	20			16	25		
63	20	20	25	20			12	20		
64	12	20	17	20			10	15		
65	14	20	19	20			20	25		
66	20	20	25	20			15	25		
67	20	20	25	20			15	25		
68	20	20	25	20			15	25		
69	20	20	25	20			15	25		
70	20	20	25	20			15	25		
71	20	20	25	20			15	25		
72	20	20	25	20			15	25		
73	20	20	25	20			15	25		
74	20	20	25	20			15	25		
75	100	100	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)

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	18	18	1	1	20	16	2	2
56	12	13	1	1	13	10	2	2
57	12	13	1	1	13	10	2	2
58	16	13	1	2	13	12	2	2
59	16	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)

C. Other Assumptions

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.

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.

Summary of Actuarial Methods and Assumptions (continued)

VIII. Dates of Adoption of Assumptions and Methods

The actuarial assumptions and methods were adopted by the Board of Trustees on August 12, 2019 as recommended by Gabriel, Roeder, Smith & Company (GRS)

IX. Changes in Assumptions and Methods since Prior Valuation

The actuarial assumptions have been revised since the prior valuation. Please see our Experience Study report dated July 30, 2019 for a more extensive discussion of the changes in the actuarial assumptions and the rationale for the current assumptions.

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 Actuarial Methods and Assumptions (continued)

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 (continued)

**Ten Year Actuarial Schedules
2011 to 2020**

- Retirement System Membership **
  - 2020 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 2010-2011 to 2019-2020 **

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

Retirement System Membership **

2011 to 2020

March 31,	Active Members	Terminated Vested Members	Inactive Nonvested Members (a)	Pensioners & Beneficiaries	Total Membership
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
2018	66,271	9,249	17,819	48,569	141,908
2019	66,383	9,321	19,533	49,885	145,122
2020	66,750	9,204	20,985	51,153	148,092

** 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)

2020 Membership Data

	Police and Firefighters		All Other Employees		All Employees	
	June 30, 2020	June 30, 2019	June 30, 2020	June 30, 2019	June 30, 2020	June 30, 2019
1. Active members						
a. Number	4,940	4,857	61,810	61,526	66,750	66,383
b. Total payroll	$ 526,406,257	$ 501,644,732	$3,996,958,688	$3,891,340,420	$4,523,364,945	$4,392,985,152
c. Average salary	$ 106,560	$ 103,283	$ 64,665	$ 63,247	$ 67,766	$ 66,176
d. Average age	42.4	42.7	48.4	48.4	47.9	47.9
e. Average service	14.1	14.4	13.0	13.0	13.1	13.1
2. Terminated vested members (a)						
a. Number	386	387	8,818,	8,934	9,204	9,3219
b. Total annual deferred benefits	$ 6,728,387	$ 6,758,663	$ 96,886,510	$ 96,469,915	$ 103,614,897	$ 103,228,578
c. Average annual deferred benefit	$ 17,431	$ 17,464	$ 10,987	$ 10,798	$ 11,258	$ 11,075
3. Service retirees						
a. Number	3,845	3750	40,911	39,029	44,756	43,765
b. Total annual benefits	$ 239,239,259	$ 223,126,890	$1,143,046,701	$1,091,736,349	$1,382,285,960	$1,314,863,239
c. Average annual benefit	$ 62,221	$ 59,501	$ 27,940	$ 27,283	$ 30,885	$ 30,044
4. Disabled retirees						
a. Number	126	128	1,604	1,547	1,730	1,675
b. Total annual benefits	$ 3,196,381	$ 3,062,338	$ 23,597,029	$ 21,973,444	$ 26,793,410	$ 25,035,782
c. Average annual benefit	$ 25,368	$ 23,925	$ 14,711	$ 14,204	$ 15,488	$ 14,947
5. Beneficiaries						
a. Number	346	321	4,321	4,124	4,667	4,445
b. Total annual benefits	$ 14,332,093	$ 12,811,415	$ 75,813,525	$ 70,305,830	$ 90,145,618	$ 83,117,245
c. Average annual benefit	$ 41,422	$ 39,911	$ 17,545	$ 17,048	$ 19,316	$ 18,699

(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). As of June 30, 2018, there were 17,819 (666 Police and firefighters plus 17,153 All other employees). As of June 30, 2019, there were 19,533 (721 Police and firefighters plus 18,812 All other employees). As of June 30, 2020, there were 20,985 (788 Police and firefighters plus 20,197 All other employees).

Historical Summary of Active Member Data

Year Ending June 30,	Active Members		Covered Payroll		Average Salary		Average Age	Average Service
	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase		
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
2018	66,271	0.5%	4,257.2	3.0%	64,240	2.4%	47.9	13.2
2019	66,383	0.2%	4,393.0	3.2%	66,176	3.0%	47.9	13.1
2020	66,750	0.6%	4,523.4	3.0%	67,766	2.4%	47.9	13.1

Ten-Year Actuarial Schedules (continued)

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

2011 to 2020

March 31,	Number of Pensioners	Average Annual Pension (1)	Ratio of Active Members per Pensioner
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
2018	44,305	$28,745	1.5
2019	45,440	$29,847	1.5
2020	46,486	$30,312	1.4

** 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**

2011 to 2020

As of Mar 31,	Added	Average Added to Rolls	Removed	Average Removed from Rolls	Total	Average Pension	% Chg
Retirants							
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%
2018	2,709	$28,712	1,261	$21,995	44,305	$28,745	2.86%
2019	2,448	$28,248	1,313	$23,323	45,440	$29,487	2.58%
2020	2,430	$29,555	1,384	$23,269	46,486	$30,312	2.80%
Beneficiaries							
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%
2018	336	$19,355	142	$15,036	4,264	$18,177	2.91%
2019	326	$19,807	148	$15,282	4,445	$18,699	2.87%
2020	373	$21,025	151	$15,493	4,667	$19,316	3.30%

** Schedule compiled by ERS staff from actuary reports.

Ten-Year Actuarial Schedules (continued)

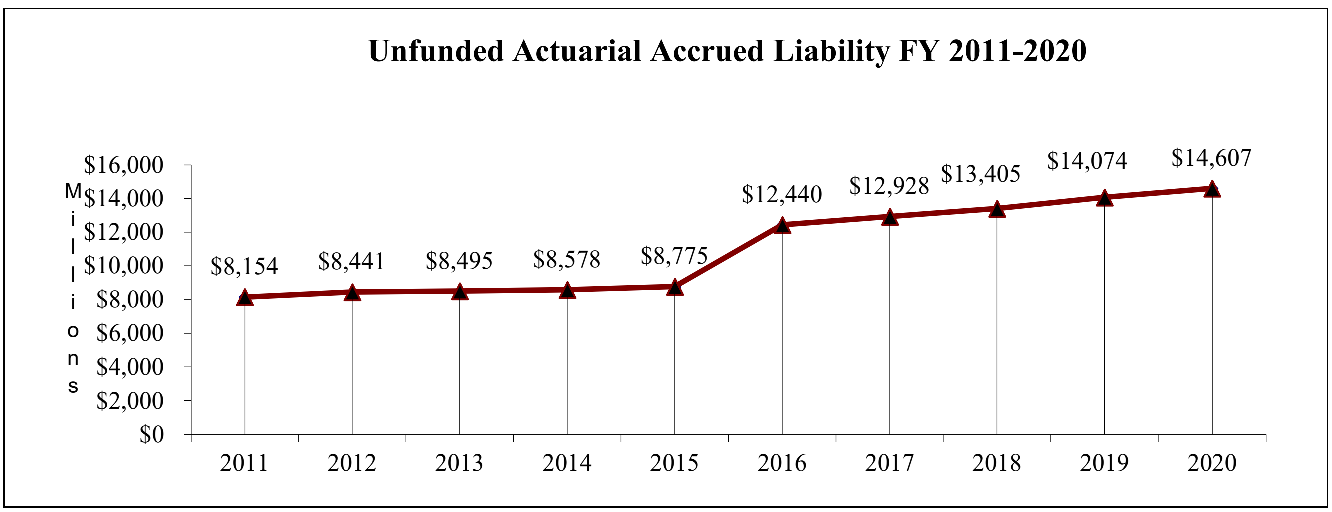
Solvency Test**

2011 to 2020

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)
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%
2018	2,181.3	16,008.8	11,727.3	16,512.7	100%	90%	0.0%
2019	2,202.2	16,871.1	12,323.1	17,322.2	100%	90%	0.0%
2020	2,231.4	17,720.9	12,739.5	18,084.4	100%	89%	0.0%

(Amounts in $millions)

** Schedule compiled by ERS Staff from actuary reports



Ten-Year Actuarial Schedules (continued)

Employer Contribution Rates as a Percentage of Payroll **

2011 to 2020

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
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%	11.87%	25.00%	7.33%	9.67%	17.00%	8.02%	9.89%	17.91%
2018 *	12.97%	15.03%	28.00%	7.14%	10.86%	18.00%	7.82%	11.34%	19.16%
2019 *	14.02%	16.98%	31.00%	7.07%	11.93%	19.00%	7.89%	12.47%	20.36%
2020 *	13.78%	22.22%	36.00%	6.90%	15.10%	22.00%	7.73%	15.88%	23.61%

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.

Per Act 017/2017 SLH, the statutory employer contribution rates for Police and Fire employees will be 28% of pay in FY 2018, 31% in FY 2019, 36% in FY 2020, and 41% in FY 2021 and thereafter, and the rate for All Other Employees will be 18% of pay in FY 2018, 19% in FY 2019, 22% in FY 2020, and 24% in FY 2021 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**

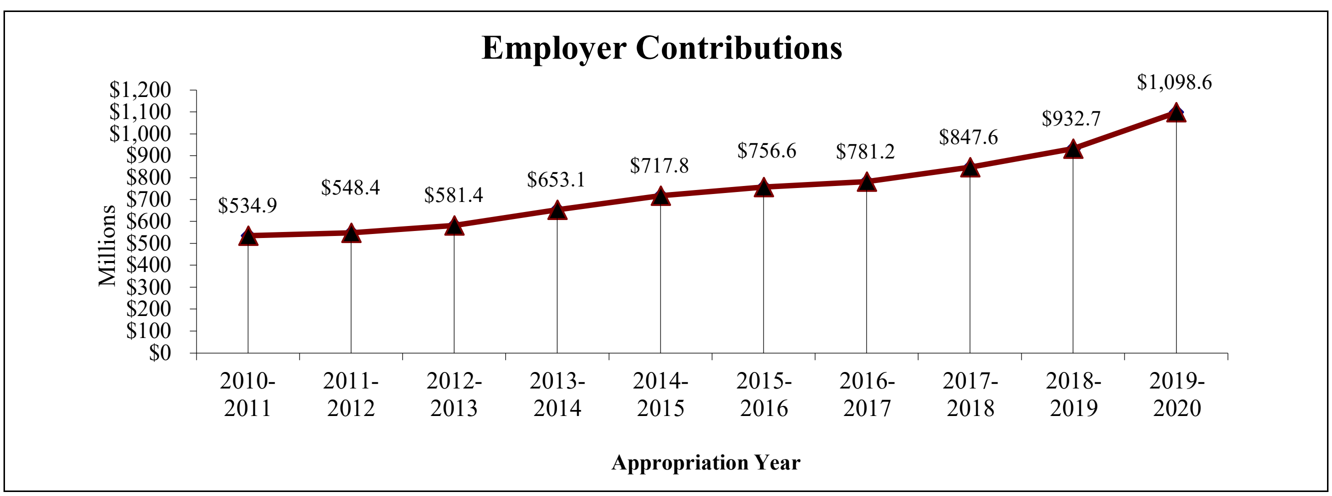
	Investment Yield Rate	
Fiscal Year	Assumed for Actuarial Valuation	Actuarial Investment Return
2010-2011	7.75%	7.10%
2011-2012	7.75%	5.05%
2012-2013	7.75%	6.67%
2013-2014	7.75%	9.23%
2014-2015	7.65%	7.85%
2015-2016	7.00%	5.59%
2016-2017	7.00%	6.92%
2017-2018	7.00%	7.18%
2018-2019	7.00%	6.81%
2019-2020	7.00%	5.59%

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) 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 017/2017 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: 25.00% in FY2018, 31.00% in FY 2019, 36.00% in FY 2020, and 41.00% in FY 2021 and beyond. The employer contribution rates for All Other Employees increased according to the following schedule: 18.00% in FY2018, 19.00% in FY 2019, 22.00% in FY 2020, and 24.00% in FY 2021 and beyond.

** 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).

Ten-Year Actuarial Schedules (continued)

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	100.1%	Wisconsin	100.0%
90% to 99%	5	Tennessee	97.5%	Idaho	92.3%
		New York	96.7%	Nebraska	91.6%
		Washington	96.5%		
80% to 89%	10	North Carolina	89.1%	Iowa	83.7%
		Utah	87.2%	Minnesota	82.0%
		Delaware	85.5%	Missouri	80.2%
		Minnesota	84.6%	West Virginia	80.2%
		Maine	83.8%	Arkansas	80.0%
70% to 79%	12	Texas	77.9%	Oregon	74.9%
		Ohio	77.2%	Maryland	73.8%
		Virginia	76.0%	Wyoming	73.2%
		Oklahoma	76.7%	Montana	71.8%
		Georgia	76.6%	California	70.7%
		Nevada	76.1%	Kansas	70.0%
60% to 69%	11	Alabama	69.0%	Indiana	64.7%
		North Dakota	67.5%	Michigan	62.2%
		Alaska	67.5%	New Hampshire	60.8%
		Louisiana	67.3%	Colorado	60.7%
		New Mexico	66.7%	Mississippi	60.5%
		Arizona	64.9%		
Less than 60%	10	Rhode Island	59.2%	South Carolina	55.2%
		Vermont	57.9%	New Jersey	51.4%
		Pennsylvania	57.5%	Illinois	48.9%
		Massachusetts	57.0%	Connecticut	46.5%
		Hawaii	**55.3%**	Kentucky	45.7%

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.

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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,:	2011	2012	2013	2014 **	2015
Additions					
Employer Contributions	$ 538,692,849	$ 548,353,394	$ 581,447,213	$ 653,127,697	$ 717,792,981
Member contributions	232,880,063	182,401,324	185,837,186	206,127,337	223,505,419
Investment income (net of expense)	2,040,061,555	(57,798,410)	1,331,208,154	2,175,479,961	556,436,475
Total additions to plan net assets	2,811,634,467	672,956,308	2,098,492,553	3,034,734,995	1,497,734,875
Deductions					
Benefits	960,219,432	1,015,447,668	1,060,561,148	1,122,445,642	1,170,744,770
Refunds	7,901,509	7,187,606	7,204,411	8,475,969	10,507,888
Administrative expenses	13,325,781	11,634,197	11,941,446	12,626,030	14,032,964
Total deductions from plan net assets	981,446,722	1,034,269,471	1,079,707,005	1,143,547,641	1,195,285,622
Net increase (decrease) in net position	1,830,187,745	(361,313,163)	1,018,785,548	1,891,187,354	302,449,253
Net position restricted for pension benefits					
Beginning of year	9,824,167,819	11,654,355,564	11,293,042,401	12,311,827,949	14,203,015,303
End of year	$ 11,654,355,564	$ 11,293,042,401	$12,311,827,949	$14,203,015,303	$ 14,505,464,556

Fiscal Year Ended June 30,:	2016	2017	2018	2019	2020
Additions					
Employer Contributions	$ 756,558,222	$ 781,244,218	$ 847,595,466	$ 922,635,334	$ 1,098,589,013
Member contributions	236,801,861	250,704,067	259,427,934	273,223,578	287,398,031
Investment income (net of expense)	(169,368,110)	1,934,512,507	1,225,572,599	932,696,412	358,282,664
Total additions to plan net assets	823,991,973	2,966,460,792	2,332,595,999	2,128,555,324	1,744,269,708
Deductions					
Benefits	1,232,589,353	1,306,788,954	1,395,881,342	1,469,634,809	1,545,589,761
Refunds	12,927,672	16,340,290	20,846,500	16,502,635	22,443,593
Administrative expenses	13,960,587	14,986,159	15,784,490	13,798,866	17,782,865
Total deductions from plan net assets	1,259,477,612	1,338,115,403	1,432,512,332	1,499,936,310	1,585,816,219
Net increase (decrease) in net position	(435,485,639)	1,628,345,389	900,083,667	628,619,014	158,453,489
Net position restricted for pension benefits					
Beginning of year	14,505,464,556	14,069,978,917	15,698,324,306	16,598,407,973	17,227,026,987
End of year	$ 14,069,978,917	$ 15,698,324,306	$ 16,598,407,973	$ 17,227,026,987	$ 17,385,480,476

** 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.

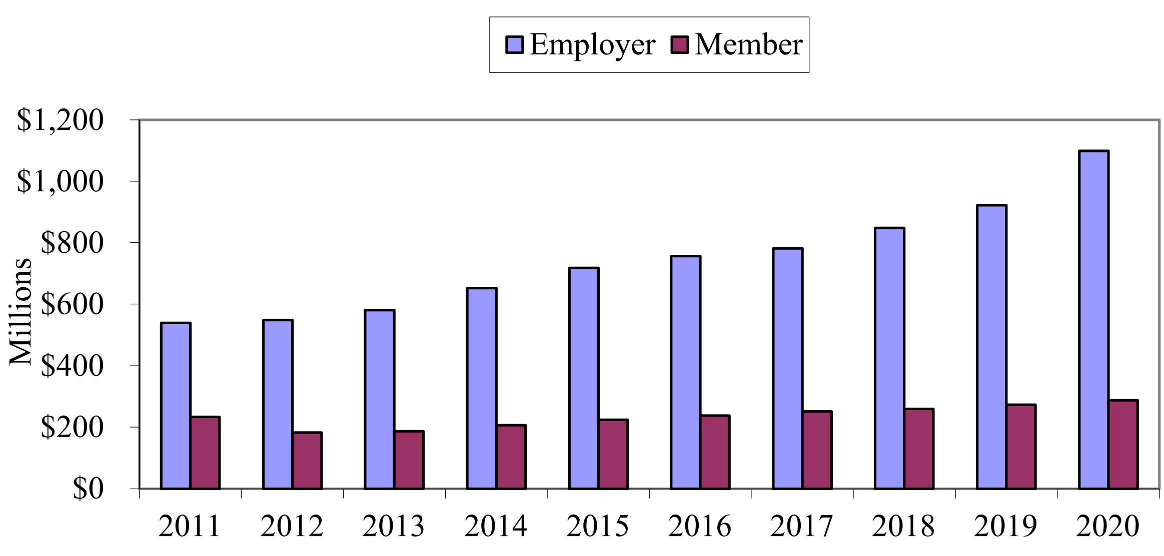
Contributions

Employer Contribution Rates as a Percentage of Payroll **

Fiscal Year		Police & Firefighters	All Other Employees	Composite Rate
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%
2018		28.00%	18.00%	19.16%
2019		31.00%	19.00%	20.36%
2020		36.00%	22.00%	23.61%

** 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

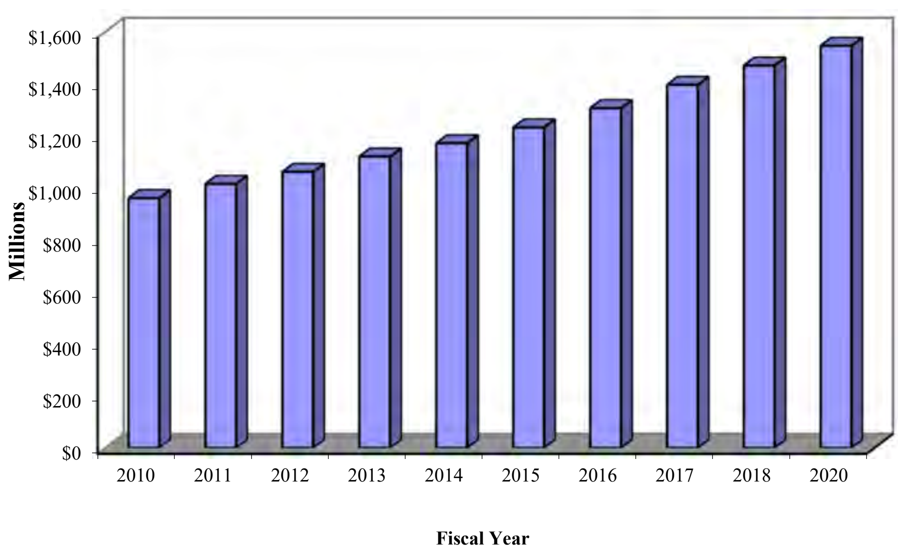
Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2011	2012	2013	2014	2015
Recurring benefit payments					
Service	$ 859,915,959	$ 917,840,937	$ 963,894,245	$ 1,016,912,124	$ 1,058,688,356
Disability	17,355,973	17,877,572	18,987,509	19,835,520	20,732,259
Death	40,173,678	43,053,039	45,948,656	53,324,252	59,238,051
subtotal	917,445,610	978,771,548	1,028,830,410	1,090,071,896	1,138,658,666
Refund Option payments (one-time)	42,773,822	36,676,120	31,730,738	32,373,746	32,086,104
Total benefit payments	$ 960,219,432	$ 1,015,447,668	$ 1,060,561,148	$1,122,445,642	$ 1,170,744,770

Fiscal Year Ended June 30,:	2016	2017	2018	2019	2020
Recurring benefit payments					
Service	$ 1,111,416,262	$ 1,175,380,410	$ 1,241,819,373	$ 1,306,624,918	$ 1,373,747,686
Disability	21,437,486	22,303,070	23,739,337	25,035,782	26,793,410
Death	65,568,232	71,889,117	77,507,539	83,117,245	90,145,618
subtotal	1,198,421,980	1,269,572,597	1,343,066,249	1,414,777,945	1,490,686,714
Refund Option payments (one-time)	34,167,373	37,216,357	52,815,093	54,856,864	54,903,047
Total benefit payments	$ 1,232,589,353	$ 1,306,788,954	$ 1,395,881,342	$ 1,469,634,809	$ 1,545,589,761

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

Benefit Payments



Participating Employers and Membership in ERS

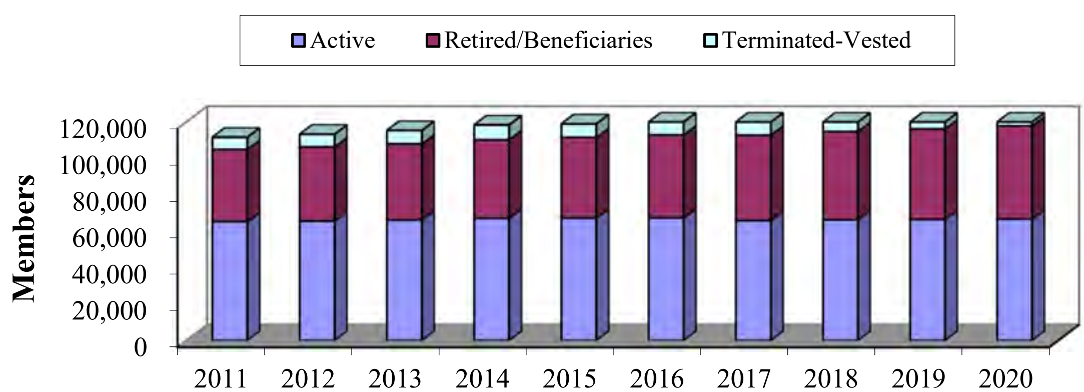
Last Ten Fiscal Years

ERS Membership

As of March 31,:	Active	Retired/ Beneficiaries	Terminated- Vested	Inactive- Non-Vested	Totals
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
2018	66,271	48,569	9,249	17,819	141,908
2019	66,383	49,885	9,321	19,533	145,122
2020	66,750	51,153	9,204	20,985	148,092

** For FYE June 30, 2014, ERS implemented GASB Statement No. 67

ERS Membership



Participating Employers and Active Members

As of March 31,:	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
State of Hawaii	50,268	50,604	51,176	51,875	51,791	51,723	50,288	50,719	50,788	51,008
City & County of Honlulu	8,485	8,451	8,457	8,625	8,727	8,807	8,740	8,709	8,713	8,757
- Board of Water Supply	516	505	532	551	558	558	572	570	581	574
Hawaii County	2,459	2,427	2,446	2,489	2,550	2,596	2,561	2,553	2,579	2,649
Kauai County	1,158	1,201	1,227	1,244	1,234	1,244	1,246	1,247	1,248	1,276
Maui County	2,424	2,411	2,388	2,422	2,450	2,449	2,504	2,473	2,474	2,486
Total	65,310	65,599	66,226	67,206	67,310	67,377	65,911	66,271	66,383	66,750

Benefit Payments by Retirement Type and Option

As of March 31, 2020

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 - 500	1,032	771	18	8	1	234	204	187	154	59	195	232	1
500 - 1,000	1,695	1,266	64	18	13	334	185	109	135	57	667	538	4
1,000 - 1,500	1,805	1,408	33	58	15	291	197	101	134	58	771	539	5
1,500 - 2,000	1,982	1,643	16	48	9	266	200	75	138	68	914	583	4
2,000 - 2,500	1,890	1,637	11	33	7	202	142	55	140	42	851	656	4
2,500 - 3,000	2,102	1,895	3	24	9	171	176	55	99	49	909	806	8
3,000 - 3,500	2,228	2,076	4	13	7	128	190	58	125	62	1,075	712	6
3,500 - 4,000	1,804	1,670	-	13	4	117	186	46	92	56	1,051	370	3
4,000 - 4,500	1,447	1,364	-	10	2	71	191	44	92	62	824	234	-
4,500 - 5,000	1,043	991	-	6	2	44	146	30	81	52	600	133	1
5,000	3,456	3,330	-	-	7	119	452	84	360	220	2,066	274	-
	20,484	18,051	149	231	76	1,977	2,269	844	1,550	785	9,923	5,077	36

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 - 500	724	649	5	-	27	43	297	85	160	96	37	49	-
500 - 1,000	2,074	1,844	76	12	54	88	774	144	488	237	222	209	-
1,000 - 1,500	2,030	1,761	114	50	27	78	717	105	490	223	268	227	-
1,500 - 2,000	1,506	1,333	68	24	14	67	486	92	391	190	204	142	1
2,000 - 2,500	1,250	1,150	36	11	15	38	390	74	319	191	192	82	2
2,500 - 3,000	1,119	1,065	26	1	10	17	409	57	268	170	144	70	1
3,000 - 3,500	968	928	8	5	7	20	367	47	229	155	119	51	-
3,500 - 4,000	758	748	-	-	4	6	287	37	150	143	92	49	-
4,000 - 4,500	554	545	-	1	3	5	225	29	117	108	51	24	-
4,500 - 5,000	348	341	1	-	3	3	123	23	86	76	27	13	-
5,000	832	815	-	-	2	15	283	44	193	180	93	39	-
	12,163	11,179	334	104	166	380	4,358	737	2,891	1,769	1,449	955	4

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 - 500	2,469	1,656	118	49	136	510	970	573	689	110	127
500 - 1,000	4,452	3,480	308	45	95	524	2,123	868	1,188	197	76
1,000 - 1,500	3,148	2,603	155	70	33	287	1,470	655	851	150	22
1,500 - 2,000	2,106	1,832	87	19	11	157	948	440	612	102	4
2,000 - 2,500	1,796	1,633	30	4	11	118	837	376	462	120	1
2,500 - 3,000	1,706	1,611	15	2	5	73	968	317	301	120	-
3,000 - 3,500	1,216	1,167	5	-	5	39	751	215	187	63	-
3,500 - 4,000	701	675	2	2	6	16	393	157	121	30	-
4,000 - 4,500	388	369	1	-	2	16	233	74	67	14	-
4,500 - 5,000	216	207	-	-	1	8	128	49	34	5	-
5,000	308	293	-	-	5	10	161	72	66	9	-
	18,506	15,526	721	191	310	1,758	8,982	3,796	4,578	920	230

* 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

		Years of Credited Service							
	As of March 31,	0-9	10-14	15-19	20-24	25-29	30-34	35+	All
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
2018	Average Monthly Benefit	$589	$713	$1,182	$1,608	$2,848	$3,366	$3,929	$2,441
	Number of Active Retirants	1,534	5,076	4,699	5,772	8,938	10,765	5,878	42,662
2019	Average Monthly Benefit	$615	$739	$1,208	$1,644	$2,940	$3,446	$4,034	$2,504
	Number of Active Retirants	1,577	5,247	4,884	5,868	9,110	11,048	6,031	43,765
2020	Average Monthly Benefit	$637	$768	$1,233	$1,674	$3,029	$3,515	$4,144	$2,567
	Number of Active Retirants	1,614	5,407	5,014	5,922	9,266	11,339	6,194	44,756

Retirees and Beneficiaries

(Recurring Benefit Payments)
Tabulated by Fiscal Year that Payments Started as of March 31, 2020

Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit	Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit
1959	1	$ 4,578	$382	1991	629	$ 16,275,434	$2,156
1960	1	699	$58	1992	633	17,749,333	$2,337
1961	1	280	$23	1993	670	20,878,575	$2,597
1962	1	6,092	$508	1994	711	21,148,659	$2,479
1964	1	12,962	$1,080	1995	1,434	51,242,131	$2,978
1966	1	7,494	$625	1996	1,477	50,327,771	$2,840
1967	2	24,777	$1,032	1997	536	13,686,990	$2,128
1968	2	20,913	$871	1998	573	15,107,006	$2,197
1969	3	26,913	$748	1999	846	24,250,286	$2,389
1970	2	15,303	$638	2000	1,076	32,035,563	$2,481
1971	4	30,716	$640	2001	1,260	37,538,653	$2,483
1972	5	46,401	$773	2002	1,086	32,543,792	$2,497
1973	10	100,528	$838	2003	1,439	47,404,633	$2,745
1974	12	149,626	$1,039	2004	1,405	43,307,501	$2,569
1975	12	156,451	$1,086	2005	1,501	47,225,036	$2,622
1976	21	270,950	$1,075	2006	1,503	44,779,294	$2,483
1977	31	417,214	$1,122	2007	1,634	47,832,088	$2,439
1978	35	577,504	$1,375	2008	1,624	45,863,461	$2,353
1979	54	853,448	$1,317	2009	1,545	43,759,276	$2,360
1980	78	1,334,701	$1,426	2010	2,218	74,450,123	$2,797
1981	119	1,986,485	$1,391	2011	2,048	70,079,013	$2,852
1982	154	2,673,984	$1,447	2012	1,995	60,028,248	$2,507
1983	159	3,132,248	$1,642	2013	2,022	56,982,754	$2,348
1984	215	4,384,175	$1,699	2014	2,098	57,907,120	$2,300
1985	266	5,804,518	$1,818	2015	2,374	63,639,909	$2,234
1986	341	8,216,592	$2,008	2016	2,431	65,372,269	$2,241
1987	570	14,101,291	$2,062	2017	2,605	75,601,056	$2,418
1988	339	6,849,834	$1,684	2018	2,923	88,886,781	$2,534
1989	468	10,913,252	$1,943	2019	2,686	79,250,068	$2,459
1990	521	13,578,250	$2,172	2020	2,742	78,374,106	$2,382
				Total	51,153	$ 1,499,225,108	$2,442

Total Benefits Payable
(Recurring Benefit Payments)
Tabulated by Attained Ages of Benefit Recipients as of March 31, 2020

Attained Ages	Service Retirement No.	Service Retirement Annual Benefits	Disability Retirement No.	Disability Retirement Annual Benefits	Survivors and Beneficiaries No.	Survivors and Beneficiaries Annual Benefits	Total No.	Total Annual Benefits
Under 20	-	-	-	-	47	$ 353,561	47	$ 353,561
20-24	-	-	-	-	9	69,269	9	69,269
25-29	-	-	-	-	38	468,066	38	468,066
30-34	-	-	-	$ -	57	732,708	57	732,708
35-39	-	-	5	79,291	88	981,571	93	1,060,862
40-44	2	$ 48,635	13	223,078	111	1,249,310	126	1,521,023
45-49	88	6,186,488	49	896,104	157	2,393,718	294	9,476,310
50-54	467	31,749,848	115	1,876,633	206	3,056,117	788	36,682,598
55-59	1,836	84,038,646	286	4,652,225	296	5,545,155	2,418	94,236,026
60-64	5,355	179,766,727	378	6,031,882	477	9,113,163	6,210	194,911,772
65-69	9,941	292,832,526	374	5,830,070	606	12,263,437	10,921	310,926,033
70-74	10,403	324,470,295	258	3,745,759	725	15,782,937	11,386	343,998,991
75-79	6,988	209,450,259	139	1,966,699	615	13,271,960	7,742	224,688,918
80-84	4,553	132,037,686	49	588,420	503	10,715,513	5,105	143,341,619
85-89	3,162	80,636,804	40	633,860	421	8,718,308	3,623	89,988,972
90-94	1,519	33,184,417	19	222,596	244	4,412,421	1,782	37,819,434
95-99	397	7,298,587	5	46,793	56	815,254	458	8,160,754
100 & over	45	585,042	-	-	11	203,150	56	788,192
Total	44,756	$ 1,382,285,960	1,730	$ 26,793,410	4,667	$ 90,145,618	51,153	$ 1,499,225,108