EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

ANNUAL COMPREHENSIVE FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2021

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OF THE
STATE OF HAWAII

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

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Employees' Retirement System

of the State of Hawaii

STATE OF HAWAII

1959

UA MAU KE EA O KA AINA I KA PONO

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 23, 2022

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, 2021. 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, 2021 the ERS' total membership of 149,416 was comprised of 65,561 active members, 52,618 retirees and beneficiaries 9,011 inactive vested members and 22,226 inactive non-vested members. This compares to 127,190 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 2021

The ERS's long term objective is "Building A Better Tomorrow" by positioning our resources to meet future success to fulfill the needs of our members, retirees, and beneficiaries while continuing to add value to the State of Hawaii. While fiscal year 2021 was a challenging time in our history we were able make progress on our long term financial and operational goals with assistance from processes and procedures put in place, and more importantly with cooperation and assistance from our partners – our members, employers, board of trustees, employees, and other stakeholders.

Most notably, the Employees' Retirement System portfolio reached a historical milestone - $21.9 billion in fiduciary net position as of June 30, 2021. This represents an increase of $4.5 billion since June 30, 2020, or 25.9% that. The ERS board's focus on strengthening our asset allocation process, the investment office's access to tools and talent resulted with exceptional returns over the 1, 3, 5 and 10-year periods to date.

Since 2014 the ERS board utilizes a risk-based asset allocation strategy, with 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 utilizes 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. This is discussed in more detail later in the *Investment Section.*

Recognizing the vital role that the ERS plays in the state's near and longer-term economic recovery, our participating employers - the Governor, State Legislature, and County employers- saw to it that employer and employee contributions were prioritized and continued throughout. These results serve to strengthen our path to full funding while concurrently lowering the risk posed by deep and prolonged downturns in the domestic and global markets.

Letter of Transmittal (continued)

These results serve to strengthen our path to full funding while concurrently lowering the risk posed by deep and prolonged downturns in the domestic and global markets.

In terms of supporting the Hawaii economy, the ERS made in excess of $1.5 billion plus in benefit payments during fiscal year 2021 that proved instrumental in establishing an economic base in support of the State's recovery.

Operationally, we were able to sustain our commitment to serve our membership throughout the pandemic while protecting both our membership and staff . New health protocols applicable to staff and our membership kept the incidence of COVID-19 infection and spread to near zero amongst our staff even as the pace of retirements and demand for services increased. This in contrast to some of our peers who were forced to cease aspects of their operations as half or more of their staff became infected. The ERS successfully completed the upgrade of several computer systems during the hectic year to improve security and service to ERS's membership.

There was no significant legislation passed during the 2021 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/.

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 $4,658.0 million in FY2021. This translates to an investment return of approximately 26.6% 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, 2021 report of the Fund's valuation our actuaries, Gabriel Roeder Smith & Company noted that that our unfunded actuarial accrued liability (UAAL) for funding purposes decreased to $14.2 billion from $14.6 billion on June 30, 2020 based on the pre-2015 GASB reporting standards. Under the current market-based GASB standards effective in FY 2015, the Net Pension Liability decreased to $12.2 billion on June 30, 2021 from $15.3 billion on June 30, 2020. On the market basis, this represents an increase in funded position to 64.3% for FY 2021 from 53.2% for FY 2020. The ERS full funding period decreased to 24 years at June 30, 2021 from 26 years at June 30, 2020, primarily from the FY 2021 extraordinary investment returns that exceeded the 7% benchmark.

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

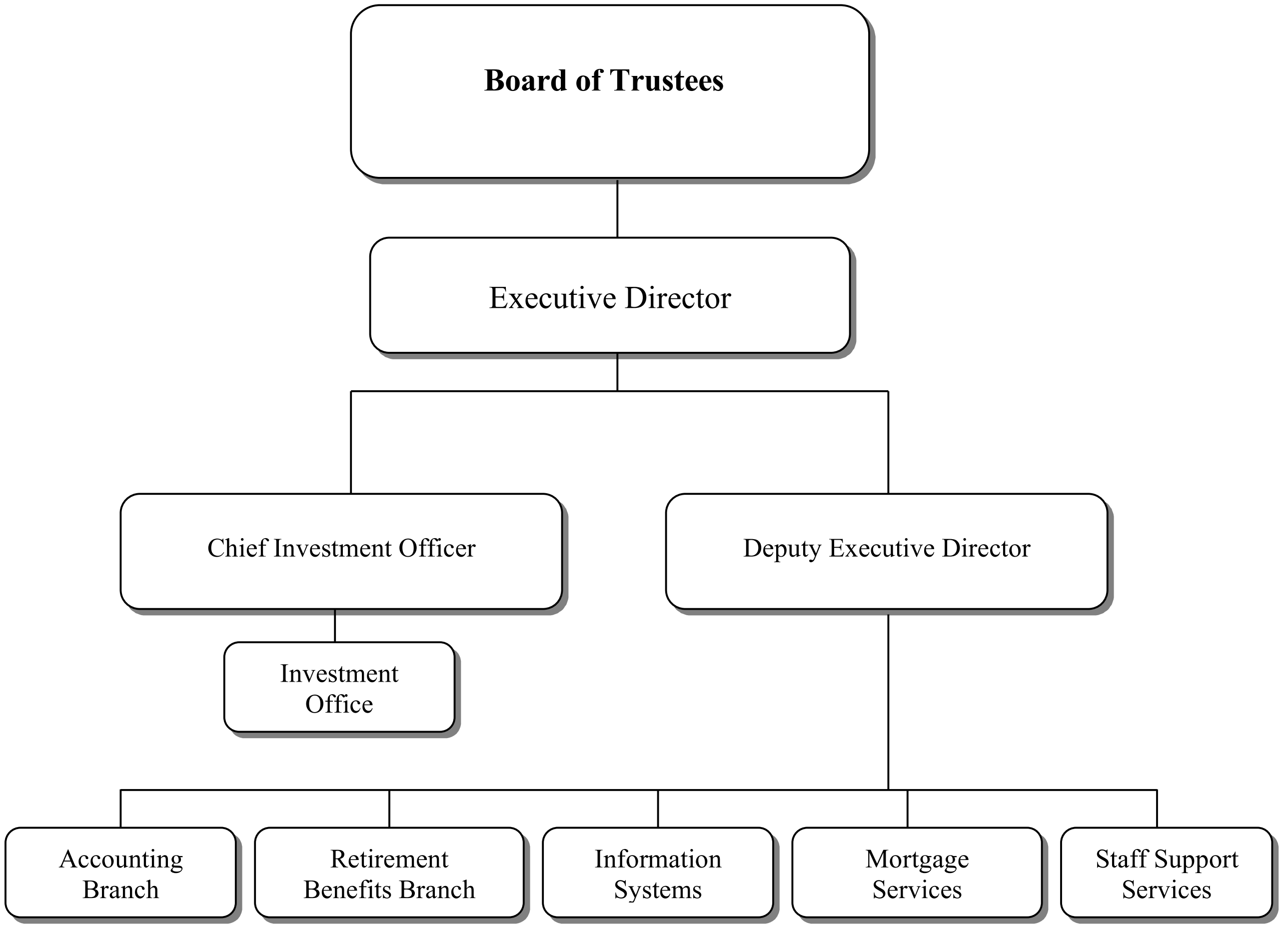
Board of Trustees

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:		
Mr. Craig K. Hirai	December 16, 2019	January 1, 2023

Organizational Structure



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

Actuary
Gabriel, Roeder, Smith and Company

Auditors
State of Hawaii, Office of the Auditor
KPMG LLP

Legal Advisor
Attorney General of the State of Hawaii

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

** A list of investment professionals is located in the *Investment Section* of this 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, 2022, 5,417 active employees were enrolled in the Contributory Class, or about 8.2% 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, 2022, the Hybrid Class had 49,803 members or about 76.0% 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, 2021, there were 10,341 active employees in the Noncontributory Class, which represents over 15.8% 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

Summary of Retirement Benefit Plan Provisions (continued)

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

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 2021

The following legislation (Acts) passed during the 2021 Legislative Session (including Special Sessions) and approved by the Governor that impacts the ERS   For more information on the 2021 Legislative Session, please refer to the capitol website at https://www.capitol.hawaii.gov/.

Act 70 (HB929) Relating to Qualified Domestic Relations Orders
Clarifies benefits to alternate payees, advisory review determinations of Hawaii domestic relations orders and the priority of multiple orders. Applies to domestic relations orders submitted on or after its effective date.
Effective: June 24, 2021

Act 71(HB930) Relating to Employees' Retirement System Investments
Exempts the employees' retirement system from disclosing under chapter 92F, Hawaii Revised Statutes, certain types of alternative investment fund information.
Effective: June 24, 2021

Act 84 Relating to the Employees' Retirement System
Authorizes a court to order the forfeiture of one-half of the Employees' Retirement System (ERS) benefits of an ERS member, former member, or retirant upon conviction of the individual for a felony related to the State or county employment of the individual. Authorizes designated beneficiaries to receive the ERS benefits to which the member, former member or retirant would be entitled under this section upon the death of the member, former member, or retirant. Prohibits designated beneficiaries convicted of a felony under the same set of circumstances as the member, former member, or retirant who was subject to forfeiture of ERS benefits from receiving benefits.
Effective: June 24, 2021

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:

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, 2021, 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 control 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 from 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 auditors' 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 policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

Independent Auditors' Report (continued)

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, 2021, and the changes in fiduciary net position for the year then ended in accordance 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 the required supplementary information including the schedule of changes in the employers' net pension liability and related ratios, employers' net pension liability and investment returns on pages 77 through 79 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 in Schedules 1 through 4are presented for purposes of additional analysis and are not a required part of the basic financial statements.

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 were derived from and relate 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 schedules of administrative expenses and investment expenses are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The information contained in the Introductory, Investment, Actuarial, and Statistical sections haves 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 23, 2022 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 solely 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 effectiveness of the ERS' 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 23, 2022

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, 2021. 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 information.

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, 2021, and the related statement of changes in fiduciary net position during the fiscal year from July 1, 2020 to June 30, 2021 (FY 2021). 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 and Investment Returns, and the related Notes to Required Supplementary Information, are required to be presented to supplement the basic financial statements for placing the financial statements in an appropriate operational, economic, or historical context.

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

Financial Highlights

- The fiduciary net position increased by $4.5 billion, or 25.9%, during FY 2021 to $21.9 billion, with the corresponding increase in funded status to 64.3% as of June 30, 2021. The ERS's fiduciary net position for pension benefits was $17.4 billion, for a 53.2% funded status as of June 30, 2020.

- The ERS investment return (net and gross of fees) was 26.6% for the 2021 fiscal year compared to 1.3% for the 2020 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 outperformed its actuarial and investment goal of 7.0% that was effective June 30, 2021 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 26.9% and 2.1% for FY 2021 and FY 2020, 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. Following the completion of the 2019 Asset Liability Study the Board adopted a new long-term strategic allocation policy that established two major asset classes of broad growth and diversifying strategies (rather than four Broad Growth, Principal Protection, Real Return and Crisis Risk Offset) that is expected to be largely completed by the end of the 2022 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 2021 and 2020, there was no significant legislation passed that significantly affects the operations or provisions of the pension trust. This was the last 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, 2021 increased to $34.1 billion from $32.7 billion on June 30, 2020, while the corresponding net pension liability decreased to $12.2 billion as of June 30, 2021 from $15.3 billion on June 30, 2020. Covered payroll for the ERS increased in FY 2021 to $4.7 billion compared to FY 2020 of $4.5 billion for a 4.4% increase.

- The fiduciary net position as a percentage of total pension liability increased to 64.3% from 53.2% as of June 30, 2021 and June 30, 20, respectively, while the funded ratio on an actuarial basis increased to 58.3% from 55.3%, 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 $196.2 million during FY 2021, or 14.2% from FY 2020. 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 $105.8 million, or 6.8% in FY 2021 from $1,545.6 million in FY 2020. Pension benefits continues to increase due to 2.5% more retirees and beneficiaries (52,618 in 2021 compared to 51,153 in 2020), an increase in the average pension benefit for new retirees, and the annual 2.5% postretirement increase.
- Administrative expenses increased by $1.3 million to $19.1 million in FY 2021 from $17.8 million in FY 2020. The increase in administrative expenses is primarily the result of an increase in depreciation of computer systems placed in service during the fiscal year, and to a lesser extent timing of Information Technology related charges, and increase in professional services for internal audit fees in FY 2021. These were offset by a reduction in the employee fringe benefit assessment, actuarial experience study conducted every three years. Administrative expenses for all years were within the ERS' budgeted amounts.

Analysis of Fiduciary Net Position

Summary of Fiduciary Net Position
June 30, 2021 and 2020
(Dollars in millions)

	2021	2020	FY 2021 % change
Assets:			
Cash and cash equivalents and short-term investments	$ 2,726.7	$ 3,477.4	(21.6) %
Receivables	353.5	249.6	41.6
Investments	19,352.1	14,120.4	37.1
Invested securities lending collateral	1,003.7	992.6	1.1
Equipment	6.0	7.6	(21.1)
Total assets	23,442.0	18,847.6	24.4
Liabilities			
Securities lending liability	1,003.7	992.6	1.1
Investment accounts and other payables	502.5	469.6	7.0
Total liabilities	1,506.2	1,462.2	3.0
Fiduciary net position	$ 21,935.8	$ 17,385.4	26.2

Summary of Changes in Fiduciary Net Position
June 30, 2021 and 2020
(Dollars in millions)

	2021	2020	FY 2021 % change
Additions:			
Contributions	$ 1,582.2	$ 1,386.0	14.2 %
Net investment income	4,662.2	358.3	1,201.2
Total additions	6,244.4	1,744.3	258.0
Deductions:			
Retirement benefit payments	1,651.4	1,545.6	6.8
Refund of contributions	23.6	22.4	5.4
Administrative expenses	19.1	17.8	7.3
Total deductions	1,694.1	1,585.8	6.8
Increase in fiduciary net position	$ 4,550.3	$ 158.5	2,770.9

Investments, Investment Income, and Investment Expense

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

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 that was completed in FY 2020, the Board adopted a new long-term strategic allocation policy. As part of the long-term strategic policy, the portfolio transitioned to two major asset classes (rather than four). Prevailing classes and sub-classes were remapped to the two major strategic classes where applicable. It 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 asset distribution of the ERS' investment securities for the pension trust, excluding pending trade settlements and securities lending collateral, at June 30, 2021 and 2020 are 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, 2021 and 2020
(Dollars in millions)

		2021	%		2020	%
Short term investments and cash	$	2,726.7	12.3 %	$	3,477.4	19.8 %
Equity securities		7,487.6	33.9		6,257.2	35.6
Fixed income		6,392.6	29.0		4,131.9	23.5
Real estate		1,871.1	8.5		1,531.9	8.7
Alternative investments		3,600.8	16.3		2,199.5	12.4
Total investment assets		22,078.8	100.0		17,597.9	100.0
Less loans on real estate and alternative investments		254.1			190.7	
	$	21,824.7		$	17,407.2	

The rate of return (gross of fees time-weighted rate of returns) on the ERS investment portfolio during FY 2021 was 26.6% with outperformance in the Broad Growth asset class, while the Diversifying Strategies asset class underperformed its benchmark (and the overall ERS investment target). This compares to an overall return on the portfolio of 1.3% in FY 2020. Total net investment income was $4,662.2 million in FY 2021 compared to $358.3 million in FY 2020.

The ERS earned exceptional returns of 34.8% in the broad growth class, lead by private growth (+55.5%), public growth (+33.8%), and followed by real assets (+13.3%). In comparison, the diversifying strategies return of 1.8% underperformed the ERS benchmark of 7.0%, comprised of illiquid diversifying (+4.9%), liquid diversifying (+4.1%), and liquid defensive (+ 1.1%) A summary of investment returns (by sub-component of the risk-based allocation) is included within the *Report on Investment Activity by Investment Consultant* that is located in Investment Section of this 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 in 2021 increased in-line with the superior returns earned during the year compared to the sub-par returns for 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 $1,582.2 and $1,386.0 million in FY 2021 FY 2020, respectively. During FY 2021, total contributions increased by $196.2 million, or 14.2%, primarily from 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. Please refer to the Financial Section in the ERS 2021 and 2020 ACFR for more information.

Pension Plan Benefits and Expenses

Pension benefit payments continue to be the primary deduction of the ERS with payments increasing to $1,651.4 in FY 2021 from $1,545.6 million in FY 2020. 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 $23.6 million in FY 2021 from $22.4 million in FY 2020.

Administrative expenses increased to $19.1 million in FY 2021 from $17.8 million in FY 2020 due primarily from an increase for computer related costs for equipment (depreciation) and maintenance during the year. This was followed by an increase in professional services for legal fees and increased internal audit activities. The increase in payroll related costs for pay raises was offset by a decrease in the fringe benefit rate assessment.

Pension Plan Changes

There was no significant legislation passed in 2021 and 2020 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 increased during FY 2021 on the fiduciary net position (market asset basis) to 64.3% as of June 30, 2021 from to 53.2% as June 30, 2020, as a result of superior investment returns and to a lesser extent the four-year phase-in of increased employer contribution rates.

During an extraordinary FY 2021 with superior investment earnings, the ERS's investment portfolio earned 26.9% based on the market value of assets. This compares to rate of return for the actuarial value of 10.8% in FY 2021, 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 fourth year of scheduled contribution rate increases (of a four-year phase in period).

The total pension liability for fiscal year ended June 30, 2021 is based on the actuarial valuation performed as of June 30, 2021 and a measurement date of June 30, 2021.

Per the valuation as of June 30, 2021, the ERS's total pension liability was $34.1 billion, covered payroll totaled $4.7 billion, and the ERS's fiduciary net position of $21.9 billion resulting in a net pension liability of $12.2 billion. The June 30, 2020 valuation results include the ERS's total pension liability of $32.7 billion, covered payroll totaled $4.5 billion, and the ERS' fiduciary net position was $17.4 billion resulting in a net pension liability of $15.3 billion. The ERS' fiduciary net position as a percentage of total pension liability was 64.3% and 53.2% on June 30, 2021 and 2020, resulting in the net pension liability as a percentage of covered payrolls of 261.5% and 341.6%, 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, 2021, 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 24 years, compared to 26 years as of June 30, 2020. 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.

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, 2021

Assets	
Cash and cash equivalents and short-term investments	
Cash and cash equivalents	$ 1,122,056,083
Short-term investments	1,604,664,717
	2,726,720,800
Receivables	
Accounts receivable and others	153,840,248
Investment sales proceeds	65,055,633
Accrued investment income	43,764,073
Employer and member contributions	90,874,146
	353,534,100
Investments, at fair value	
Equity securities	7,487,550,452
Fixed income securities	6,392,593,824
Real estate investments	1,871,180,686
Alternative investments	3,600,762,896
	19,352,087,858
Other	
Invested securities lending collateral	1,003,664,522
Equipment, at cost, net of depreciation	6,005,533
	1,009,670,055
Total assets	23,442,012,813
Liabilities	
Accounts and other payables	154,392,821
Payable for securities purchased	94,105,759
Securities lending collateral	1,003,664,522
Notes payable	254,058,000
Total liabilities	1,506,221,102
Commitments and contingencies	
Fiduciary net position	$ 21,935,791,711

See accompanying notes to financial statements

Financial Statements (continued)

Statement of Changes in Fiduciary Net Position

Year ended June 30, 2021

Additions		
Contributions		
Employers contributions	$	1,281,558,696
Members contributions		300,626,446
Total contributions		1,582,185,142
Investment income		
From investing activities:		
Net appreciation in fair value of investments		4,147,130,645
Interest on fixed income securities		161,100,654
Dividends on equity securities		92,471,242
Income on real estate investments		65,936,316
Interest on short-term investments		361,212
Alternative investment income		308,353,317
Miscellaneous		2,636,927
		4,777,990,313
Less investment expenses		119,947,169
Net investment income from investing activities		4,658,043,144
From securities lending activities:		
Securities lending income		4,658,495
Less: securities lending expenses, net		475,878
Net investment income from securities lending		4,182,617
Total net investment income		4,662,225,761
Total additions, net		6,244,410,903
Deductions		
Benefit payments		1,651,431,372
Refunds of member contributions		23,618,435
Administrative expenses		19,049,861
Total deductions		1,694,099,668
Net increase in fiduciary net position		4,550,311,235
Fiduciary net position		
Beginning of year		17,385,480,476
End of year	$	21,935,791,711

See accompanying notes to financial statements.

June 30, 2021

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, 2021 are as follows:

Employers:	
State	1
County	4
Total employers	5
Pensioners and beneficiaries currently receiving benefits:	
Pensioners currently receiving benefits:	
Police and firefighters	4,105
All other employees	43,619
Total pensioners	47,724
Beneficiaries currently receiving benefits:	
Police and firefighters	376
All other employees	4,518
Total beneficiaries	4,894
Total pensioners and beneficiaries	52,618
Terminated vested members entitled to benefits but not yet receiving benefits:	
Police and firefighters	239
All other employees	8,772
Total terminated vested members	9,011
Inactive members	
Police and firefighters	869
All other employees	21,357
Total inactive members	22,226
Total terminated vested and inactive members	31,237
Active members:	
Vested:	
Police and firefighters	3,226
All other employees	34,111
Total vested members	37,337
Nonvested:	
Police and firefighters	1,671
All other employees	26,553
Total nonvested members	28,224
Total active members	65,561
Total membership	149,416

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, 2021, 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 Cash Equivalents and Investments**

The ERS' investment policy for cash and cash equivalents 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 and cash equivalents, 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.

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.

Note C – Summary of Accounting Policies (continued)

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. Adoption of this standard was effective for the ERS' reporting period ending June 30, 2021 and did not materially impact ERS' financial statements and disclosures

In May 2020, GASB issued Statement No. 96, Subscription-based Information Technology Arrangements (SBITAs) (Statement No. 96). Statement No. 96 defines a SBITA; establishes criteria for identifying when a SBITA results in a right-to-use subscription asset—an intangible asset—and a corresponding subscription liability; provides the capitalization criteria for outlays other than subscription payments; including implementation costs; and requires note disclosures regarding a SBITA. To the extent relevant, the standards for SBITAs are based on the standards established in Statement No. 87, Leases, as amended. The requirements of this Statement No. 96 are effective for fiscal years beginning after June 15, 2022. 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 as of June 30, 2021 are as follows:

		2021
Pension Accumulation Reserve	$	18,574,542,162
Annuity Savings Reserve		3,337,854,144
Expense Reserve		23,395,405
Total fiduciary net position	$	21,935,791,711

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, 2021, the ERS was strategically invested in the following classes:

	Strategic Allocation (functional/risk-based classes)
Broad Growth	72%
Diversifying Strategies	28%
Total	100%

During FY 2021, the Broad Growth strategic asset class includes sub-asset classes or components of Public Growth (Traditional Equity, Stabilized Equity, and Global Credit), Private Growth, and Real Assets (Core Real Estate, Non-Core Real Estate, Infrastructure and Timber). The Diversifying Strategies asset class includes Illiquid Diversifying (Idiosyncratic Return Capture, and Insurance Linked), Liquid Defensive (Defensive Return Capture, Systematic Trend Following and Treasury Agency Duration Capture), and Liquid Diversifying (Alternative Return Capture Strategies, and Relative Value Arbitrage) . 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 transitioned to two major strategic classes (rather than four). Prevailing classes and sub-classes were 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 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.

Note F – Deposit and Investment Disclosures (continued)

1. Investment Policy (continued)

The Board manages the expected return/risk posture of the Plan as part of the formal asset-liability studies that are completed every three-to-five years. Based on the most recent asset-liability study the Total Fund was repositioned to achieve a long-term report of approximately 7.0% with an annualized volatility of approximately 9.4%-11.4% (dependent on modeling approach) over a horizon of 20-30 years. It is expected that a new asset-liability study will commence in the 2023 fiscal year. ERS will strategically invest in the following strategic asset classes:

Strategic Allocation (risk-based classes)	Strategic Class Weights	Expected Long-term Geometric Average Return[1]	Expected Volatility
Broad Growth	63.0%	8.0%	15.8%
Diversifying Strategies	37.0%	5.1%	8.5%
Total Portfolio	100.0%	7.2%	10.7%

[1] Uses an expected inflation of 2.1%

The implementation plan for long-term strategic policy established in 2020 is expected to be completed by the end of the FY 2022 as follows.

Implementation Plan for Long-term Strategic Policy				
	(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, 2021, the annual money-weighted return on pension plan investments, net of pension plan investment expense, was 26.9%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

2. Deposits

Cash and cash equivalents 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, 2021, the carrying amount of deposits totaled approximately $1,122,056,083 and the corresponding bank balance was $1,129,770,560, 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, 2021.

Investments at fair value		
Cash and cash equivalents and short-term instruments		
Cash and cash equivalents	$	1,122,056,083
Short-term bills and notes		927,027,771
Pooled and others		677,939,551
Fixed income securities		
U.S. Treasury bonds and notes		2,984,625,708
U.S. government agencies bonds		14,993,804
U.S. government agency mortgage backed		255,052,216
U.S. government-sponsored agency mortgage backed		18,372,532
Asset backed securities		43,551,836
U.S. corporate bonds		2,160,646,024
Non-U.S. government / agency bonds		8,556,172
Non-U.S. corporate bonds		210,551,984
Pooled and Others		650,141,159
Derivatives		
Forwards - Cash and short-term instruments		(302,605)
Forwards - Debt securities		5,140,885
Futures - Debt securities		27,181,306
Options - Equities		(17,982,734)
Options - Debt securities		703,775
Swaps - Debt securities		13,076,423
Warrants - Equities		29,928,751
Equities		7,475,604,435
Real estate		1,871,180,686
Alternative investments		3,600,762,896
Total investments	$	22,078,808,658
Short-term instruments for securities lending collateral pool	$	1,003,664,522

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.

Investments measured at the net asset value (NAV)
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.

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, 2021.

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

		Fair Value Measurement Using		
	Total	Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level 6/30/2021				
Short-term investments				
Short-term bills and notes	$ 927,027,771	$ 926,727,771	$ 300,000	$ -
Equity securities				
Common stocks	5,466,422,474	5,466,422,474	-	-
Preferred shares and other	484,332,937	350,541,260	28,593,467	105,198,210
Total equity securities	5,950,755,411	5,816,963,734	28,593,467	105,198,210
Fixed income securities				
U.S. Treasury bonds and notes	2,984,625,708	2,509,720,816	474,904,892	-
U.S. government agencies bonds	14,993,804	-	14,993,804	-
U.S. government agency mortgage backed	255,052,216	-	255,052,216	-
U.S. government-sponsored agency mortgage	18,372,532	-	18,372,532	-
Asset backed securities	43,551,836	-	43,551,836	-
U.S. corporate bonds	2,160,646,024	-	1,987,722,240	172,923,784
Non-U.S. government / agency bonds	8,556,172	-	8,314,225	241,947
Non-U.S. corporate bonds	210,551,984	-	113,942,138	96,609,846
Pooled and Others	406,922,573	-	406,919,858	2,715
Total fixed income securities	6,103,272,849	2,509,720,816	3,323,773,741	269,778,292
Real estate (direct investment)	733,019,181	-	-	733,019,181
Alternative investments (direct investment)	175,472,222	-	-	175,472,222
Total assets at fair value level	$ 13,889,547,434	$ 9,253,412,321	$ 3,352,667,208	$ 1,283,467,905
Liabilities				
Notes payable (on real estate-direct)	$ 254,058,000	$ -	$ -	$ 254,058,000
Total investments (excluding derivatives), net of notes payable measured by fair value level	$ 13,635,489,434	$ 9,253,412,321	$ 3,352,667,208	$ 1,029,409,905
Investment derivative instruments				
Currency purchases forwards	$ (302,605)	$ -	$ (302,605)	$ -
To Be Announced (TBAs) forwards	5,140,885	-	5,140,885	-
Bond futures	(11,885,171)	(11,885,171)	-	-
Commodity futures	30,577,925	30,577,925	-	-
Currency futures	11,285,278	11,285,278	-	-
Index fixed income futures	(2,371,723)	(2,371,723)	-	-
Interest rate futures	2,816,269	2,816,269	-	-
Options	(17,982,734)	(3,083,648)	(14,899,086)	-
Options on debt securities	703,775	-	(31,923)	735,698
Credit default swaps	(1,026,730)	-	(1,026,730)	-
Total return swaps	5,649,017	-	5,649,017	-
Interest rate swaps	5,212,864	-	(359,656)	5,572,520
Warrants	29,928,751	29,807,531	114,023	7,197
Total investment derivative instruments	$ 57,745,801	$ 57,146,461	$ (5,716,075)	$ 6,315,415

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	$ 17,421,902	$ -	$ 17,421,902	$ -
Repurchase agreements	447,427,935	-	447,427,935	-
Global commercial paper	50,100,566	-	50,100,566	-
Global asset backed notes	14,632,062	-	14,632,062	-
Global corporate notes	474,082,057	-	474,082,057	-
Total invested securities lending collateral	$ 1,003,664,522	$ -	$ 1,003,664,522	$ -

Investments and Derivative Instruments Measured at Fair Value (contnued)

Investments measured at net asset value (NAV)	
Short-term investments	$ 677,939,551
Equity securities	1,524,849,024
Fixed income	243,218,586
Real estate	1,138,161,505
Alternative investments	3,425,290,674
Total investments measured at NAV	7,009,459,340

	June 30, 2021	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Short-term investments (a)	$ 677,939,551	$ -	Daily	1 day
Equity securities (b)	1,524,849,024	-	Daily	2 days
Fixed income (c)	243,218,586	126,001,000	Various	Various
Real estate (d)	1,138,161,505	1,133,754,000	Not eligible	n/a
Alternative investments (e)	3,425,290,674	1,988,583,000	Not eligible	n/a
Total investments measured at NAV	$ 7,009,459,340	$ 3,248,338,000		

(a) Short-term investments primarily consist of three pooled funds to invest excess cash at the ERS' custodian, The Bank of New York Mellon. 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 three funds, including 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 consists of eight 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 56 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 261 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	$ 927,027,771	$ 677,939,551	$ (302,605)	$ -	$ 1,604,664,717
Equity securities	5,950,755,411	1,524,849,024	11,946,017	-	7,487,550,452
Fixed income securities	6,103,272,849	243,218,586	46,102,389	-	6,392,593,824
Real estate investments	733,019,181	1,138,161,505	-	-	1,871,180,686
Alternative investments	175,472,222	3,425,290,674	-	-	3,600,762,896
Invested securities lending collateral	-	-	-	1,003,664,522	1,003,664,522
	$ 13,889,547,434	$ 7,009,459,340	$ 57,745,801	$ 1,003,664,522	$ 21,960,417,097
Liabilities					
Notes payable	$ 254,058,000	$ -	$ -	$ -	$ 254,058,000
	$ 254,058,000	$ -	$ -	$ -	$ 254,058,000

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 Credit Portfolio consists of investment strategies and assets that are largely exposed and/or susceptible to various collateral types (corporate cash flows, mortgages, various credit receivables, etc.) that produce relatively high levels of income. These investments may be traded in public markets or sourced through private issuance. Such investments typically contain relatively lower levels of risk and exhibit lower volatility than other Broad Growth components but do have exposure to growth-related characteristics. In addition, periodic income will likely be a material portion of the Credit Portfolio's investment return. The overall objectives of the Diversifying Strategy strategic class are to provide stability, diversification, and liquidity complements to the Broad Growth strategic class. This class can help diversify the Broad Growth Class during challenging periods, such as material equity market drawdowns. Individual investment managers have specific investment policy guidelines, limits, and/or requirements for their portfolio, that may include limits on, but not limited to, security type, sectors, currency, duration, credit rating and issue amounts.

The ERS may invest, across the Broad Growth and Diversifying Strategies asset classes, in directly held securities, Partnerships/Fund of Ones or commingled funds which invest in liquid and less liquid corporate credit across the capital structure as well as opportunistically provide private financing. Investment instruments and/or strategies include but are not limited to the purchase and/or origination of investment grade, broadly syndicated high yield bonds, broadly syndicated leveraged loans, narrowly syndicated private debt ("club deals"), collateralized loan obligations ("CLO") debt and equity, municipal securities, capital solutions and convertibles. Other investment instruments and/or strategies include but are not limited to U.S. Treasuries and government-backed, high-quality, very liquid agencies, the purchase and/or origination of legacy non-agency residential mortgage-backed securities, asset backed securities, agency risk transfer, FNMA/Freddie preferred equity, non-qualified mortgage, origination, re-performing loans, credit tenant leases ,bridge financings, and other types. Derivatives may be used for managing interest rate, volatility, term structure, country, currency, sector exposures, etc. as authorized by their mandate.

Note F – Deposits and Investment Disclosures (continued)

4. Credit Risk (continued)

A table of the ERS' fixed income securities as of June 30, 2021 is below. Securities below investment grade of Baa and non-rated issues (average rating by S&P, Moody's and/or Fitch) amounted to $2,736,907,999 or 42.8% of total fixed income investments. All short-term investments, not held in a pooled investment, are rated A1/P1or better.

Credit Ratings - Average rating by S&P, Moodys and Fitch as of June 30, 2021

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	$ 14,993,804	$ -	$ 996,627	$ 254,911,144	$ -	$ 356,064	$ 3,377,700	$ 274,635,339
AA1	-	-	8,977,845	141,072	-	-	-	$ 9,118,917
AA2	-	-	2,009,679	-	-	-	-	$ 2,009,679
AA3	-	-	7,546,504	-	-	1,885,951	-	$ 9,432,455
A1	-	-	8,884,137	-	3,124,446	217,982	-	$ 12,226,565
A2	-	863,256	34,192,214	-	3,905,935	-	-	$ 38,961,405
A3	-	-	16,799,458	-	3,717,924	-	-	$ 20,517,382
BAA1	-	3,753,676	67,168,060	-	7,149,299	-	4,075,264	$ 82,146,299
BAA2	-	-	54,378,564	-	7,276,453	694,437	8,870,863	$ 71,220,317
BAA3	-	-	46,242,375	-	15,565,826	2,208,624	22,300,013	$ 86,316,838
BA1	-	4,462,567	30,077,587	-	11,133,545	-	11,325,359	$ 56,999,058
BA2	-	-	36,257,790	-	14,435,182	-	19,780,218	$ 70,473,190
BA3	-	3,917,616	33,350,280	-	11,097,168	1,060,400	-	$ 49,425,464
B1	-	-	77,891,604	-	17,549,059	-	-	$ 95,440,663
B2	-	-	212,843,440	-	20,502,636	735,371	3,863,400	$ 237,944,847
B3	-	-	76,860,221	-	9,884,148	-	5,321,744	$ 92,066,113
CAA1	-	-	67,400,320	-	6,019,692	954,936	-	$ 74,374,948
CAA2	-	-	43,086,300	-	3,940,063	-	-	$ 47,026,363
CAA3	-	-	2,665,864	-	87,000	-	-	$ 2,752,864
CA	-	-	784,992	-	-	-	-	$ 784,992
DEF	-	-	-	-	-	-	-	$ -
Not rated	-	30,554,721	1,332,232,163	-	75,163,608	442,407	571,226,598	$ 2,009,619,497
	$ 14,993,804	$ 43,551,836	$ 2,160,646,024	$ 255,052,216	$ 210,551,984	$ 8,556,172	$ 650,141,159	3,343,493,195
				US Treasury Bonds and Notes				2,984,625,708
				US Government agency - Government National Mortgage Association (GNMAs) mortgage backed				18,372,532
				subtotal				$ 6,346,491,435
				Derivatives (debt securities)				46,102,389
				Total fixed income securities in Investments				$ 6,392,593,824

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 $1,122,056,083 in cash and securities exposed to custodial credit risk as of June 30, 2021.

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, 2021, 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, 2021, 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	$	2,984,625,708	8.0
U.S. government agencies bonds		14,993,804	4.6
U.S. government agency mortgage backed		255,052,216	23.4
U.S. government-sponsored agency mortgage backed		18,372,532	25.3
Asset backed securities		43,551,836	0.2
U.S. corporate bonds		2,160,646,024	6.3
Non-U.S. government / agency bonds		8,556,172	9.3
Non-U.S. corporate bonds		210,551,984	7.7
Pooled and Others		650,141,159	5.5
Total	$	6,346,491,435	8.1

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, 2021. (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	$ 45,844	$ -	$ -	$ -	$ -	$ -	$ 45,844
Australian dollar	(725,520)	79,560,390	356,064	63,265,139	-	-	142,456,073
Brazilian real	54,170	9,042,819	-	26,907,575	-	-	36,004,564
Canadian dollar	1,346,608	246,618,155	1,339,998	94,393,513	-	-	343,698,274
Chilean peso	59,120	4,613,320	-	1,146,431	-	-	5,818,871
Chinese Yuan Renminbi	721,508	94,976,120	-	15,610,859	-	-	111,308,487
Colombian peso	36,039	(984,671)	-	28,154	-	-	(920,478)
Czech koruna	10,302	10,249,091	-	2,042,387	-	-	12,301,780
Danish krone	201,471	25,427	-	50,892,279	-	-	51,119,177
Euro currency unit	(892,161)	(430,203,497)	37,591,680	498,204,038	-	-	104,700,060
Hong Kong dollar	5,089,241	(1,445,766)	-	187,627,985	-	-	191,271,460
Hungarian forint	24,871	31,927,393	-	4,538,808	-	-	36,491,072
Indian Rupee	803,840	(36,151,950)	-	102,299,950	-	-	66,951,840
Indonesian rupiah	6,999	234,959	5,972,880	2,499,276	-	-	8,714,114
Israeli shekel	70,594	24,913,206	-	9,570,645	-	-	34,554,445
Japanese yen	2,617,679	(330,653,496)	-	361,651,645	-	-	33,615,828
Malaysian ringgit	687,181	(5,539)	-	9,328,800	-	-	10,010,442
Mexican peso	451,853	48,564,911	-	5,992,937	-	-	55,009,701
New Taiwan dollar	709,716	13,550,088	-	160,269,500	-	-	174,529,304
New Zealand dollar	(844,212)	35,902,347	-	4,878,761	-	-	39,936,896
Norwegian krone	750,593	76,662,628	-	8,789,775	-	-	86,202,996
Philippine peso	-	1,732,745	-	4,459,763	-	-	6,192,508
Polish zloty	39,972	24,339,062	-	1,401,003	-	-	25,780,037
Pound sterling	(1,907,525)	186,588,905	11,522,836	259,819,074	-	-	456,023,290
Russian ruble (new)	57,872	19,490,049	694,437	1,658,299	-	-	21,900,657
Singapore dollar	454,505	78,102,902	-	12,871,693	-	-	91,429,100
South African rand	290,891	42,133,206	-	32,430,786	-	-	74,854,883
South Korean won	2,768,076	39,724,429	-	58,188,932	-	-	100,681,437
Swedish krona	1,238,849	45,662,471	-	66,623,170	-	-	113,524,490
Swiss franc	(1,792,929)	(121,305,221)	-	123,417,754	-	-	319,604
Thai baht	(142,139)	(9,918,379)	-	5,639,339	-	-	(4,421,179)
Turkish lira	55,230	(17,372,767)	-	2,497,540	-	-	(14,819,997)
Various Countries	-	-	-	1,416,730,743	-	-	1,416,730,743
Total	$ 12,288,538	$ 166,573,337	$ 57,477,895	$ 3,595,676,553	$ -	$ -	$ 3,832,016,323

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, 2021 was 94 days.

At June 30, 2021, 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	$ 870,937,833	$ 516,288,619	$ 368,438,682
U.S. equities	538,653,880	448,559,550	110,922,283
International equities	252,299,324	36,686,682	244,010,816
International fixed income	2,659,255	2,129,671	704,678
	$ 1,664,550,292	$ 1,003,664,522	$ 724,076,459

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, 2021 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, 2021 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	$ -	$ (302,605)	0.0 yrs
	To Be Announced (TBAs)	-	5,140,885	30.1 yrs to 30.1 yrs
	Total forwards	-	4,838,280	
Futures	Bond contracts	(46,125,509)	(11,885,171)	0.3 yrs
	Commodity contracts	787,441,392	30,577,925	0.2 yrs to 1.3 yrs
	Currency contracts	(464,272,346)	11,285,278	0.1 yrs to 0.3 yrs
	Index contracts	796,617,435	(2,371,723)	0.1 yrs to 1.5 yrs
	Interest rate contracts	1,754,162,983	2,816,269	0.1 yrs to 4.3 yrs
	Futures total	2,827,823,955	30,422,578	
Options	Options	-	(17,982,734)	0.0 yrs to 1.7 yrs
	Options on debt securities	-	703,775	0.0 yrs to 0.5 yrs
	Options total	-	(17,278,959)	
Swaps	Credit default swaps	-	(1,026,730)	0.1 yrs
	Total return swaps	-	5,649,017	0.1 yrs
	Interest rate swaps	-	5,212,864	0.3 yrs to 30.3 yrs
	Swaps total	-	9,835,151	
Warrants	Warrants	-	29,928,751	
	Grand Total	$ 2,827,823,955	$ 57,745,801	

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, 2021.

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, 2021, 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, 2021, credit ratings of the counterparty for ERS' investments in derivatives were as follows:

Counterparty	S&P's Rating	Fair Value
Bank of America Corp	A-	18,605
Bank of America Merrill Lynch	A-	3,694,596
Barclays PLC	BBB	994,425
BNP Paribas SA	A+	10,204
Citibank Global Markets Inc.	BBB+	(236,694)
Citibank NA	A+	523,476
Citigroup Inc	BBB+	21,820
CME Group Inc	AA-	(239,522)
Credit Suisse Group AG	BBB+	(1,377)
Credit Suisse Securities (USA) LLC	A+	4,595,941
Deutsche Bank Securities Inc	BBB+	(209,721)
Goldman Sachs & Co LLC	BBB+	3,434,165
HSBC Holdings PLC	A-	1,945
Intercontinental Exchange Inc	BBB+	1,507,798
JPMorgan Chase & Co	A-	(3,311,836)
London Stock Exchange Group PLC	A	(117,420)
Morgan Stanley & Co LLC	BBB+	11,891,152
SG Americas Securities LLC	A	11,125,776
UBS Securities LLC	A-	(5,095,380)
Exchange traded derivatives		29,137,848
Total		$ 57,745,801

Note G – Pension Liability

1. Net Pension Liability

The components of the net pension liability of the ERS at June 30, 2021 were as follows:

Total Pension Liability	$34,139,165,472
Plan Fiduciary Net Position	21,935,791,711
Net Pension Liability	$12,203,373,761
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	64.3%
Net Pension Liability as a Percentage of Covered Payroll	261.5%

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, 2021. 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.

Summary of Actuarial Valuation as of June 30, 2021 follows:

Valuation date	June 30, 2021
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, 2021, are summarized in the following table:

Classes	Strategic class weights	Long-term expected geometric rate of return	Volatility
Broad growth:			
Private Equity	13.5%	9.9%	28.0%
Global Equity	20.0%	7.3%	18.0%
Low Volatility Equity	4.0%	6.5%	14.0%
Global Options	4.0%	4.8%	13.0%
Credit	6.0%	5.7%	12.3%
Core Real Estate	6.0%	5.6%	12.0%
Non-Core Real Estate	4.5%	9.3%	23.5%
Timber/Agriculture/Infrastructure	5.0%	7.6%	12.4%
Diversifying Strategies:			
TIPs	2.0%	1.8%	7.0%
Global Macro	4.0%	6.1%	15.0%
Reinsurance	4.0%	6.0%	12.0%
Alternative Risk Premia	8.0%	6.1%	10.0%
Long Treasuries	5.0%	2.6%	12.0%
Intermediate Government	4.0%	1.4%	3.0%
Systematic Trend Following	10.0%	5.5%	18.0%

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%)
$16,810,511,423	$12,203,373,761	$8,405,054,565

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, 2021. 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 $3,618,229,000 as of June 30, 2021, consisting of $495,892,000 in fixed income, $1,333,754,000 in real estate investments, and $1,988,583,000 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, 2021, 2020, 2019, 2018, 2017, 2016, 2015 and 2014

	2014	2015	2016	2017	2018	2019	2020	2021
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	$642,140,242
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	2,252,271,074
3. Changes of benefit terms	-	-	-	-	-	-	-	-
4. Difference between expected and actual experienceof the Total Pension Liability	66,400,876	(192,816,757)	297,534,219	61,179,390	124,753,379	221,473,495	71,837,371	228,048,119
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)	(1,675,049,807)
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	$1,447,409,628
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	32,691,755,844
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	$34,139,165,472
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	$1,281,558,696
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	299,473,128
2. Contributions – employee	1,306,327	1,595,560	1,721,893	1,492,316	2,133,901	2,458,908	3,255,037	1,153,318
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	4,662,225,761
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)	(1,675,049,807)
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)	(19,049,861)
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	$4,550,311,235
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	17,385,480,476
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	$21,935,791,711
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	$12,203,373,761
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%	64.25%
E. Covered 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	$4,667,346,006
F. Net pension liability as a percentage of covered payroll	209.38%	218.57%	325.11%	305.18%	312.94%	323.78%	341.55%	261.46%

* 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, 2021*

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%
2021	$34,139,165,472	$21,935,791,711	$12,203,373,761	64.25%	$4,667,346,006	261.46%

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

Schedule of Investment Returns
2014 to 2021

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%
2021	26.9%

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

Notes to Required Supplementary Information - Unaudited

June 30, 2021

Note A - Description

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

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.

Schedule 1

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

Year ended June 30, 2021

	2021			
	Pension Accumulation Reserves	**Annuity Savings Reserves**	**Expense Reserves**	**Total**
Additions				
Appropriations and contributions:				
Employers	$ 1,281,558,696	$ -	$ -	$ 1,281,558,696
Members	-	300,626,446	-	300,626,446
Net investment income	4,662,225,761	-	-	4,662,225,761
Total additions	5,943,784,457	300,626,446	-	6,244,410,903
Deductions				
Benefit payments	1,651,431,372	-	-	1,651,431,372
Refunds of member contributions	-	23,618,435	-	23,618,435
Administrative expenses	-	-	19,049,861	19,049,861
Total deductions	1,651,431,372	23,618,435	19,049,861	1,694,099,668
Other changes in net position restricted for pension benefits:				
Transfer due to retirement of members	228,639,061	(228,639,061)	-	-
Transfer of interest allocation	(124,832,809)	124,832,809	-	-
Transfer to pay administrative expenses	(19,151,883)	-	19,151,883	-
Return of unrequired funds due to savings in administrative expenses	-	-	-	-
	84,654,369	(103,806,252)	19,151,883	-
Net increase	4,377,007,454	173,201,759	102,022	4,550,311,235
Fiduciary net position restricted for pensions:				
Beginning of year	14,197,534,708	$ 3,164,652,385	$ 23,293,383	17,385,480,476
End of year	$ 18,574,542,162	$ 3,337,854,144	$ 23,395,405	$ 21,935,791,711

See accompanying independent auditors' report.

Schedule 2

Social Security Contribution Fund

Statement of Changes in Assets and Liabilities

Year ended June 30, 2021

	2021			
	Beginning Balance	**Additions**	**Deductions**	**Ending Balance**
Assets				
Receivable from employers	$ -	$ 255,504,128	$ 255,504,128	$ -
Total assets	$ -	$ 255,504,128	$ 255,504,128	$ -
Liabilities				
Due to employers	$ -	$ 255,504,128	$ 255,504,128	$ -
Total liabilities	$ -	$ 255,504,128	$ 255,504,128	$ -

See accompanying independent auditors' report.

Other Supplementary Information (continued)

Schedule 3

Schedule of Administrative Expenses

Year ended June 30, 2021

		2021
Personnel services		
Salaries and wages	$	7,322,910
Fringe benefits		3,713,786
Net change in unused vacation credits		27,394
Total personnel services		11,064,090
Professional services		
Actuarial		149,881
Auditing and tax consulting		614,208
Disability hearing expenses		26,676
Legal services		727,030
Medical		383,256
Total professional services		1,901,051
Communication		
Postage		301,748
Printing and binding		84,242
Telephone		77,930
Travel		1,928
Total communication		465,848
Rentals		
Rental of equipment		112,624
Rental of premises		30,767
Total rentals		143,391
Other		
Armored car service		1,234
Computer and office automation systems		160,309
Repairs and maintenance		2,828,353
Stationery and office supplies		29,245
Miscellaneous		147,389
Total other		3,166,530
Depreciation		2,308,951
	$	19,049,861

See accompanying independent auditors' report.

Schedule 4

Schedule of Investment Expenses

Year ended June 30, 2021

		2021
Real estate and alternative investment expenses		
Operating expenses	$	27,766,848
Mortgage interest		6,755,009
Total real estate and alternative investment expenses		34,521,857
Investment expenses		
Investment manager/advisor fees	$	62,744,373
Bank custodian fees		298,906
Other investment expenses		22,382,033
Total investment expenses		85,425,312
Securities lending expenses		
Borrower rebates		(198,831)
Management fees		674,709
Total securities lending expenses		475,878
	$	120,423,047

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 23, 2022

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, 2021.

- ERS's Fiduciary net position was valued at $21.9 billion as of June 30, 2021
  - The ERS investment portfolio outperformed its one-year, three-year, and five-year Policy Benchmark returns by an annualized 3.3%, 1.7% and 1.4%, respectively.[1] The portfolio's return for the fiscal year was 26.6%,[2] while the Policy Benchmark[3] only returned 23.3%. As of the end of the fiscal year, the ERS investment portfolio exceeds its long-term 7.0% target rate of return by 1.15% on an inception-to-date basis.
  - Understanding the Board of Trustees' investment policy is critical to understanding the performance of the fund. The ERS Board of Trustees' asset allocation policy is designed to be risk aware. As such, the construction of the portfolio has a dual mandate to achieve the 7.0% target return while minimizing risk. To that end, our five-year Sharpe Ratio[4] was 1.4 compared to the median peer public defined benefit plan of 1.1 Our annualized standard deviation was 6.9% of this period compared to the median peer plan of 8.8%. We have continued to exceed our target return while taking lower levels of risk than peer funds.
  - The ERS investment portfolio has two crucial components—broad growth and diversifying strategies. These two portfolios are designed to be complementary and achieve a certain goal (diversifying strategies) or be exposed to a specific set of macroeconomic risks that are common among the different assets within each class

[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.
[4] The Sharpe ratio is a performance measure adjusted for risk—in this case represented by standard deviation. The Sharpe Ratio is calculated by deducting the risk-free rate (T-bills) from the average annualized return of an investment and dividing by its standard deviation.

Letter from Chief Investment Officer (continued)

(broad growth). Over time, these complementary investments should contribute to a more stable return profile.

- Broad growth consists of investment strategies that are exposed to changes in global economic growth and corporate profitability. Within this class there are five major components: global credit, traditional equity, stabilized equity, real assets, and private growth.
    - Traditional equity is largely global public equity and includes both active and passive investments.
    - Stabilized equity invests in strategies that are similar traditional growth but with lower expected levels of volatility, such as convertible bonds, options-based strategies, or low volatility factor equity strategies.
    - Real assets consist of private investments assets that are tied to growth risk but may also provide inflation diversification as hard assets, such as core real estate, non-core real estate, infrastructure, timber, and agriculture.
    - Private growth consists of higher-risk, higher-returning growth-oriented investments that rely on private markets to raise investment capital (e.g., private equity, venture capital, distressed debt, etcetera).

- Although rare, in fiscal year 2021 all sub-component portfolios exhibited positive portfolio returns. The outperformance over the Policy Benchmark for the fiscal year was led by positive returns from the broad growth class (+34.8%). All underlying components contributed positively to the portfolio on the year on an absolute basis, although traditional equity (+42.9%) and real assets (+13.3%) contributed the most to performance on an attribution basis. While private growth had historically high absolute returns (+55.5%) it was the only sub-component of broad growth that failed to outpace its benchmark (59.58%).

    - Traditional equity outperformed its benchmark by 2.0%. The outperformance was attributable to both passive and active equity components beating their benchmarks by 0.9% and 1.1% respectively.

    - While Private Growth under-performed its benchmark, it was primarily due to the industry-wide nuances of having a 3- to 4-month lag in receiving financial statements after the June 30 closing. Updated performance (post-closing) for June 30, indicates Private Growth (59.3%) actually outpaced its benchmark (40.8%). Top five performance drivers were in the following strategies: Venture Capital (74.5%), Growth Equity (74.5%), Mid-buyout (59.6%), Large-buyout (59.4%) and Mega-buyout (55.5%).

- Real assets had positive performance in all sub-components except Timber (-2.2%). Real assets returned +13.3% for the fiscal year, outperforming its benchmark return (+2.6%) by +10.7%. Core real estate returned +18.0%, outperforming its benchmark return (+1.5%) by +16.5%. Non-core real estate returned +12.0%, outperforming its benchmark return (+2.5%) by +9.5%. Real estate outperformance was attributed to outsized appreciation, driven by strong revenue and pricing growth at the apartment, industrial, and storage properties, and income returns that also exceeded the benchmark. Infrastructure returned +24.2%, outperforming its benchmark return (+9.5%) by +14.7%. Timber returned -2.2%, underperforming its benchmark return (+1.5%) by -3.7%. Timber outperformed its benchmark over longer periods, but underperformed over shorter periods. The 1yr underperformance was attributed to net unrealized depreciation associated with appraisals (decreases in appraised values, driven by soft comparable sales, lower log prices and merchantable inventory), as well as a slight mismatch in appraisal dates between ERS properties and index properties.

- Within Public Growth, Global Credit returned 22.0% for the fiscal year, outperforming its benchmark (+14.4%) by 7.6%. Both public and private credit strategies contributed to outperformance with particularly strong returns generated by the portfolio's contingent credit strategies that were able to capitalize on a variety of opportunities following the market sell-off in the first quarter of calendar year 2020.
- The Diversifying Strategies class returned 1.8% in the fiscal year, contributing 0.8% to the fiscal year return. Within Diversifying Strategies all three underlying components (illiquid diversifying, liquid defensive, and liquid diversifying) exhibited positive portfolio returns. Liquid defensive, while positive, unperformed its benchmark which was partially attributable to significant underperformance from a defensive quantitative macro strategy, and an alternative risk premia strategy. Importantly, the correlation between broad growth and diversifying was -0.13 for the fiscal year. The function of the Diversifying Strategies portfolio is to diversify away from growth risk and to reduce overall portfolio volatility while earning a positive return. A zero, low, or negative correlation is perfectly in line with our expectations for the functioning of these two asset classes as a part of a portfolio construct.

ECONOMIC & CAPITAL MARKET CONDITIONS

First Quarter of 2021 Fiscal Year. Global equity markets started the fiscal year with two months of strong performance, peaking on September 2nd and reaching several new highs in the process. This represented five full months of rebound from March 23rd equity market low. This mostly steady, although somewhat volatile, climb was the result of optimism about the prospects for a Covid-19 vaccine becoming available in a few months and encouraging data confirming an economic recovery as various governments enacted extensive fiscal stimulus programs for both businesses and individuals and eased COVID-19 related economic and social activity restrictions, even though several countries were experiencing pockets of viral resurgence and reinstated previously lifted restrictions. Further bolstering various developed economies were the easing actions of their central banks that resulted in near-zero interest rates for short-term sovereign securities and large increases in money supply from sovereign and credit instrument buying programs. The U.S. Federal Reserve in August altered its inflation policy by targeting average inflation of two percent over time rather than a constant two percent.

Early September saw a change in market sentiment, as global equity markets retreated over the remainder of the month due to concerns about the U.S. election outcome, the impasse between U.S. Republicans and Democrats to agree on another fiscal stimulus package, concerns about the COVID-19 vaccine being delayed or ineffective, reinstatements of government lockdowns resulting from numerous localized COVID-19 breakouts, civil unrest, Brexit, and tense relations between the U.S. and China, finishing the month down about three percent, but up 50 percent since the market low on March 23rd.

By quarter end, the sharp recession and rapid rise in unemployment resulting from the government-imposed shutdowns had passed and many economies around the globe had gradually reopened and begun to expand. The massive monetary and fiscal responses from central banks and central governments

Letter from Chief Investment Officer (continued)

(nearly $3 trillion in the U.S. and over $10 trillion globally) to support companies, workers and local governments had buoyed consumer spending and staved off many bankruptcies and foreclosures in the developed world, but it was very uncertain what permanent damage would be revealed as the stimulus diminishes or ends. The ill effects of the shutdowns were largely borne by the travel/hospitality, energy, and financial sectors, as well as small businesses deemed unessential by local governments, while many technology companies had benefited from the new virtual work and education environment. The long-term impacts of the shutdowns and build-up of massive government debt on jobs, education, travel, inflation, taxation, and government programs were uncertain, but likely to be significant, even though the capital markets seemed to have no concern about inflation. The U.S. Treasury yield curve finished the quarter down about 5 bps, sloping gradually up from about 10 bps for the three-month to 1.46% for the 30-year.

Second Quarter of 2021 Fiscal Year. Global equity markets retreated for the second consecutive month in October due to concerns about the U.S. election outcome, the impasse on passing another U.S. fiscal stimulus package, concerns about the COVID-19 vaccine being delayed or ineffective, reinstatements of government lockdowns resulting from numerous localized COVID-19 breakouts in the U.S. and Europe, resurgent civil unrest in the U.S., Brexit, and tense relations between the U.S. and China, finishing the month down about two percent, but still up 46 percent since the March market low. October saw the beginning of a rotation toward value and small cap stocks in the U.S. with U.S. small cap equities rallying over two percent. The rest of the quarter saw a very strong rebound in global equity valuations, especially in November, which experienced a 12% increase, hitting new highs due to very positive news about the apparent rapid deployment of effective COVID-19 vaccines, near resolution of the U.S. election outcome, and the expectation of a negotiated Brexit outcome, tempered by the impasse on passing another U.S. fiscal stimulus package and reinstatements of government lockdowns resulting from numerous localized COVID-19 virus breakouts in the U.S. and Europe. U.S. large cap equities likewise hit new highs and were up 11 percent in November, while U.S. small cap equities rallied nearly 20 percent in November. Dispersion across stocks was also extremely high with November 9th being the single highest day for dispersion since 2008. In December, global equity markets rose about five percent, again hitting new highs as optimism from a negotiated Brexit outcome and approval of another U.S. stimulus package ($900 billion pandemic relief bill) added to November's optimistic sentiment.

The long-end of the U.S. Treasury yield curve steepened about 19 bps during the quarter with the 30-year Treasury yield finishing at 1.65 percent. The shape of the yield curve was still indicating that the Fed would keep rates at historic lows far into the future and the threat of higher inflation in the next several years seemed virtually non-existent.

Third Quarter of 2021 Fiscal Year. Global equity markets ended down very slightly in January after hitting new highs on January 21st due to the global deployment of multiple, effective COVID-19 vaccines, the inauguration of President Joe Biden, and the likelihood of another large U.S. stimulus package ($1.9 trillion American Rescue Plan) with Democrats controlling both houses of Congress, tempered by reinstatements of government lockdowns resulting from numerous COVID-19 virus breakouts in the U.S. and Europe. U.S. large cap equities were down 1.0% after hitting new highs, while the NASDAQ was up about 1.4% and U.S. small caps rose over 6% during January.

U.S. Treasury yields rose and the curve steepened in January with the 10-year yield increasing by 15 bps and the 30 year increasing by 22 bps as domestic growth and employment data surpassed expectations. The U.S. dollar was up 0.7% for the month, benefiting from rising U.S. Treasury yields, the stimulus package, and the rise in demand for safe-haven investments due to the month-end rise in equity volatility from Reddit's Wallstreetbets participants successfully targeting stocks heavily shorted by hedge funds. In commodities, markets had mixed results with gold selling off and energy and grains continuing their rally due to lower inventory and higher expected demand.

Global equity markets rose about 2.5% in February after hitting new highs mid-month before backing off the final two days of the month, due to optimism from the global deployment of multiple, effective COVID-19 vaccines, favorable economic news, accommodative central banks, and the near certainty of the $1.9 trillion American Rescue Plan being enacted, tempered by government lockdowns to deal with COVID-19 virus breakouts in Europe. U.S. large cap equities were up nearly three percent, while the NASDAQ was up about one percent and U.S. small caps rose over six percent during February. Energy and financials were up significantly as the rotation continued from growth stocks to value and cyclical stocks. U.S. equity market conditions were excellent for stock pickers in February with high dispersion and elevated volatility. U.S. Treasury yields increased sharply and the curve steepened in February with the 10-year yield increasing by 33 bps and the 30-year increasing by 30 bps. The U.S. dollar was unchanged versus a basket of foreign currencies, while commodities posted strong returns with indexes increasing between 6.5% and 9.0%, led by the surge in oil prices.

Similarly to February, global equity markets rose about 2.5% in March finishing very near the mid-February highs as economic optimism continued based on the fast rollout of COVID-19 vaccinations in the U.S., favorable economic news, accommodative central banks, the passage of the $1.9 trillion American Rescue Plan, and the announcement of President Biden's infrastructure plan ($2 trillion over 10 years), tempered by safety concerns about two of the COVID-19 vaccines and government lockdowns to deal with COVID-19 virus outbreaks in several U.S. states, Europe, Brazil and India. U.S. large cap equities were up about 4.5 percent, while the NASDAQ was up about one-half percent and U.S. small caps rose about one percent during March. U.S. equity market conditions were again excellent for stock pickers in March with high dispersion, low correlation and elevated, but falling volatility. U.S. Treasury yields increased and the curve steepened in March with the 10-year yield increasing by 30 bps and the 30-year increasing by 24 bps. The U.S. Treasury curve sloped up from about 3 bps for the three-month Treasury bill to 2.41 percent for the 30-year Treasury. Commodity indexes fell roughly 2.5 percent in March, as energy prices retreated.

Fourth Quarter of 2021 Fiscal Year. Global equity markets rose for the third consecutive month in April (up about four percent), reaching new highs as economic optimism continued based on the broad rollout of COVID-19 vaccinations in the developed world, bullish economic growth news (U.S. GDP 1Qtr grew at an annualized 6.4%, U.S. unemployment was down 0.2% to 6.0%, and labor participation was up to 61.5% in March), accommodative central banks, the economic impact of the U.S. $1.9 trillion American Rescue Plan, and the expectation of a sizeable U.S. infrastructure package enacted in 2021, tempered by global supply constraints, possible tax increases from the new U.S. administration, signs of impending U.S. inflation (March year-over-year inflation at 2.6%), and government lockdowns to deal with COVID-19 virus outbreaks in several U.S. states, Europe, Brazil and particularly India. U.S. large cap equities and the NASDAQ were each up about five percent, while U.S. small caps rose about two percent during April, reflecting the pause in the rotation from growth stocks to value and cyclical stocks. During April, stock correlations were low, dispersion was low to moderate, and volatility moderated in a very broad and strong equity market rally. Despite inflationary fears, longer-dated U.S. Treasury yields decreased in April back to mid-March levels, as the 10-year yield fell by 9 bps and the 30-year fell by 11 bps. Commodity indexes resumed their rapid appreciation, rising about eight percent in April after pausing in March.

Global equity markets rose for the fourth consecutive month in May (up about 1.6%), reaching new highs as economic optimism continued based on falling COVID-19 infections and deaths in the developed world, accommodative central banks, and the Biden administration's unveiling of a $6 trillion U.S. budget proposal, tempered by global supply constraints, possible tax increases from the Biden administration, signs of impending U.S. inflation, and government lockdowns to deal with COVID-19 virus outbreaks particularly in Brazil and India. International developed markets stocks were up about 3.5%, and U.S. large cap stocks were up about 0.7%, while U.S. small cap, Emerging Markets, and the NASDAQ indexes were each up about two percent during May, as dispersion remained low and volatility moderated in the broad and sustained rally in global equities. Despite inflationary fears, longer-dated U.S. Treasury yields decreased slightly in May. Commodity indexes continued their strong appreciation, rising about three percent in May, while the U.S. dollar was mostly unchanged.

Global equity markets rose for the fifth consecutive month in June (up about 1.2%), reaching new highs as economic optimism continued based on falling COVID-19 infections and deaths in the developed world, accommodative central banks, and the Biden administration's highly stimulative fiscal policies, tempered by global supply constraints, probable tax increases from the Biden administration, rising U.S. inflation, and government lockdowns to deal with COVID-19 virus outbreaks particularly in Japan, Brazil and India. International stocks were down about 0.5%, while U.S. large cap stocks were up about 2.2% and U.S. small cap were up about 1.7% in June, as dispersion rose to above average levels and volatility remained below average in the sustained rally in global equities since the March 2020 equity market low. Despite recent U.S. inflation, longer-dated U.S. Treasury yields decreased again in June for the third consecutive month. The U.S. Treasury curve sloped up from 5 bps for the three-month Treasury bill to 2.06 percent for the 30-year Treasury. Commodity indexes continued their strong appreciation, rising about two percent in June, while the U.S. dollar rose nearly three percent versus a basket of non-US currencies.

Fiscal Year 2021 was a phenomenal period for capital markets with global equities up 41 percent (about five times its average annual return of eight percent), high yield credit instruments up about 14% due to spread tightening, many commodities rebounding sharply, and a stronger U.S. dollar. U.S. Treasury yields, on the other hand, rose and the curve steepened with the 30-year Treasury yield rising 65 bps resulting in long Treasury bonds falling over eight percent in value during the fiscal year. Accommodative monetary policies and fiscal programs (over $20 trillion globally since the onset of COVID-19) in the developed economies broadly and strongly supported the capital markets.

PORTFOLIO RESTRUCTURING ACTIVITY

Fiscal year 2021 continued the progress of refining, streamlining, and diversifying the portfolio. We continued upon the pacing plan approved by the Board of Trustees as result 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.

Highlights of portfolio-level changes throughout Fiscal Year 2021 are:

- Real Assets: Committed roughly $590 million (8 funds) of additional capital to the real assets program[5]. This includes commitments of roughly $190 million (4 funds) to non-core real estate and roughly $400 million (4 funds) to infrastructure. This is in line with its long-term target allocation and annual strategic/pacing plan.

- Public Equities and Credit: At fiscal year-end, Global Credit comprised 5.5% of total ERS assets. During the year, committed $150 million and $100 million to two new managers and an additional $50 million commitment to an existing manager. As part of the portfolio's long-term restructuring plan, one legacy manager was fully redeemed, and another was fully redeemed subsequent to year end. Traditional Equity and Stabilized Equity components comprised 28.7% and 16.7% of total assets respectively. During the year, a commitment of $500 million was allocated to a convertible securities strategy within Stabilized Equity.

- Private Equity: Private Equity achieved a significant milestone as of June 30, 2021 by meeting its targeted allocation of 13.5%[6]. This was the target established in the 2015 asset allocation study mentioned above and was to be achieved over a 7-year period ending in 2022 but was achieved earlier than projected given the unprecedented performance. During the fiscal year, the market value increased to roughly $3.0 billion from $1.9 billion an increase of nearly $1.1 billion.

- Diversifying Strategies: Diversifying Strategies rose from $3.4 billion to $5.3 billion during the fiscal year due to the addition of eight new managers and the allocation of $0.5 billion of capital to a new mandate in an existing account (U.S. Treasury Inflation-Protected Securities). Six accounts were closed during the fiscal year as the Investment Office began the transition from a Crisis Risk Offset approach to a broader mandate that incorporated both sources of return that were largely uncorrelated to growth risk as well as anti-correlating strategies to growth risk. The transition is expected to be completed in fiscal year 2023 with Diversifying Strategies growing from 20% to 35% of ERS asset between the beginning of fiscal year 2021 and the end of fiscal year 2023.

[5] Between July 1, 2020 and June 30, 2021, $590 million in real assets commitments were approved for investment. Actual closing dates on commitments may be outside of that window.
[6] The actual allocation was slightly higher at 14.1% and is expected to fluctuate as market values change and investments are bought and sold.

Letter from Chief Investment Officer (continued)

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, improve operational processes, 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 25% 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, 2021 was slightly overweight Broad Growth (+1.4%) and underweight Diversifying strategies (-3.4%)[7]. The overlay accounted for 0.5% of the portfolio, and the ERS Operating Account (used to fund new investments or pay benefits and other cash needs) was 1.3% of plan assets. 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 80% of the volatility in the portfolio, down from 85% the prior fiscal year.

[7] Total sums to 97.8%. ERS Operating Account and the Overlay account for1.8% while Closing Accounts and Transition Accounts account for the remaining 0.4%.

- 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. In July 2020, real return was reorganized into real assets and folded into broad growth.

Long-Term Strategic Allocation

STRATEGIC CLASS	COMPONENT	PRIOR LONG-TERM ALLOCATION	CURRENT LONG-TERM ALLOCATION
Broad Growth	**Private Growth**	**28.3%**	**13.5%**
	Traditional Growth	**22.3%**	**17%**
	Stabilized Growth	**22.3%**	**17%**
	Real Assets	**N/A**	**15.5%**
Diversifying Strategies		**27%**	**37%**

Office Development

The 2021 fiscal year was the seventh complete year for the investment team in the Investment Office. In fiscal year 2020 the Investment Officer- Risk was promoted to Deputy Chief Investment Officer ("DCIO"). The team consists of one DCIO, four 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 2021 marks her third year as CIO. In fiscal year 2021 CIO Burton successfully completed another part of her 2019 business plan, by securing approval for a new Governance model that would complement the new investment strategies. A new governance matrix was approved by the Board of Trustees that delegates greater responsibility to staff and has resulted in capturing market inefficiencies in a timelier basis than in previous years. 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

While equity markets have continued to climb and bond markets fade in and out of recoveries, there remain a significant number of risks on global investment horizon. Despite being nearly 18 from the beginning of the coronavirus pandemic, U.S. unemployment remains elevated and global shutdowns continue in various forms throughout the world as new strains of the virus emerge. Faced with increasing levels of inflation, the Federal Reserve has signaled a rollback—and eventual end date—to its bond buying program and the narrative of increasing interest rates has become more hawkish.

In our last ACFR we noted that the role of fixed income in asset allocation is becoming more concerning, as bond yields hover near zero. This becomes only more concerning in the face of rising inflation and rising rates. Rising inflation is one of the largest risks to the portfolio, as negative real returns (returns adjusted for inflation) would have a meaningful impact on the portfolio and our asset allocation assumptions. We have constructed a portfolio that we believe can weather a variety of scenarios – including inflation. We have increased our exposure to strategies that should be able to maintain value in a variety of rate environments, including but not limited to, income producing strategies in fixed income such as direct lending, exposure to financials in our equity portfolios, and increasing our exposure to real assets and diversifying strategies.

As we cannot predict the future, we continue to believe that prudently building a diversified portfolio is our best hedge against uncertain market outcomes. Although we have continued to increase our exposure to illiquid assets in an effort to increase our exposure to the illiquidity premium, we continue to maintain a very liquid portfolio, which was an advantage for us the last two years, and should continue to be an advantage to us moving forward.

We hope to add additional staff to the investment office in fiscal year 2022, especially within the areas of diversifying strategies and investment operations. The investment office remains lean in terms of staff and will continue to seek the resources necessary to execute on the Board of Trustees asset allocation plan, particularly considering impending market turbulence, the risk of inflation, geopolitical and social unrest, and in general a potential challenging real 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.

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,

Howard Hodel

Howard Hodel
Acting Chief Investment Officer

Letter from Investment Consultant

MEKETA
INVESTMENT GROUP

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Portland, OR 97210

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January 21, 2022

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, 2021, as requested by the Government Financial Officers' Association (GFOA).

Hawaii ERS - Total Fund Performance

The total assets of the Retirement System were approximately $21.5 billion as of June 30, 2021, an increase of roughly $4.3 billion for the fiscal year. The ERS Total Fund generated positive relative returns throughout the portfolio. The investment return for the Total Fund, expressed as a time-weighted total rate of return, was +26.6% for the 2021 fiscal year compared to the benchmark's return of +23.3% and the Investment Metrics Public Funds Greater than $1 Billion Database (which includes the previously utilized BNY Mellon >$1B Database) peer median return of +27.4%. For the three-year period ending June 30, 2021, the Total Fund returned 10.8% per annum versus the benchmark's return of +9.1% and the Investment Metrics Public Funds Greater than $1 Billion Database peer median return of +11.0%. For the trailing five-year period ending June 30, 2021, the Total Fund returned +10.8% per annum versus the benchmark's return of +9.4% and the Investment Metrics Public Funds Greater than $1 Billion Database peer median return of +11.0%. 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. The ERS has deliberately constructed a more risk-focused, diversified, and globally oriented portfolio compared to peers. Considering the market environment of recent years, the ERS's peer-relative performance is entirely in-line with expectations.

Letter from Investment Consultant (continued)

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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. There were slight revision to the naming conventions of the classes and their components during the 2021 fiscal year as well. 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 strategic class produced a +34.8% return for the fiscal year versus the Broad Growth benchmark's return of +31.5%. At fiscal year-end, the Broad Growth class utilized three components: 1) Public Growth, 2) Private Growth, and 3) Real Assets. The Public Growth component generated a +33.8% return for the fiscal year, the Private Growth component produced a +55.5% return for the fiscal year, and the Real Assets component generated a +13.3% return for the fiscal year.

The Diversifying Strategies strategic class produced a +1.8% return for the fiscal year versus the Diversifying Strategies benchmark's return of +4.1%. At fiscal year-end, the Diversifying Strategies class contained three components: 1) Illiquid Diversifying, 2) Liquid Defensive, and 3) Liquid Diversifying. The Illiquid Diversifying component generated a +4.9% return for the fiscal year, the Liquid Defensive component produced a +1.1% return for the fiscal year, and the Liquid Diversifying component generated a +4.1% return for the fiscal year.

The major strategic classes above utilize a variety of underlying asset classes and strategies. The performance tables in the Investment Results section of this letter provide additional granularity with respect to the various strategic classes and their underlying components and sub-components.

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.

Letter from Investment Consultant (continued)

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Market Conditions

Investors entered fiscal year 2021 with equity markets continuing to appreciate from their March 2020 lows, aided by extremely accommodative monetary and fiscal policies enacted across the globe and aimed at supporting teetering economies in the face of a pandemic. By fiscal year end, global risk assets produced historically strong returns. Robust stimulus across global developed and emerging regions, the reopening of economies, and a focus on successful vaccine roll-out all contributed to the strong performance of risk assets in the 2021 fiscal year. The notable pickup in economic activity, evident in the latter half of the year, also began to drive inflation higher.

While fiscal year 2021 proved to be a strong market year it should be noted there was still a considerable amount of uncertainty at fiscal year-end. Among those were: 1) the path of the pandemic, particularly given the rise of the Delta variant at that time – a highly contagious strain of COVID-19, 2) the health and recovery of the labor market, 3) the related implications for inflation and economic growth, and 4) the overall impact of fiscal and monetary measures as they began to subside.

US equities, as represented by the Russell 3000 Index, finished the fiscal year with a 44.2% return. Emerging markets (MSCI Emerging Markets) delivered 40.9% for the year and the MSCI EAFE Index, representing foreign developed markets, returned 32.4% for the same time horizon.

With large-scale fiscal and monetary support, and the corresponding improvement in investor risk sentiment, expectations of short-term volatility, as measured by the VIX Index, declined relatively quickly throughout the course of the year. At the height of the pandemic, the VIX Index reached 82.7, declining to 30.4 at the start of the fiscal year. By fiscal year-end, the VIX Index had settled at a level of 15.8. For much of the fiscal year, most markets embraced a "risk on" appetite.

In the wake of positive vaccine news, we saw a rotation away from growth stocks and into value stocks at calendar year-end that, for the most part, continued for the remainder of the fiscal year. By fiscal year-end, the Russell 3000 Value Index (+45.4%) had outpaced the prior leadership of the Russell 3000 Growth Index (+43.0%). Just a year prior - leadership performance of the Russell 1000 Growth Index (+21.9%) versus the Russell 1000 Value Index (-9.4%) held a significantly wider spread that by fiscal year- end 2021 had all but diminished. Cyclical sectors like energy and financials saw strong results, as investors rotated out of the stay-at-home focused companies in the technology sector that were so previously favored in 2020.

Letter from Investment Consultant (continued)

Similarly, but with a drastically more pronounced divergence, we saw a rotation away from large cap stocks and into small cap stocks. The performance dispersion between the Russell 1000 Index (+43.1%) and the Russell 2000 Index (+62.0%) reached nearly 20% by fiscal year-end as smaller companies benefitted from the re-opening of economies and its pro-cyclical tailwind.

Within international developed markets, the MSCI EAFE opportunity set, of which Japan, the UK, and the Eurozone are featured most heavily, underperformed relative to the US and emerging markets in part due to the weak footing on which they entered the crisis, the robust spread of COVID-19, and prolonged lockdowns in many of these economies. Within emerging markets, we witnessed a widespread divergence between countries that were able to manage the virus's spread by deploying aggressive countermeasures early on (e.g., China) relative to countries facing already challenging economic circumstances (e.g., Brazil, Mexico, and South Africa). Specific to China, fears of tighter monetary policies impacting growth in addition to the more recent Chinese regulatory crackdown on ADR-listed companies have been a headwind to the region's performance.

The US Treasury yield curve had declined materially at the onset of COVID-19 (March 2020) as investors flocked to this safe-haven asset and aggressive Federal Reserve policies were enacted through policy rate cuts and the quantitative easing program. For context, at the end of June 30, 2020, the 10-year yield was at 0.66% with yields remaining below 1.0% through December; by March 2021, the yield nearly doubled to 1.7% on prospects of stronger than expected growth, driving negative bond index returns. By the end of the fiscal year, the 10-year yield retreated to 1.4% as concerns about the economic impact of the Delta variant trimmed investor risk appetite at the margin.

Within fixed income markets, the Bloomberg US Aggregate Index produced essentially flat returns, delivering -0.33% for the year ending June 30, 2021; the Bloomberg US TIPS Index returned 6.5% as inflationary concerns proved to be a tailwind; and the Barclays High Yield Index posted the strongest returns at 15.4% as investors searched for yield given the current historically low levels being offered elsewhere. Lastly, long maturity Treasuries were the worst performer, with the Barclays Long US Government Index returning -10.4% to end fiscal year 2021. Rising inflation and US economic growth conditions in the second half of the year negatively impacted longer dated fixed income instruments; though we witnessed some recovery as inflation concerns somewhat abated by the end of the fiscal year.

Outside of equity and fixed income markets, we saw strong results from many other asset classes, as they benefitted from the recovery and economic expansion. Energy prices saw a dramatic increase, with WTI crude oil trading at $75.23 by June 30, 2021 and returning to pre-COVID levels – versus $39.88 just one year ago. At their trough in 2020, the Bloomberg Commodity Index and the S&P Global Natural Resources Index were down -23.1% and -44.6%, respectively. At the end of the fiscal year, the Bloomberg Commodities Index and the S&P Global Natural Resources Index recovered with healthy returns and printed 45.6% and 49.4% one-year returns, respectively. In the second half of the fiscal year, as economies re-opened, an imbalance in supply (low) and demand (high) caused many raw materials to rise sharply (e.g., steel, copper, corn, lumber, etc.). The increased demand, made worse supply chain congestion, incited inflationary fears.

Letter from Investment Consultant (continued)

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One of the hardest hit asset classes in 2020 had been real estate, where fears regarding utilization rates in commercial real estate prevented the asset class from participating in the recovery in the early months. Since then, REITS have handsomely recovered from their 2020 losses such that one-year returns ending June 30, 2021 were 38.1% as proxied by the MSCI U.S. REIT Index.

In April 2021, the advent of vaccines and the rise in economic activity led the IMF to materially upgrade its World Economic Outlook for 2021 with advanced economies projected to rise by 5.1%.

Sincerely,

Colin Bebee, CFA
Managing Principal

Colin Bebee, CFA
Managing Principal

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January 21, 2022
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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 2021

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 6/30/2021)[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	**72.0%**
Diversifying Strategies	**28.0%**
Opportunities	**0%**
Other	**0%**
Total	**100%**

[1] The above strategic allocation is supported by a multitude of 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 transitioned to two major strategic classes (rather than four). Prevailing classes and sub-classes were 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

The Board manages the expected return/risk posture of the Plan as part of the formal asset-liability studies that are completed every three-to-five years. Based on the most recent asset-liability study, the Total Fund was repositioned to achieve a long-term return of approximately 7.0% with an annualized volatility of approximately 9.4%-11.4% (dependent on modeling approach) over a horizon of 20-30 years. It is expected that a new asset-liability study will commence in the 2023 fiscal year.

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%***

Report on Investment Activity by Investment Consultant (continued)

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January 21, 2022
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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, among other items. Material revisions to the Manual occurred during each of the last nine 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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January 21, 2022
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Investment Results as of June 30, 2021 (Risk-based Classes):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2021	2020	2019	2018	2017	6/2021	6/2021
Broad Growth *	**34.81%**	**(0.38%)**	**6.09%**	**9.76%**	**17.42%**	**12.52%**	**12.92%**
Broad Growth Blended Benchmark	*31.53%*	*(1.86%)*	*4.78%*	*9.50%*	*14.39%*	*10.59%*	*11.12%*
Diversifying Strategies **	**1.82%**	**6.54%**	**6.83%**	**4.20%**	**---**	**5.04%**	**---**
Diversifying Strategies Blended Benchmark[3]	*4.10%*	*5.54%*	*4.96%*	*2.58%*	---	*4.86%*	---
Other ***	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Total Fund	**26.63%**	**1.28%**	**6.00%**	**7.85%**	**13.68%**	**10.78%**	**10.76%**
Composite Benchmark[4]	*23.32%*	*0.65%*	*4.65%*	*7.67%*	*11.87%*	*9.11%*	*9.37%*
*Median Fund*****	*27.4%*	*1.3%*	*5.9%*	*8.7%*	*12.6%*	*11.0%*	*11.0%*

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

** Per BNY Mellon data, the composite was incepted 4/1/2017. Performance prior to 7/1/2020 largely represents that of the Crisis Risk Offset composite .

*** Class-specific performance is not provided or is not meaningful for Opportunities and Other, but their accounts roll-up to the Total Fund performance.

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

[1] Broad Growth Blended Benchmark: 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% 100% MSCI ACWI IMI Index, and 10.0% Private Growth Blended Benchmark through 12/31/17; 43.0% Stabilized Growth Blended Benchmark, 43.0% 100% MSCI ACWI IMI Index, and 14.0% Private Growth Blended Benchmark through 6/30/20; 70% Public Growth Benchmark, 14% Real Assets Benchmark, 16% Private Growth Benchmark thereafter.

Stabilized Growth Benchmark: includes 17% CBOE BXM Index, 8.5% Bloomberg Global Credit Index (Hedged), 5.67% Bloomberg Global High Yield Index (Hedged), 2.83% S&P LSTA Leveraged Loan Index, 17% CBOE PUT, 8.5% MSCI ACWI ex. US Index, 8.5% 3-month T-Bills Index, 17% MSCI ACWI Minimum Volatility Index, and 15% NCREIF Property Index (net, quarter lagged) since 7/1/16.

Please refer to the following pages for Liquid Defensive Benchmark, Liquid Diversifying Benchmark, and Illiquid Diversifying Benchmark definitions .

[2] Diversifying Strategies Blended Benchmark: 30.0% 90-Day T-Bill +5%, 45.0% MLM Global Index LT 15V, and 25.0% Bloomberg 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% Bloomberg US Treasury Long Term Index through 6/30/20; 50% Liquid Defensive Benchmark, 40% Liquid Diversifying Benchmark, and 10% Illiquid Diversifying Benchmark thereafter.

Please refer to the following pages for Liquid Defensive Benchmark, Liquid Diversifying Benchmark, and Illiquid Diversifying Benchmark definitions.

[3] Composite Benchmark: 83% Broad Growth Blended Benchmark, 12% Principal Protection Benchmark, 5% CPI + 3% from 7/1/16 through 3/31/17; 76% Broad Growth Blended Benchmark; 9% Principal Protection Benchmark, 5% CPI + 3%, and 10% Crisis Risk Offset Benchmark through 12/31/17; 72% Broad Growth Blended Benchmark; 8% Principal Protection Benchmark, 7% CPI + 3%, and 13% Crisis Risk Offset Benchmark through 12/31/18; 68% Broad Growth Blended Benchmark; 8% Principal Protection Benchmark, 5% CPI + 3%, and 16% Crisis Risk Offset Benchmark through 6/30/20; 72% Broad Growth Blended Benchmark and 28% Diversifying Strategies Blended Benchmark thereafter.

Principal Protection Benchmark includes: 100% Bloomberg Global Intermediate ex. Credit (Hedged) through 12/31/17; 55% Bloomberg US Intermediate ex. Credit and 45% Bloomberg Global Intermediate ex. Credit (Hedged) thereafter.

Crisis Risk Offset Benchmark includes: 25% Bloomberg US Treasury Long Index, 45% MLM Global Index (15% Vol), and 30% 90-day T-Bills + 5% through 3/31/19; 25% Bloomberg US Treasury Long Index, 45% MLM Global Index (15% Vol), and 30% 90-day T-Bills + 2.5% thereafter.

Report on Investment Activity by Investment Consultant (continued)

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Investment Results as of June 30, 2021 (Risk-Based Classes – Sub-Components):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2021	2020	2019	2018	2017	6/2021	6/2021
Broad Growth*	**34.81%**	**(0.38%)**	**6.09%**	**9.76%**	**17.42%**	**12.52%**	**12.92%**
Broad Growth Blended Benchmark[1]	*31.53%*	*(1.86%)*	*4.78%*	*9.50%*	*14.39%*	*10.59%*	*11.12%*
Public Growth Equity	**33.81%**	**(0.34%)**	**4.66%**	**9.08%**	**17.78%**	**11.76%**	**12.39%**
Public Growth Blended Benchmark[2]	*31.75%*	*0.86%*	*5.43%*	*10.29%*	*17.70%*	*11.90%*	*12.71%*
Traditional Equity	**42.93%**	**1.79%**	**4.78%**	**12.46%**	**21.98%**	**15.09%**	**15.90%**
Traditional Equity Blended Benchmark[3]	*40.94%*	*1.17%*	*4.56%*	*11.14%*	*19.01%*	*14.24%*	*14.55%*
Stabilized Equity	**23.80%**	**(2.28%)**	**3.79%**	**5.96%**	**11.65%**	**7.88%**	**8.30%**
Stabilized Equity Blended Benchmark[4]	*23.25%*	*(5.14%)*	*5.45%*	*6.34%*	*9.18%*	*7.23%*	*7.44%*
Global Credit	**22.03%**	**(1.06%)**	**8.18%**	**0.69%**	**8.06%**	**9.31%**	**7.28%**
Global Credit Blended Benchmark[5]	*14.40%*	*2.07%*	*8.27%*	*1.53%*	*7.12%*	*8.13%*	*6.58%*
Private Growth* **	**55.53%**	**(0.64%)**	**16.55%**	**16.57%**	**20.29%**	**21.67%**	**20.36%**
Private Growth Blended Benchmark[6]	*59.58%*	*(10.73%)*	*3.89%*	*17.03%*	*17.37%*	*13.96%*	*15.25%*
Real Assets* **	**13.29%**	**2.98%**	**6.74%**	**8.56%**	**8.46%**	**7.55%**	**7.94%**
*Real Assets Blended Benchmark[7]***	*2.55%*	---	---	---	---	---	---
Core Real Estate	**17.99%**	**2.34%**	**4.13%**	**6.19%**	**8.68%**	**7.93%**	**7.73%**
NCREIF Blended Benchmark[8]	*1.47%*	*3.93%*	*6.55%*	*7.11%*	*7.27%*	*3.96%*	*5.26%*
Non-Core Real Estate	**12.00%**	**2.35%**	**9.55%**	**10.86%**	**12.09%**	**7.89%**	**9.34%**
NCREIF ODCE (Quarter Lagged) + 1%	*2.49%*	*4.97%*	*8.59%*	*9.14%*	*9.41%*	*5.00%*	*6.31%*
Infrastructure	**24.19%**	**19.46%**	**17.47%**	**10.25%**	**15.57%**	**20.34%**	**17.30%**
CPI + 4%	*9.54%*	*4.74%*	*5.73%*	*6.91%*	*5.71%*	*6.67%*	*6.54%*
Timber	**(2.21%)**	**(0.72%)**	**3.76%**	**9.63%**	**2.66%**	**0.24%**	**2.54%**
*NCREIF Timberland Index****	*1.46%*	*1.30%*	*2.38%*	*3.64%*	*2.90%*	*1.71%*	*2.51%*

* Per BNY Mellon data, the Broad Growth composite was incepted 10/1/2014. It contains lagged and non-lagged components .
** Real Assets Blended Benchmark began on 7/1/20 as part of the long-term strategic allocation policy change..
*** May contain lagged components .
Note: Changes to composite constructions between fiscal year reports may result in updates to historical data over time at the composite level.

[1] Broad Growth Blended Benchmark: 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% 100% MSCI ACWI IMI Index, and 10.0% Private Growth Blended Benchmark through 12/31/17; 43.0% Stabilized Growth Blended Benchmark, 43.0% 100% MSCI ACWI IMI Index, and 14.0% Private Growth Blended Benchmark through 6/30/20; 70% Public Growth Benchmark, 14% Real Assets Benchmark, 16% Private Growth Benchmark thereafter.
Stabilized Growth Benchmark: includes 17% CBOE BXM Index, 8.5% Bloomberg Global Credit Index (Hedged), 5.67% Bloomberg Global High Yield Index (Hedged), 2.83% S&P LSTA Leveraged Loan Index, 17% CBOE PUT, 8.5% MSCI ACWI ex. US Index, 8.5% 3-month T-Bills Index, 17% MSCI ACWI Minimum Volatility Index, and 15% NCREIF Property Index (net, quarter lagged) since 7/1/16.

[2] Public Growth Blended Benchmark: 55.5% MSCI ACWI IMI ND, 20% Options-Based Equity Benchmark, 9% MSCI ACWI Minimum Volatility Index, and 15.5% Global Credit Benchmark.
Options-Based Equity Benchmark includes 50% CBOE PUT (S&P) Index, 35% CBOE PXEA (EAFE) Index, and 15% CBOE PXEF (EM) Index.

[3] Traditional Equity Blended Benchmark: 100% MSCI ACWI IMI Index since 10/1/14.

[4] Stabilized Equity Blended Benchmark: 69% Options-Based Equity Benchmark and 31% MSCI ACWI Minimum Volatility Index since 7/1/20.

[5] Global Credit Blended Benchmark: 12.5% Bloomberg Global High Yield Index (Hedged), 12.5% S&P LSTA Leveraged Loan Index, 37.5% Bloomberg Global High Yield Index (Hedged) + 1% (month lagged), and 37.5% S&P LSTA Leveraged Loan + 1% (month lagged) since 7/1/20.

[6] Private Growth Blended Benchmark: 100% MSCI ACWI IMI (lagged) + 2% since 10/1/14.

[7] Real Assets Blended Benchmark: 40% NCREIF ODCE (1 quarter lag)/35% NCREIF ODCE +1% (1 quarter lag)/12% NCREIF Timber (1 quarter lag)/5% NCRIEF Farmland (1 quarter lag)/7.5% CPI + 4% since 7/1/20.

[8] NCREIF Blended Benchmark: 100% NCREIF Property Index (quarter lagged); through 12/31/18; NCREIF ODCE Net (quarter lagged) thereafter.

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Investment Results as of June 30, 2021 (Risk-Based Classes – Sub-Components) [continued]:

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2021	2020	2019	2018	2017	6/2021	6/2021
Diversifying Strategies*	**1.82%**	**6.54%**	**6.83%**	**4.20%**	---	**5.04%**	---
Diversifying Strategies Blended Benchmark[1]	*4.10%*	*5.62%*	*4.38%*	*1.58%*	---	*4.86%*	---
Illiquid Diversifying**	**4.92%**	---	---	---	---	---	---
Illiquid Diversifying Blended Benchmark[2]	*4.41%*	---	---	---	---	---	---
Idiosyncratic Return Capture**	**2.44%**	---	---	---	---	---	---
90 Day T-Bill +3.5%	*3.60%*	---	---	---	---	---	---
Insurance Linked**	**7.71%**	---	---	---	---	---	---
Swiss RE Global Catastrophe Bond	*5.93%*	---	---	---	---	---	---
Liquid Defensive*	**1.11%**	**10.71%**	**4.31%**	**0.28%**	---	**5.30%**	---
Liquid Defensive Blended Benchmark[3]	*5.20%*	*6.27%*	*3.40%*	*(0.48%)*	---	*4.95%*	---
Defensive Return Capture**	**(32.33%)**	---	---	---	---	---	---
90 Day T-Bill +2.5%	*2.60%*	---	---	---	---	---	---
Systematic Trend Following*	**20.87%**	**1.70%**	**0.20%**	**1.74%**	---	**7.19%**	---
MLM Global Index LT 15V	*22.93%*	*(6.03%)*	*(2.10%)*	*(0.87%)*	---	*4.18%*	---
Treasury Agency Duration Capture*	**(3.29%)**	**25.13%**	**11.94%**	**(2.36%)**	---	**10.65%**	---
Trsry/Agcy Duration Blended Benchmark[4]	*(5.62*	*25.40*	*12.30%*	*(0.13%*	---	*9.95*	---
Liquid Diversifying*	**4.09%**	**4.09%**	**(0.61%)**	**15.39%**	---	**6.08%**	---
Liquid Diversifying Blended Benchmark[5]	*2.60*	*4.17%*	*6.78%*	*6.43*	---	*4.50*	---
Alternative Return Capture*	**4.20%**	**(0.61%)**	**15.39%**	**13.62%**	---	**6.12%**	---
90-Day T-Bill + 2.5%	*2.60%*	*4.17%*	*6.78%*	*6.43%*	---	*4.50%*	---
Relative Value Arbitrage***	---	---	---	---	---	---	---
90 Day T-Bill +2.5%	---	---	---	---	---	---	---

* Per BNY Mellon data, the composite was incepted 4/1/2017. Performance of Diversifying Strategies prior to 7/1/2020 represents that of the Crisis Risk Offset composite. Performance of Treasury Agency Duration Capture prior to 7/1/2020 represents that of Treasury Duration Capture composite..
** Per BNY Mellon data, the composite was incepted 7/1/2020.
*** Per BNY Mellon data, the composite was incepted 11/1/2020.
Note: Changes to composite constructions between fiscal year reports may result in updates to historical data over time at the composite level.

[1] Diversifying Strategies Blended Benchmark: 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 through 6/30/20; 50% Liquid Defensive Benchmark, 40%
[2] Illiquid Diversifying Blended Benchmark: 65% T-Bills + 3.5% and 35% Swiss RE Global Catastrophe Bond Index (Hedged) since 7/1/20.
[3] Liquid Defensive Blended Benchmark: 30% Bloomberg US Long Treasury Index, 30% Bloomberg US Intermediate Agg ex. Credit Index, and 40% MLM EV 15 Vol. .
[4] Treasury Agency Duration Blended Benchmark: 50% Bloomberg US Long Treasury Index and 50% Bloomberg US Intermediate Agg ex. Credit Index since 7/1/20.
[5] Liquid Diversifying Blended Benchmark: 100% T-Bills + 2.5% since 7/1/20.

INVESTMENT MANAGERS

BROAD GROWTH

PRIVATE GROWTH

Hamilton Lane
Landmark
Stafford Partners

PUBLIC GROWTH
– GLOBAL CREDIT

Carval Credit
HPS Credit
Pacific Investment Management Company
Silver Rock Credit
Western Asset Management Company

PUBLIC GROWTH
– TRADITIONAL EQUITY

Alliance Bernsteain
Blackrock
Legal and General Investment Management
Longview
Wasatch
Wellington

PUBLIC GROWTH
- STABILIZED EQUITY

Gateway
Geode
Lord Abbett
Neuberger Berman
Robeco
TOBAM

REAL ASSETS
- CORE REAL ESTATE

Cabot Industrial
Heitman Capital Management
Invesco Realty Advisors

REAL ASSETS
- NON-CORE REAL ESTATE

Angelo Gordon
Almanac
Blacksand Capital
Blackrock
Blackstone Realty
CB Richard Ellis
Cerebus
DRA
EJF
Fortress Japan
GLP Capital
Kayne Anderson
Kohlberg Kravis Roberts
LaSalle Investment Management
Lone Star
Mesa West Capital
Prudential
Starwood
Torchlight

REAL ASSETS
- TIMBER

Hancock Timber Resource Group

REAL ASSETS
- INFASTRUCTURE

I Squared
Kohlberg Kravis Roberts

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INVESTMENT MANAGERS (CONTINUED)

DIVERSIFYING STRATEGIES

LIQUID DEFENSIVE
– DEFENSIVE RETURN CAPTURE
AHL
P E Global

LIQUID DEFENSIVE
– SYSTEMATIC TREND FOLLOWING
AlphaSimplex
Aspect Capital
Crabel Capital Management
Mount Lucas Management

LIQUID DEFENSIVE
– TREASURY AGENCY DURATION CAPTURE
Bank of Hawaii
First Hawaiian Bank
Sun Life Capital

ILLIQUID DIVERSIFYING
– INSURANCE LINKED
Nephila
Pillar ENSO

LIQUID DIVERSIFYING
– ALTERNALATIVE RETURN CAPTURE
Graham Capital Management
Lombard Odier

LIQUID DIVERSIFYING
– RELATIVE VALUE ARBITRAGE
Aequim
Aristesia
Monashee
Shaolin

ILLIQUID DIVERSIFYING
– IDIOSYNCRATIC RETURN CAPTURE
Blackstone
Petershill

OTHER

Parametric

Continued on next page

INVESTMENT MANAGERS *(CONTINUED)*

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, 2021 (excludes investments in pooled vehicles, investment companies, limited partnerships 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	99,000,000	U S TREASURY NOTE	1.625%	12/15/2022	AAA	$ 101,099,790
2	94,300,000	U S TREASURY NOTE	2.375%	3/15/2022	AAA	95,824,831
3	94,300,000	U S TREASURY NOTE	1.750%	6/15/2022	AAA	95,784,282
4	94,300,000	U S TREASURY NOTE	2.750%	9/15/2021	AAA	94,824,308
5	88,400,000	U S TREASURY NOTE	1.500%	9/15/2022	AAA	89,856,832
6	88,400,000	U S TREASURY NOTE	0.500%	3/15/2023	AAA	88,845,536
7	65,715,000	U S TREASURY BOND	2.750%	8/15/2047	AAA	74,776,441
8	64,300,000	U S TREASURY NOTE	2.625%	12/15/2021	AAA	65,051,024
9	40,510,000	U S TREASURY BOND	2.500%	2/15/2045	AAA	43,860,177
10	42,300,000	U S TREASURY BOND	2.250%	8/15/2049	AAA	43,844,796
International Fixed Income						
1	1,500,000	ITALY BUONI POLIENNALI DE 144A	3.500%	3/1/2030	BAA3	2,208,624
2	1,275,000	VIRGIN MEDIA SECURED FINA REGS	5.000%	4/15/2027	BA2	1,828,350
3	1,000,000	HSBC HOLDINGS PLC	VAR RT	7/24/2027	A2	1,396,513
4	900,000	NETFLIX INC REGS	3.625%	6/15/2030	BA1	1,267,964
5	1,000,000	ATLANTIA SPA REGS	1.875%	7/13/2027	BA2	1,226,821
6	1,400,000	PROV OF ONTARIO	2.600%	6/2/2025	AA3	1,195,495
7	1,000,000	DUFRY ONE BV REGS	2.000%	2/15/2027	B1	1,117,730
8	900,000	WPC EUROBOND BV	0.950%	6/1/2030	BAA2	1,049,191
9	800,000	GAZPROM OAO VIA GAZ CAPIT REGS	2.949%	1/24/2024	BAA2	996,410
10	700,000	MPT OPERATING PARTNERSHIP LP /	2.500%	3/24/2026	BA1	984,972
Domestic Equities						
1	413,985	MICROSOFT CORP				$ 112,148,537
2	31,157	ALPHABET INC				78,089,412
3	442,014	AMERICAN EXPRESS CO				73,033,973
4	19,425	AMAZON.COM INC				66,825,109
5	167,231	META PLATFORMS INC				58,147,891
6	143,387	UNITEDHEALTH GROUP INC				57,417,890
7	414,952	MEDTRONIC PLC				51,507,992
8	640,450	ORACLE CORP				49,852,628
9	125,890	ANTHEM INC				48,064,802
10	65,479	CHARTER COMMUNICATIONS INC				47,239,825
International Equities						
1	489,296	SANOFI				$ 51,271,431
2	1,897,204	COMPASS GROUP PLC				39,889,983
3	656,627	ASAHI GROUP HOLDINGS LTD				30,710,433
4	461,598	JULIUS BAER GROUP LTD				30,152,310
5	220,000	SILERGY CORP				29,925,527
6	272,109	HENKEL AG & CO KGAA				28,732,680
7	119,998	NASPERS LTD				25,196,660
8	174,757	SAP SE				24,628,916
9	296,044	BAJAJ FINANCE LTD				23,960,128
10	63,180	ROCHE HOLDING AG				23,823,648

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, 2021**	**Percentage**
Equity securities			
Common stock	$	5,508,988	28.47%
Pooled funds		1,494,530	7.72%
Preferred shares and others		484,032	2.50%
		7,487,550	38.69%
Fixed income securities			
US treasury / government / agencies		3,254,672	16.82%
US mortgage-backed		61,924	0.32%
US corporate		2,160,646	11.16%
Non-US government / agencies		8,556	0.04%
Non-US corporate		210,552	1.09%
Pooled and others		696,244	3.60%
		6,392,594	33.03%
Others			
Real estate investments		1,871,181	9.67%
Alternative investments		3,600,763	18.61%
		5,471,944	28.28%
Total, investments at fair value	$	19,352,088	100.00%

Investment Schedules (continued)

Schedule of Investment Fees
by Asset Class Allocation

(Dollar values expressed in thousands)

	Fair value as of June 30, 2021	Total FY 2021 Investment Fees	Basis Points
Broad Growth			
Public Growth Equity			
Traditional Equity	$ 6,159,246	$ 17,461	28 bp
Stabilized Equity	3,584,312	5,480	15
Global Credit	1,177,351	4,450	38
Private Growth	3,032,314	2,190	7
Real Assets			
Core Real Estate	707,793	7,289	103
Non-Core Real Estate	816,311	-	-
Infrastructure	92,186	-	-
Timber	177,662	1,551	87
	15,747,175	38,421	24
Diversifying Strategies			
Illiquid Diversifying			
Idiosyncratic Return	207,610	1,097	53
Insurance Linked	304,877	657	22
Liquid Defensive			
Defensive Return Capture	465,435	2,680	58
Systematic Trend Following	1,237,508	4,979	40
Treasury Agency Duration	1,527,665	680	4
Liquid Diversifying			
Alteranative Return	559,968	4,774	85
Relative Value Arbitrage	996,312	6,895	69
	5,299,375	21,762	41
Other	472,770	904	19
Subtotal on investments	21,519,320	61,087	28
Other Investment Services			
Custodian fees		299	n/a
Investment consultant fees		1,657	n/a
Total including consultant and custodian	$ 21,519,320	$ 63,043	29

Investment Schedules (continued)

Schedule of Broker Commissions

The following is a list of brokers who received commissions from equity trades for securities directly held during Fiscal Year 2021.

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
ABEL NOSER, NEW YORK	4,100	$ 176,956	$ 164	$ 0.040
ABN AMRO CLEARING BANK N.V, AMSTERDAM	842,295	25,167,713	5,973	0.007
ALLEN & COMPANY LLC, JERSEY CITY	27,148	2,044,518	814	0.030
AMBIT CAPITAL PRIVATE LTD, MUMBAI	428,270	16,272,344	32,436	0.076
B RILEY AND CO LLC, NEW YORK	4,200	106,702	84	0.020
BAIRD, ROBERT W & CO INC, MILWAUKEE	359,035	12,730,660	9,679	0.027
BANCO BTG PACTUAL SA, RIO DE JANEIRO	24,367	93,204	105	0.004
BANCO DE INVESTIMENTUS GARATIA	2,587	47,419	31	0.012
BANCO ITAU, SAO PAULO	1,239,712	6,239,168	9,307	0.008
BANCO SANTANDER, NEW YORK	187,800	691,992	1,227	0.007
BANCO SANTANDER-CHILE, SANTIAGO	130,443	20,066	30	0.000
BANQUE PARIBAS, PARIS	587,629	9,002,896	2,089	0.004
BARCLAYS BANK IRELAND PLC, DUBLIN	70,270,153	132,034,378	28,506	0.000
BARCLAYS CAPITAL INC./LE, NEW JERSEY	1,322,031	95,770,063	13,693	0.010
BARCLAYS CAPITAL LE, NEW YORK	911,027	100,512,222	18,004	0.020
BARCLAYS CAPITAL, FRANKFURT	290	21,297	4	0.014
BARCLAYS CAPITAL, LONDON (BARCGB33)	2,102,010	29,662,787	14,730	0.007
BARCLAYS CAPITAL, NEW YORK	12,242	406,002	112	0.009
BERENBERG GOSSLER & CIE, HAMBURG	157,527	7,755,544	10,138	0.064
BERNSTEIN SANFORD C & CO, NEW YORK	3,793,552	213,859,305	25,378	0.007
BMO CAPITAL MARKETS CORP, NEW YORK	1,399,806	81,009,347	31,557	0.023
BNP PARIBAS PEREGRINE SEC LTD, HONG KONG	764,083	1,603,404	1,726	0.002
BNP PARIBAS PRIME BROKERAGE,INC,NEW YORK	693,503	64,306,897	4,853	0.007
BNP PARIBAS SEC SRVS SA, SINGAPORE	1,363,664	11,969,965	11,192	0.008
BNP PARIBAS SEC SVCS, LONDON (PARBGB2L)	8,066	92,568	27	0.003
BNP PARIBAS SECS SERVS, SYDNEY	627,451	1,346,857	804	0.001
BNP PARIBAS SECURITIES SVCS, HONG KONG	90,000	334,283	503	0.006
BNY CONVERGEX EXECUTION SOL, NEW YORK	2,199,387	21,607,913	17,172	0.008
BNYMELLON/RE BARCLAYS BANK IRE, NEW YORK	1,232,168	77,648,314	15,530	0.013
BOFA SECURITIES EUROPE S.A., PARIS	4,171,273	46,295,417	9,139	0.002
BOFA SECURITIES, INC, NEW YORK	16,052,882	24,914,717	18,711	0.001
BRADESCO S.A. CTVM, SAO PAULO	785,730	4,200,319	4,589	0.006
BRASIL PLURAL CCTVM SA, SAO PAULO	26,328	88,228	88	0.003
BTIG LLC, NEW YORK	817,618	36,127,358	27,430	0.034
Amounts carried forward	112,638,377	1,024,160,823	315,825	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	112,638,377	$ 1,024,160,823	$ 315,825	
CALYON SECURITIES, NEW YORK	1,059,500	$ 4,350,058	$ 5,772	$ 0.005
CANADIAN IMPERIAL BK OF COMMERCE, NY	7,700	315,309	121	0.016
CANTOR FITZGERALD & CO INC, NEW YORK	204,672	10,449,388	7,233	0.035
CARNEGIE ASA, OSLO	3,316	56,641	45	0.014
CARNEGIE SECS LTD, HELSINKI (CASFFIH1)	26,239	165,574	132	0.005
CASTLEOAK SECURITIES LP, JERSEY CITY	61,033	1,136,473	1,221	0.020
CELFIN CAPITAL SA CORREDORES, SANTIAGO	293,164	46,417	46	0.000
CHINA INTL CAP CORP HK SECS, HONG KONG	137,200	410,518	4,064	0.030
CIBC WORLD MKTS INC, TORONTO (WGDB)	249,306	13,062,675	1,392	0.006
CITADEL SECURITIES INSTL LLC, CHICAGO	6,007	970,546	30	0.005
CITATION GROUP BCC CLRG, NEW YORK	354,099	53,248,441	1,771	0.005
CITIBANK LTD, MELBOURNE	36,041	483,322	720	0.020
CITIGROUP GBL MKTS INC, NEW YORK	507,920	754,263	362	0.001
CITIGROUP GBL MKTS INC, TAIPEI	1,379,000	8,295,160	2,356	0.002
CITIGROUP GBL MKTS INDIA, MUMBAI	19,175	621,595	558	0.029
CITIGROUP GBL MKTS/SALOMON, NEW YORK	9,857,270	24,474,007	11,379	0.001
CITIGROUP GLOBAL MARKETS (EFP), NEW YORK	487	34,670	7	0.014
CITIGROUP GLOBAL MARKETS EURO, FRANKFURT	932,390	27,076,904	5,884	0.006
CITIGROUP GLOBAL MARKETS LTD, LONDON	9,389,872	34,440,999	9,801	0.001
CITIGROUP GLOBAL MARKETS, INC., NEW YORK	2,319,266	221,503,614	24,808	0.011
CLSA AUSTRALIA PTY LTD, SYDNEY	5,589,069	50,561,589	10,321	0.002
CONVERGEX EXECUTION SOLUTION, NEW YORK	33,730	6,864,947	253	0.008
COWEN AND CO LLC, NEW YORK	2,366,116	209,707,769	18,142	0.008
COWEN AND COMPANY LLC, NEW YORK	15,800	695,051	117	0.007
CREDIT LYONNAIS SEC, SEOUL	140,148	11,624,057	4,183	0.030
CREDIT LYONNAIS SECS (ASIA) LTD, BANGKOK	150,900	435,385	1,042	0.007
CREDIT LYONNAIS SECS (ASIA), HONG KONG	15,133,227	31,276,148	10,933	0.001
CREDIT LYONNAIS SECS ASIA LTD, TAIPEI	5,386,000	10,961,319	4,155	0.001
CREDIT LYONNAIS SECS, SINGAPORE	16,435,933	142,808,274	36,041	0.002
CREDIT SUISSE (EUROPE), LONDON	4,571,457	97,444,345	25,507	0.006
CREDIT SUISSE (EUROPE), SEOUL	12,720	1,739,534	586	0.046
CREDIT SUISSE (HK) LIMITED, HONG KONG	413,600	1,344,690	470	0.001
CREDIT SUISSE (HK) SECS LTD, HONG KONG	1,582,498	6,245,516	1,686	0.001
CREDIT SUISSE SECURITIES (CANAD, TORONTO	764	60,338	12	0.016
CREDIT SUISSE SECURITIES LTD, SANDTON	27,960	14,514	11	0.000
CREDIT SUISSE SECURITIES, MADRID	131,219	705,014	141	0.001
CREDIT SUISSE, LONDON (CSFPGB2L)	26,275	1,261,363	379	0.014
CREDIT SUISSE, MUMBAI	4,799	162,050	146	0.030
CREDIT SUISSE, NEW YORK (CSUS)	7,833,404	264,253,342	76,824	0.010
CREDIT SUISSE, SAO PAULO	871,400	4,376,055	7,250	0.008
CREDIT SUISSE, TAIPEI	160,000	430,410	140	0.001
D CARNEGIE AB, STOCKHOLM	125,375	2,689,081	2,644	0.021
Amounts carried forward	200,494,428	2,271,718,188	594,510	

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	200,494,428	$ 2,271,718,188	$ 594,510	
DAIWA SECS (HK) LTD, HONG KONG	31,900	404,560	445	$ 0.014
DAIWA SECS AMER INC, NEW YORK	597,960	20,908,127	30,190	0.050
DAVIDSON(D A) & CO INC, NEW YORK	52,038	3,630,682	1,041	0.020
DAVY STOCKBROKERS, DUBLIN	415,510	1,057,691	953	0.002
DEUTSCHE BK INTL EQ, LONDN (DEUTGB22EEQ)	209,358	2,281,575	460	0.002
DEUTSCHE BK SECS INC, NY (NWSCUS33)	37,721	577,391	754	0.020
DEUTSCHE SEC ASIA LTD, HONG KONG	3,900	15,133	6	0.002
DSP MERRILL LYNCH LTD, MUMBAI	102,158	3,712,602	4,835	0.047
EDELWEISS SECURITIES PRIVATE LTD, MUMBAI	149,196	8,715,507	17,476	0.117
EUROCLEAR BANK SA NV, BRUSSELS	308	28,348	6	0.019
EXANE, NEW YORK	86,355	10,795,846	2,536	0.029
EXANE, PARIS (EXANFRPP)	4,271,494	67,960,842	18,765	0.004
FIDELITY CAPITAL MARKETS, NEW YORK	307,020	26,356,577	2,328	0.008
FIDELITY CLEARING CANADA ULC, TOR (FIDC)	14,047	1,001,299	216	0.015
FX- BAYERISCHE LANDESBANK-CLS, MUNICH	7,028,000	978,549	195	0.000
GOLDMAN SACHS & CO (GBL CUST ONLY), NY	25,632	86,375	24	0.001
GOLDMAN SACHS & CO, NY	19,739,665	1,828,534,045	143,008	0.007
GOLDMAN SACHS (ASIA) LLC, TAIPEI	117,000	2,881,609	711	0.006
GOLDMAN SACHS (INDIA), MUMBAI	56,218	1,812,488	1,630	0.029
GOLDMAN SACHS AUSTRALIA PTY LTD,MELBOURN	211,200	2,059,870	1,671	0.008
GOLDMAN SACHS BANK EUROPE SE, FRANKFURT	34,158	3,399,010	109	0.003
GOLDMAN SACHS INTL, LONDON	607,043	46,450,936	10,286	0.017
GOLDMAN SACHS INTL, LONDON (GSILGB2X)	10,674,681	95,835,463	40,080	0.004
GOODBODY STOCKBROKERS, DUBLIN	264,746	748,693	788	0.003
GUGGENHEIM CAPITAL MARKETS LLC, NEW YORK	89,900	4,592,920	1,864	0.021
GUZMAN & COMPANY, CORAL GABLES	1,538	19,969	12	0.008
HAITONG INTL SEC CO LTD, HONG KONG	108,000	547,858	547	0.005
HSBC BANK PLC (ALDGATE BRH)(05E), LONDON	71,553	69,538	2,003	0.028
HSBC BANK PLC (MIDLAND BK)(JAC), LONDON	2,883,010	38,267,382	8,675	0.003
HSBC JAMES CAPEL, SEOUL	637	96,633	144	0.226
HSBC SECS INC, NEW YORK	167,627	2,611,726	809	0.005
HSBC SECURITIES (USA) INC, NEW YORK	1,429,131	113,181,144	13,002	0.009
ICBC FINCL SVCS, NEW YORK	14,970	530,455	150	0.010
ICICI BROKERAGE SERVICES LTD, MUMBAI	48,378	984,723	884	0.018
INDIA INFOLINE LTD, MUMBAI	2,148	101,709	153	0.071
INSTINET AUSTRALIA CLEARING SERV, SYDNEY	894,786	6,097,431	1,219	0.001
INSTINET CLEARING SER INC, NEW YORK	614,808	46,323,086	4,057	0.007
INSTINET CORP, NEW YORK	1,660,513	124,273,093	13,416	0.008
INSTINET EUROPE LIMITED, LONDON	2,531,178	51,590,053	15,283	0.006
INSTINET PACIFIC LTD, HONG KONG	8,750,972	14,192,370	4,527	0.001
INSTINET, SINGAPORE	22,500	204,043	41	0.002
INVESTMENT TECH GROUP INC, NEW YORK	220,143	21,768,462	2,575	0.012
Amounts carried forward	265,043,528	4,827,404,001	942,384	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	265,043,528	$ 4,827,404,001	$ 942,384	
INVESTMENT TECHNOLOGY GR INC	3,653	75,535	15	$ 0.004
INVESTMENT TECHNOLOGY GROUP LTD,DUBLIN	36,294,317	191,261,222	51,081	0.001
ISI GROUP INC, NEW YORK	349,886	20,338,655	8,048	0.023
ITG AUSTRALIA LTD, MELBOURNE	546,685	6,891,079	2,639	0.005
ITG CANADA CORP, TORONTO	119,765	4,313,761	918	0.008
ITG HONG KONG LIMITED, HONG KONG	21,480	46,714	37	0.002
ITG INC, NEW YORK	114,561	8,782,634	1,483	0.013
J P MORGAN SEC LTD/STOCK LENDING, LONDON	256,045	10,329,439	2,480	0.010
J P MORGAN SEC, SYDNEY	244,532	1,886,562	604	0.002
J P MORGAN SECS LTD, LONDON	22,799,438	148,693,190	73,489	0.003
J P MORGAN SECURITIES INC, BROOKLYN	700	34,986	14	0.020
J.P MORGAN SECURITIES INC, NEW YORK	2,923,096	255,133,478	53,230	0.018
J.P. MORGAN SECURITIES LLC, NEW YORK	1,369,666	90,261,326	10,965	0.008
J.P. MORGAN SECURITIES, HONG KONG	11,416,862	30,794,628	16,430	0.001
J.P.MORGAN AG, FRANKFURT	5,654,968	60,561,355	13,794	0.002
JEFFERIES & CO INC, NEW YORK	4,653,733	284,002,050	53,382	0.011
JEFFERIES & CO LTD, LONDON	2,994,726	40,578,791	12,772	0.004
JEFFERIES HONG KONG LIMITED, HONG KONG	1,531,976	5,606,566	3,250	0.002
JEFFERIES INDIA PRIVATE LTD, MUMBAI	82,139	1,646,719	2,451	0.030
JEFFERIES INTERNATIONAL LTD, LONDON	150	26,845	5	0.033
JM MORGAN STANLEY SECURITIES, MUMBAI	1,422,128	17,717,455	12,286	0.009
JMP SECURITIES, SAN FRANCISCO	25,954	2,333,496	519	0.020
JONESTRADING INST SVCS LLC, NEW YORK	77,573	5,794,469	2,327	0.030
JP MORGAN BROKING (HK) LTD, HONG KONG	359,696	3,163,330	1,582	0.004
JP MORGAN INDIA PRIVATE LTD, MUMBAI	5,452,457	24,179,411	13,058	0.002
JP MORGAN SECS (FAR EAST) LTD, HONG KONG	26,600	312,589	156	0.006
JP MORGAN SECS (FAR EAST) LTD, SEOUL	111,540	7,160,501	3,657	0.033
JP MORGAN SECS (TAIWAN) LTD, TAIWAN	1,401,040	10,159,454	7,738	0.006
JP MORGAN SECS, SINGAPORE	805,600	1,664,015	831	0.001
JPMORGAN SECURITIES INC, NEW YORK	808,405	4,104,622	3,691	0.005
KEB SALOMON SMITH BARNEY SECS, SEOUL	23,413	1,366,585	479	0.020
KEEFE BRUYETTE + WOODS INC, NEW YORK	199,324	16,744,407	5,980	0.030
KEPLER EQUITIES, PARIS	41,774	4,362,028	5,325	0.127
KEYBANC CAPITAL MARKETS INC, NEW YORK	130,917	4,995,115	3,665	0.028
KNIGHT EQUITY MARKETS LP, NEW YORK	61,300	5,778,827	387	0.006
KNIGHT SECS, NEW JERSEY	1,547	175,380	8	0.005
KOTAK SECURITIES,MUMBAI	452,084	20,147,093	40,159	0.089
LARRAIN VIAL, SANTIAGO	318,172	50,136	53	0.000
LIQUIDNET ASIA LTD, HONG KONG	557,000	2,098,412	1,170	0.002
LIQUIDNET CANADA INC, TORONTO	53,085	3,629,858	829	0.016
LIQUIDNET EUROPE LIMITED, LONDON	23,080,502	28,113,031	13,802	0.001
LIQUIDNET INC, NEW YORK	1,418,210	118,778,695	15,427	0.011
Amounts carried forward	393,250,227	6,271,498,445	1,382,600	

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	393,250,227	$ 6,271,498,445	$ 1,382,600	
LOOP CAPITAL MARKETS, JERSEY CITY	974,564	85,356,245	6,823	$ 0.007
LUMINEX TRADING AND ANALYTICS, BOSTON	476,755	49,564,536	2,384	0.005
MACQUARIE BANK LIMITED, SYDNEY	77,489	1,074,588	256	0.003
MACQUARIE BANK LTD, HONG KONG	834,202	26,398,627	31,679	0.038
MACQUARIE SECS (INDIA) PVT LTD, MUMBAI	189,412	3,831,597	3,508	0.019
MACQUARIE SECS USA INC, NEW YORK	24,351	1,642,504	844	0.035
MACQUARIE SECURITIES LTD, SEOUL	31,051	2,169,076	652	0.021
MACQUARIES SECURITIES AUSTRALIA, SYDNEY	852,088	8,935,923	10,675	0.013
MAXIM GROUP, JERSEY CITY	103,400	6,415,939	4,136	0.040
MERRILL LYNCH & CO INC ATLAS GLOBAL, NY	147,356	2,528,022	3,713	0.025
MERRILL LYNCH GILTS LTD, LONDON	678,385	38,963,367	8,546	0.013
MERRILL LYNCH INTERNATIONAL, DUBAI	1,905	70,213	3,951	2.074
MERRILL LYNCH INTL LONDON EQUITIES	11,557,110	159,711,822	73,741	0.006
MERRILL LYNCH PIERCE FENNER SMITH INC NY	13,146,995	958,472,016	161,696	0.012
MERRILL LYNCH PIERCE FENNER, WILMINGTON	125,800	569,645	694	0.006
MERRILL LYNCH PROFESSIONAL CLRG, PURCHAS	44,238	4,627,129	1,226	0.028
MIRAE ASSET SECURITIES, SEOUL	18,552	2,781,794	765	0.041
MITSUBISHI UFJ SECURITIES, NEW YORK	106,339	3,947,909	3,512	0.033
MIZUHO SECURITIES USA INC, NEW YORK	71,890	2,358,191	1,438	0.020
MIZUHO SECURITIES USA INC. NEW YORK	17,183	412,304	407	0.024
MIZUHO SECURITIES USA, INC., NEW YORK	176,413	16,070,283	5,292	0.030
MKM PARTNERS LLC, GREENWICH	152,427	5,450,267	3,802	0.025
MORGAN INTL/MSBAG, NEW YORK	126,052	3,424,341	685	0.005
MORGAN STANLEY & CO INC, NY	10,444,259	365,838,261	97,018	0.009
MORGAN STANLEY & CO INTL LTD, SEOUL	332,101	18,177,519	8,774	0.026
MORGAN STANLEY & CO INTL LTD, TAPEI	7,177,000	13,903,781	7,041	0.001
MORGAN STANLEY & CO, LONDON (MSLNGB2X)	7,214,948	125,401,923	35,523	0.005
MORGAN STANLEY AND CO INC, NEW YORK	57,723	125,980	4,643	0.080
MORGAN STANLEY AND CO. INTL PLC, LONDON	39,864	330,561	6,143	0.154
MORGAN STANLEY EUROPE SE, FRANKFURT	39,381,001	78,646,651	21,191	0.001
NATIONAL FINL SVCS CORP, NEW YORK	266,560	17,007,049	1,397	0.005
NBCN INC, TORONTO (NBCS)	30,518	1,058,982	478	0.016
NEEDHAM AND CO LLC, NEW YORK	14,826	1,109,198	297	0.020
NESBITT BURNS, TORONTO (NTDT)	462,755	24,177,356	3,715	0.008
NOMURA FINANCIAL & INVESTMENT, SEOUL	5,282	332,655	100	0.019
OKASAN INTERNATIONAL (ASIA), HONG KONG	26,500	574,293	521	0.020
OPPENHEIMER & CO INC, NEW YORK	190,468	7,686,687	7,184	0.038
PAREL, PARIS	6	486	-	-
PEEL HUNT LLP, LONDON	6,191	853,841	594	0.096
PENSERRA SECURITIES LLC,JERSEY CITY	1,200	141,087	24	0.020
PENSERRA SECURITIES, NEW YORK	12,226	1,238,335	122	0.010
PERSHING LLC, JERSEY CITY	3,523,304	224,345,448	51,204	0.015
Amounts carried forward	492,370,916	8,537,224,876	1,958,994	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	492,370,916	$ 8,537,224,876	$ 1,958,994	
PERSHING SECURITIES LTD, LONDON	5,181,576	76,958,560	54,349	$ 0.010
PIPER JAFFRAY & CO., JERSEY CITY	12,746	1,080,095	382	0.030
RAYMOND JAMES & ASSOC INC, ST PETERSBURG	1,070,005	72,875,111	18,745	0.018
RBC CAPITAL MARKETS LLC, NEW YORK	1,212,558	93,574,159	14,448	0.012
RBC DOMINION SECS INC, TORONTO (DOMA)	599,000	24,863,167	9,309	0.016
REDBURN PARTNERS LLP, LONDON	231,777	5,033,643	3,325	0.014
ROTH CAPITAL PARTNERS LLC, NEW YORK	25,290	1,816,921	506	0.020
S G WARBURG, SEOUL	14,069	1,252,075	519	0.037
SANFORD C BERNSTEIN & CO INC, LONDON	39,539,804	57,278,741	13,475	0.000
SCOTIA CAPITAL (USA) INC, NEW YORK	713,591	50,109,166	5,115	0.007
SCOTIA CAPITAL INC, NEW YORK	10,251	62,605	46	0.004
SCOTIA CAPITAL MKTS, TORONTO	251,721	11,920,354	1,410	0.006
SG SECURITIES, HONG KONG	1,874	36,563	7	0.004
SIDOTI AND COMPANY LLC, NEW YORK	97,655	5,885,100	1,953	0.020
SKANDINAVISKA ENSKILDA BANKEN, LONDON	26,102	618,251	247	0.009
SKANDINAVISKA ENSKILDA BANKEN, STOCKHOLM	56,809	1,468,362	1,339	0.024
SMBC SECURITIES, INC NEW YORK	97,050	799,233	479	0.005
SOCIETE GENERALE, PARIS	1,207,043	21,823,566	4,879	0.004
STIFEL NICOLAUS	366,466	14,690,896	10,007	0.027
STUART FRANKEL & CO. INC, JERSEY CITY	25,891	4,377,132	259	0.010
SUNTRUST CAPITAL MARKETS INC, NEW YORK	52,429	1,820,559	1,622	0.031
TORONTO DOMINION SEC, TORONTO	289,757	14,922,777	2,100	0.007
UBS AG LONDON BRANCH, LONDON	90,607	7,324,690	1,907	0.021
UBS EQUITIES, LONDON	11,318,572	65,814,168	37,615	0.003
UBS EUROPE SE, FRANKFURT AM MAIN	26,433,063	121,699,564	17,544	0.001
UBS SECURITIES CANADA, TORONTO (BWIT)	26,284	1,305,031	174	0.007
UBS SECURITIES LLC, STAMFORD	6,923,758	405,346,556	96,585	0.014
UBS WARBURG ASIA LTD, HONG KONG	3,595,520	34,859,531	28,922	0.008
UBS WARBURG AUSTRALIA EQUITIES, SYDNEY	153,258	934,003	234	0.002
UBS WARBURG LLC, STAMFORD	11,828	97,032	63	0.005
UBS WARBURG SEC,TAIWAN	768,000	3,855,687	1,289	0.002
UNION BANK OF SWITZERLAND, ZURICH	36,567	1,344,731	379	0.010
UNION BANK SWITZERLAND SECS, LONDON	202,500	113,005	50	0.000
VIRTU AMERICAS LLC, JERSEY CITY	580,736	47,561,844	6,439	0.011
VIRTU AMERICAS LLC, NEW YORK	542,185	53,936,331	4,125	0.008
WEDBUSH MORGAN SECS INC, LOS ANGELES	1,261	70,952	25	0.020
WELLS FARGO SECURITIES LLC, CHARLOTTE	1,341,914	104,803,827	9,425	0.007
WELLS FARGO SECURITIES, LLC, NEW YORK	354,773	15,410,613	10,093	0.028
WILLIAM BLAIR & CO, CHICAGO	119,102	8,174,939	2,382	0.020
WILLIAMS CAPITAL GROUP LP, JERSEY CITY	129,915	9,273,505	776	0.006
WOLFE TRAHAN SECURITIES, NEW YORK	11,278	486,214	226	0.020
Total trades	596,095,501	$ 9,882,904,135	$ 2,321,768	$ 0.004

Employees' Retirement System

of the State of Hawaii

ACTUARIAL SECTION

GASB STATEMENT NO. 67 REPORT

GRS

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February 25, 2022

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.
- 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 6, 2022, 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, 2021 (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, 2021, 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

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

GABRIEL, ROEDER, SMITH & COMPANY

GASB STATEMENT NO. 67 REPORT (continued)

EXECUTIVE SUMMARY ***
as of June 30, 2021

	2021	2020
Actuarial Valuation Date	June 30, 2021	June 30, 2020
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	June 30, 2021	June 30, 2020
Membership		
Number of		
- Retirees and beneficiaries	52,618	51,153
- Inactive, nonretired members **	31,237	30,189
- Active members	65,561	66,750
- Total	149,416	148,092
Reported Payroll for Fiscal Year	$4,667,346,006	$4,481,443,808
Net Pension Liability		
Total Pension Liability	$34,139,165,472	$32,691,755,844
Plan Fiduciary Net Position	21,935,791,711	17,385,480,476
Net Pension Liability	$12,203,373,761	$15,306,275,368
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	64.25%	53.18%
Net Pension Liability as a Percentage of Covered Payroll	261.46%	341.55%
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*	1.92%	2.45%
Last year ending June 30 in the 2021 to 2120 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, 2021 and June 30, 2020. 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, 2021 Actuarial Valuation Report information that follows this section beginning on page 127.

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.

GABRIEL, ROEDER, SMITH & COMPANY

GASB STATEMENT NO. 67 REPORT (continued)

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, 2021 and a measurement date of June 30, 2021.

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 1.92% (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%.

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January 6, 2022

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, 2021

We certify that the information contained in the 2021 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, 2021. 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, 2021, 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 6, 2022
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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. 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.

Progress toward realization of financing objectives

We have determined that the funding period for paying off the UAAL of the ERS (in aggregate) is 24 years. This is a decrease from 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 less than expected. This result is due to gains on the investments of the ERS more than offsetting the liability losses. Because this period is less than 30 years, the minimum 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. 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. This was the final phase of the increase in the employer contribution rates. The funding period assumes that these contribution rates will remain in effect throughout the 24 year funding 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 58.3% which is a large increase over the 55.3% funded ratio in the previous valuation. The funded ratio improved due to the large actuarial gain on investments.

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 would instead assume that all amortization payments in the future will be the same percentage of pay as in the current year.

Gabriel Roeder Smith & Company

Letter from the Actuary (continued)

Board of Trustees
January 6, 2022
Page 3

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 the All Other employees) being larger than expected by the assumptions. In addition, the ERS currently experiences negative amortization (interest on the UAAL is greater than the contributions towards the elimination of the UAAL). However, the ERS experienced a large gain on the actuarial value of assets which more than offset both the liability loss and the negative amortization, and actually resulted in a decrease in the UAAL for the first time since 2007. As a result, the UAAL decreased (in dollars) based on this actuarial valuation as of June 30, 2021 and ERS's underfunded status as measured by the UAAL is now $14.229 billion.

Because of the very favorable investment performance in FY2021, the ERS is currently deferring $2,026 million in investment gains, compared with $699 million in deferred investment losses last year. If there are no significant investment losses or other actuarial losses, the funded status of the ERS would be expected to increase both in the near future and 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 2024, and then begin to decrease,
5. The unfunded actuarial accrued liability will be fully amortized after 24 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 ninth valuation with members covered under the new benefit tier.

Letter from the Actuary (continued)

Board of Trustees
January 6, 2022
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.

Letter from the Actuary (continued)

Board of Trustees
January 6, 2022
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Data

Member data for retired, active, and inactive participants was supplied as of March 31, 2021, 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, 2021 actuarial valuation of the Employees' Retirement System of the State of Hawaii (ERS).

Item	**2021**	**2020**
Membership		
• Number of		
- Active members	65,561	66,750
- Retirees and beneficiaries	52,618	51,153
- Inactive, vested	9,011	9,204
- Total	127,190	127,107
• Covered payroll for active members	$4,622 million	$4,523 million
• Actual benefit payments and refunds	$1,675 million	$1,568 million
Assets		
• Actuarial (smoothed) value	$19,910 million	$18,084 million
• Market value	$21,936 million	$17,385 million
• Return on actuarial value	10.8%	5.6%
• Return on market value	26.9%	2.1%
• Employer contributions during fiscal year	$1,282 million	$1,099 million
• External cash flow %	(0.5%)	(1.1%)
Actuarial Information		
• Total normal cost % (employee + employer)	14.06%	14.12%
• Unfunded actuarial accrued liability (UAAL)	$14,229 million	$14,607 million
• Funded ratio (based on smoothed assets)	58.3%	55.3%
• Funded ratio (based on market assets)	64.3%	53.2%
• Funding period (years) *	24	26
• Employer contribution rate % of projected payroll for FY beginning July 1		
Police and Firefighters	41.00%	41.00%
All Other Employees	24.00%	24.00%

* 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.

Actuarial Certification Statement

		Police and Firefighters June 30, 2021	All Other Employees June 30, 2021	All Employees June 30, 2021
1. Gross normal cost as a percentage of pay		26.20%	12.43%	14.06%
2. Present value of future benefits				
a. Active employees	$	4,189,479,029	15,803,462,425	19,992,941,454
b. Inactive members		63,137,431	975,584,376	1,038,721,807
c. Pensioners and beneficiaries		3,762,469,109	14,966,453,716	18,728,922,825
d. Total	$	8,015,085,569	31,745,500,517	39,760,586,086
3. Present value of future employee and employer contributions				
a. Present value of future normal costs	$	1,322,645,309	4,298,775,305	5,621,420,614
b. Present value of future employee contributions		690,224,720	2,188,010,305	2,878,235,025
c. Present value of future employer normal cost (Item 3a - Item 3b)	$	632,420,589	2,110,765,000	2,743,185,589
4. Actuarial accrued liability (Item 2d - Item 3a)	$	6,692,440,260	27,446,725,212	34,139,165,472
5. Actuarial value of assets				
a. Annuity Savings Fund	$	1,323,377,944	2,014,476,200	3,337,854,144
b. Pension Accumulation Fund		2,911,665,004	13,660,272,406	16,571,937,410
c. Total	$	4,235,042,948	15,674,748,606	19,909,791,554
6. Unfunded actuarial accrued liability	$	2,457,397,312	11,771,976,606	14,229,373,918
7. Adequacy of contribution rates				
a. Statutory Contribution Rate for Fiscal Year 2020		41.00%	24.00%	25.94%
B. Funding period in years as of June 30, 2021 *		25	23	24

*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, 2021 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.

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

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 17, 2021, 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)

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Ratio of the market value of assets to payroll	4.59	3.75	3.81	3.79	3.68	3.30	3.48	3.56	3.16	2.90
Ratio of actuarial accrued liability to payroll	7.14	7.06	6.95	6.82	6.72	6.44	5.57	5.57	5.44	5.32
Ratio of actives to retirees and beneficiaries	1.25	1.30	1.33	1.36	1.40	1.48	1.52	1.56	1.58	1.61
Ratio of net cash flow to market value of assets	-0.5%	-1.1%	-1.8%	-2.0%	-2.0%	-1.9%	-1.8%	-2.0%	-2.5%	-2.7%
Duration of the actuarial accrued liability*	14.95	15.03	15.11	NA	NA	NA	NA	NA	NA	NA

*Duration measure not available prior to 2019

Gabriel Roeder Smith & Company

Summary of 2021 Actuarial Valuation

Exhibit 1
Development of Employer Cost

	Police and Firefighters June 30, 2021	All Other Employees June 30, 2021	All Employees June 30, 2021
1. Projected FY 2022 payroll for contribution purposes	$ 546,561,229	$ 4,237,217,252	$ 4,783,778,481
2. Gross normal cost (Exhibit 3)	26.20%	12.43%	14.06%
3. Employer normal cost rate (Exhibit 3)	13.53%	6.77%	7.57%
4. Present value future benefits (Exhibit 2)	$ 8,015,085,569	$ 31,745,500,517	$ 39,760,586,086
5. Present value future employer normal cost	$ 632,420,589	$ 2,110,765,000	$ 2,743,185,589
6. Present value future employee contributions	$ 690,224,720	$ 2,188,010,305	$ 2,878,235,025
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 6,692,440,260	$ 27,446,725,212	$ 34,139,165,472
8. Actuarial value of assets	$ 4,235,042,948	$ 15,674,748,606	$ 19,909,791,554
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,457,397,312	$ 11,771,976,606	$ 14,229,373,918
10. Funding period *	25	23	24

	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%	14.12%
3. Employer normal cost rate (Exhibit 3)	13.78%	6.90%	7.73%
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

*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.

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Summary of 2021 Actuarial Valuation (continued)

Exhibit 2
Actuarial Present Value of Future Benefits

	Police and Firefighters June 30, 2021	All Other Employees June 30, 2021	All Employees June 30, 2021
1. Active members			
a. Service retirement benefits	$ 4,020,768,692	$ 14,442,539,151	$ 18,463,307,843
b. Termination benefits	114,583,361	894,962,859	1,009,546,220
c. Survivor benefits	19,443,388	132,779,833	152,223,221
d. Disability retirement benefits	34,683,588	333,180,582	367,864,170
e. Total	$ 4,189,479,029	$ 15,803,462,425	$ 19,992,941,454
2. Retired members			
a. Service retirement	$ 3,524,781,804	$ 13,813,731,206	$ 17,338,513,010
b. Disability retirement	38,704,179	295,335,436	334,039,615
c. Beneficiaries	198,983,126	857,387,074	1,056,370,200
d. Total	$ 3,762,469,109	$ 14,966,453,716	$ 18,728,922,825
3. Inactive members			
a. Vested terminations	$ 56,109,266	$ 828,795,763	$ 884,905,029
b. Nonvested terminations	7,028,165	146,788,613	153,816,778
c. Total	$ 63,137,431	$ 975,584,376	$ 1,038,721,807
4. Total actuarial present value of future benefits	$ 8,015,085,569	$ 31,745,500,517	$ 39,760,586,086

	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

Gabriel Roeder Smith & Company

Summary of 2021 Actuarial Valuation (continued)

Exhibit 3
Analysis of Normal Cost

	Police and Firefighters June 30, 2021	All Other Employees June 30, 2021	All Employees June 30, 2021
1. Normal cost as a percent of pay			
a. Service retirement benefits	23.19%	9.17%	10.82%
b. Deferred termination benefits	1.17%	0.82%	0.86%
c. Refunds	0.88%	1.49%	1.42%
d. Disability retirement benefits	0.42%	0.47%	0.47%
e. Survivor benefits	0.19%	0.13%	0.14%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	26.20%	12.43%	14.06%
2. Employee contribution rate	12.67%	5.66%	6.49%
3. Effective employer normal cost rate (Item 1g – Item 2)	13.53%	6.77%	7.57%

	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%

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Summary of 2021 Actuarial Valuation (continued)

Exhibit 4
Development of Actuarial Value of Assets

1. Actuarial value of assets, beginning of year	$	18,084,382,899
2. Net new investments		
a. Contributions	$	1,582,185,142
b. Benefits paid and Refunds	$	(1,675,049,807)
c. Administrative expenses	$	(19,049,861)
d. Subtotal	$	(111,914,526)
3. Market value of assets at end of year	$	21,935,791,711
4. Expected return on actuarial value of assets	$	1,261,989,795
5. Expected actuarial value of assets, end of year	$	19,234,458,168
6. Excess/(shortfall) return (Item 3-Item 5)	$	2,701,333,543

7. Development of amounts to be recognized as of June 30, 2021:

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)
2018	-	-	-	1	-	-
2019	(63,444,747)	63,444,747	-	2	-	-
2020	(635,457,676)	635,457,676	-	3	-	-
2021	3,400,235,966	(698,902,423)	2,701,333,543	4	675,333,386	2,026,000,157
Total	$ 2,701,333,543	$ -	$ 2,701,333,543		$ 675,333,386	$ 2,026,000,157

8. Actuarial value of assets as of June 30, 2021 (Item 3 - Item 7)	$	19,909,791,554
9. Ratio of actuarial value to market value		90.8%
10. Asset gain/(loss) for year (Item 8 - Item 5)	$	675,333,386

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Summary of 2021 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	$ 2,647,291,656	$ 11,960,081,289	$ 14,607,372,945
2. Normal cost for the year (employer and employee)	$ 144,894,907	$ 516,295,196	$ 661,190,103
3. Less: contributions and assessments for the year	$ (336,115,350)	$ (1,246,069,792)	$ (1,582,185,142)
4. Interest at 7.00%			
a. On UAAL	$ 185,310,416	$ 837,205,690	$ 1,022,516,106
b. On normal cost	5,071,322	18,070,332	23,141,654
c. On contributions	(11,764,037)	(43,612,443)	(55,376,480)
d. Total	$ 178,617,701	$ 811,663,579	$ 990,281,280
5. Expected UAAL as of June 30, 2021 (Sum of Items 1– 4)	$ 2,634,688,914	$ 12,041,970,272	$ 14,676,659,186
6. Actual UAAL as of June 30, 2021	$ 2,457,397,312	$ 11,771,976,606	$ 14,229,373,918
7. Total gain (loss) for the year (Item 5 – Item 6)	$ 177,291,602	$ 269,993,666	$ 447,285,268
B. Source of gains and losses			
8. Asset gain (loss) for the year (Exhibit 6)	$ 143,651,222	$ 531,682,164	$ 675,333,386
9. Gain (loss) due to change in payment timing	-	-	-
10. Other liability gain (loss)	$ 33,640,380	$ (261,688,498)	$ (228,048,118)
11. Change in benefit provisions	-	-	-
12. Total gain (loss) for the year	$ 177,291,602	$ 269,993,666	$ 447,285,268

Summary of 2021 Actuarial Valuation (continued)

Exhibit 6
Investment Experience Gain or Loss

Item	June 30, 2021	June 30, 2020
1. Actuarial assets, beginning of year	$ 18,084,382,899	$ 17,322,194,107
2. Total contributions during year	$ 1,582,185,142	$ 1,385,987,044
3. Benefits and refunds paid	$ (1,675,049,807)	$ (1,568,033,354)
4. Administrative expenses paid	$ (19,049,861)	$ (17,782,865)
5. Assumed net investment income at 7.00%		
a. Beginning of year assets	$ 1,265,906,803	$ 1,212,553,586
b. Contributions	$ 55,376,480	$ 48,509,547
c. Benefits and refunds paid	$ (58,626,743)	$ (54,881,167)
d. Benefits and refunds paid	$ (666,745)	$ (622,400)
e. Total	$ 1,261,989,795	$ 1,205,559,566
6. Expected actuarial assets, end of year (Sum of Items 1 through 5)	$ 19,234,458,168	$ 18,327,924,498
7. Actual actuarial assets, end of year	$ 19,909,791,554	$ 18,084,382,899
8. Asset gain (loss) for year (Item 7– Item 6)	$ 675,333,386	$ (243,541,599)
9. Asset gain (loss) as a percent of actuarial value of assets, end of year (Item 8 / Item 7)	3.39%	(1.35%)

Gabriel Roeder Smith & Company

Summary of 2021 Actuarial Valuation (continued)

Exhibit 7
Projection Results Based on June 30, 2021 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)
2021	25.94%	4,784	1,241	34,139	19,910	$ 14,229	58.3%
2022	25.94%	4,898	1,271	35,403	21,087	$ 14,316	59.6%
2023	25.94%	5,028	1,304	36,667	22,291	$ 14,376	60.8%
2024	25.93%	5,162	1,339	37,933	23,526	$ 14,407	62.0%
2025	25.92%	5,303	1,375	39,196	24,794	$ 14,402	63.3%
2026	25.91%	5,450	1,412	40,457	26,097	$ 14,360	64.5%
2027	25.90%	5,604	1,451	41,714	27,439	$ 14,275	65.8%
2028	25.87%	5,765	1,492	42,967	28,822	$ 14,145	67.1%
2029	25.87%	5,933	1,535	44,217	30,251	$ 13,966	68.4%
2030	25.87%	6,109	1,581	45,463	31,735	$ 13,728	69.8%
2031	25.87%	6,293	1,628	46,706	33,278	$ 13,428	71.3%
2032	25.87%	6,485	1,678	47,947	34,887	$ 13,060	72.8%
2033	25.87%	6,684	1,729	49,186	36,570	$ 12,616	74.4%
2034	25.87%	6,893	1,783	50,423	38,335	$ 12,088	76.0%
2035	25.87%	7,111	1,840	51,663	40,192	$ 11,471	77.8%
2036	25.87%	7,337	1,898	52,906	42,150	$ 10,756	79.7%
2037	25.87%	7,573	1,959	54,155	44,222	$ 9,933	81.7%
2038	25.87%	7,820	2,023	55,414	46,421	$ 8,993	83.8%
2039	25.87%	8,079	2,090	56,687	48,763	$ 7,924	86.0%
2040	25.87%	8,349	2,160	57,981	51,263	$ 6,718	88.4%
2041	25.87%	8,631	2,233	59,301	53,939	$ 5,362	91.0%
2042	25.87%	8,924	2,309	60,653	56,810	$ 3,843	93.7%
2043	25.87%	9,229	2,388	62,043	59,896	$ 2,147	96.5%
2044	25.87%	9,547	2,470	63,478	63,218	$ 260	99.6%
2045	25.87%	9,876	2,555	64,963	66,798	$ (1,835)	102.8%
2046	25.87%	10,219	2,644	66,507	70,660	$ (4,153)	106.2%
2047	25.87%	10,575	2,736	68,115	74,829	$ (6,714)	109.9%
2048	25.87%	10,944	2,832	69,794	79,330	$ (9,536)	113.7%
2049	25.87%	11,327	2,931	71,552	84,193	$ (12,641)	117.7%
2050	25.87%	11,724	3,033	73,394	89,444	$ (16,050)	121.9%

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

Gabriel Roeder Smith & Company

Summary of 2021 Actuarial Valuation (continued)

Exhibit 8
Highlights of Last Five Annual Actuarial Valuations
2017 through 2021

Item	Valuation Date: June 30				
	2017	2018	2019	2020	2021
Number of active members	65,911	66,271	66,383	66,750	65,561
Number of inactive members	9,241	9,249	9,321	9,204	9,011
Number of pensioners	42,857	44,305	45,440	46,486	47,724
Number of beneficiaries	4,070	4,264	4,445	4,667	4,894
Average monthly contributory member pension amount	$ 2,854	$ 2,994	$ 3,136	$ 3,293	$ 3,458
Average monthly noncontributory member pension amount	$ 1,669	$ 1,702	$ 1,736	$ 1,773	$ 1,813
Average monthly hybrid member pension amount	$ 2,178	$ 2,238	$ 2,285	$ 2,345	$ 2,416
Average monthly beneficiary amount	$ 1,472	$ 1,515	$ 1,558	$ 1,610	$ 1,668
Total actuarial value of assets ($millions)	$ 15,721	$ 16,513	$ 17,322	$ 18,084	$ 19,910
Unfunded actuarial accrued liability ($millions)	$ 12,928.0	$ 13,404.7	$ 14,074.3	$ 14,607.4	$ 14,229.4
Funding Period (in years) (1)	26	25	26	26	24

Item (Dollar amounts in millions (2))	Fiscal Year				
	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Employer contributions (2)	$ 781.2	$ 847.6	$ 922.6	$ 1,098.6	$ 1,281.6

(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, 2016, the employer contribution rate was 25.0% for Police and Fire, 17.0% for All Others.
Beginning July 1, 2017, the employer contribution rate was 28.0% for Police and Fire, 18.0% for All Others.
Beginning July 1, 2018, the employer contribution rate was 31.0% for Police and Fire, 19.0% for All Others.
Beginning July 1, 2019 the employer contribution rate was 36.0% for Police and Fire, 22.0% for All Others.
Beginning July 1, 2020, the employer contribution rate was 41.0% for Police and Fire, 24.0% for All Others.

Gabriel Roeder Smith & Company

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

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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.

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%

Summary of Actuarial Methods and Assumptions (continued)

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
2012 to 2021

- Retirement System Membership **
  - 2021 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 2011-2012 to 2020-2021 **

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

Retirement System Membership **
2012 to 2021

March 31,	Active Members	Terminated Vested Members	Inactive Nonvested Members (a)	Pensioners & Beneficiaries	Total Membership
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
2021	65,561	9,011	22,226	52,618	149,416

** 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)

2021 Membership Data

	Police and Firefighters		All Other Employees		All Employees	
	June 30, 2021	June 30, 2020	June 30, 2021	June 30, 2020	June 30, 2021	June 30, 2020
1. Active members						
a. Number	4,897	4,940	60,664	61,810	65,561	66,750
b. Total payroll	$ 528,078,482	$ 526,406,257	$4,093,929,713	$3,996,958,688	$4,622,008,195	$4,523,364,945
c. Average salary	$ 107,837	$ 106,560	$ 67,485	$ 64,665	$ 70,499	$ 67,766
d. Average age	42.3	42.4	48.5	48.4	48.0	47.9
e. Average service	13.9	14.1	13.1	13.0	13.2	13.1
2. Inactive members						
a. Number	239	386	8,772	8,818	9,011	9,204
b. Total annual deferred benefits	$ 5,552,300	$ 6,728,387	$ 99,765,972	$ 96,886,510	$ 105,318,272	$ 103,614,897
c. Average annual deferred benefit	$ 23,231	$ 17,431	$ 11,373	$ 10,987	$ 11,688	$ 11,258
3. Service retirees						
a. Number	3,977	3,845	41,998	40,911	45,975	44,756
b. Total annual benefits	$ 258,146,590	$ 239,239,259	$1,202,295,261	$1,143,046,701	$1,460,441,851	$1,382,285,960
c. Average annual benefit	$ 64,910	$ 62,221	$ 28,627	$ 27,940	$ 31,766	$ 30,885
4. Disabled retirees						
a. Number	128	126	1,621	1,604	1,749	1,730
b. Total annual benefits	$ 3,433,775	$ 3,196,381	$ 24,677,949	$ 23,597,029	$ 28,111,724	$ 26,793,410
c. Average annual benefit	$ 26,826	$ 25,368	$ 15,224	$ 14,711	$ 16,073	$ 15,488
5. Beneficiaries						
a. Number	376	346	4,518	4,321	4,894	4,667
b. Total annual benefits	$ 16,649,880	$ 14,332,093	$ 81,296,984	$ 75,813,525	$ 97,946,864	$ 90,145,618
c. Average annual benefit	$ 44,282	$ 41,422	$ 17,994	$ 17,545	$ 20,014	$ 19,316

(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). As of June 30, 2021, there were 21,226 (869 Police and firefighters plus 21,357 All other employees).

Historical Summary of Active Member Data

Year Ending June 30,	Active Members		Covered Payroll		Average Salary			
	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
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
2021	65,561	-1.8%	4,622.0	2.2%	70,499	4.0%	48.0	13.2

Ten-Year Actuarial Schedules (continued)

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

2012 to 2021

March 31,	Number of Pensioners	Average Annual Pension (1)	Ratio of Active Members per Pensioner
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
2021	47,724	$31,766	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**

2012 to 2021

As of Mar 31,	Added	Average Added to Rolls	Removed	Average Removed from Rolls	Total	Average Pension	% Chg
Retirants							
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%
2021	2,608	$31,438	1,370	$25,041	47,724	$31,191	2.90%
Beneficiaries							
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%
2021	381	$23,159	154	$16,835	4,894	$20,014	3.61%

** Schedule compiled by ERS staff from actuary reports.

Gabriel Roeder Smith & Company

Ten-Year Actuarial Schedules (continued)

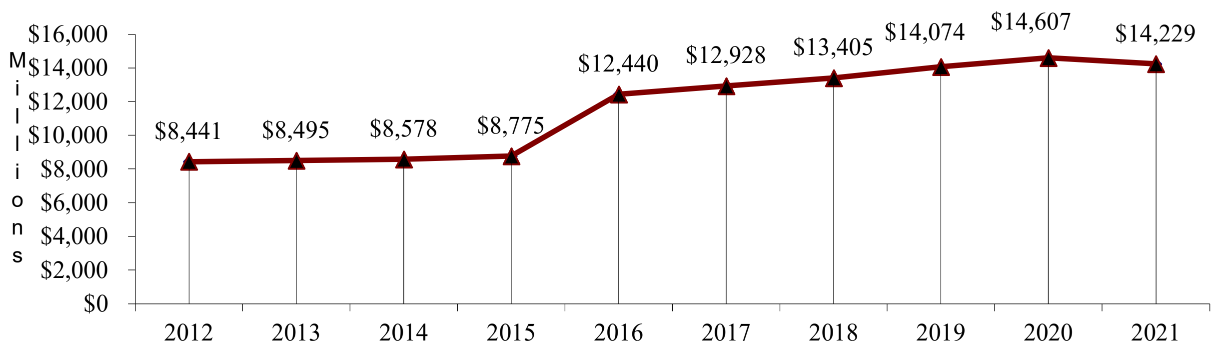
Solvency Test**
2012 to 2021

June 30,	Actuarial Accrued Liabilities (AAL): Active Member Contributions	Actuarial Accrued Liabilities (AAL): Retirees, Beneficiaries, and Inactive Vested Members	Actuarial Accrued Liabilities (AAL): 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)
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%
2021	2,243.2	18,728.9	13,167.0	19,909.8	100%	94%	0.0%

(Amounts in $millions)

** Schedule compiled by ERS Staff from actuary reports

Unfunded Actuarial Accrued Liability FY 2012-2021



Ten-Year Actuarial Schedules (continued)

Employer Contribution Rates as a Percentage of Payroll **

2011 to 2020

Actuarial	Police and Firefighters			All Other Employees			All Active Employees		
Valuation as of June 30,	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate
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%
2021 *	13.53%	27.47%	41.00%	6.77%	17.23%	24.00%	7.57%	18.37%	25.94%

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**

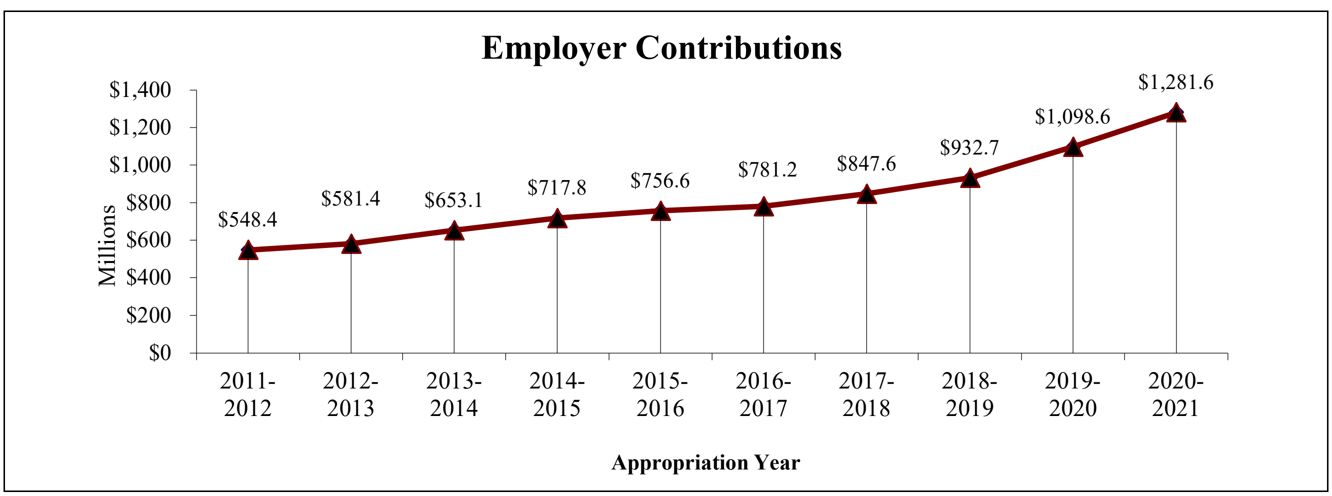
	Investment Yield Rate	
Fiscal Year	Assumed for Actuarial Valuation	Actuarial Investment Return
2011-2012	7.75%	5.05%
2012-2013	7.75%	6.67%
2013-2014	7.75%	9.23%
2014-2015	7.65%	7.85%
2015-2016	7.00%	5.59%
2016-2017	7.00%	6.92%
2017-2018	7.00%	7.18%
2018-2019	7.00%	6.81%
2019-2020	7.00%	5.59%
2020-2021	7.00%	10.75%

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	3	South Dakota	105.5%	Wisconsin	100.0%
		Washington	102.2%		
90% to 99%	5	Idaho	99.9%	Nebraska	97.4%
		Tennessee	99.4%	Utah	90.8%
		New York	99.4%		
80% to 89%	10	North Carolina	89.1%	Maine	83.8%
		Delaware	89.1%	Florida	83.4%
		Iowa	87.9%	Arkansas	81.6%
		Minnesota	87.1%	Missouri	80.7%
		West Virginia	84.7%	Oklahoma	80.4%
70% to 79%	11	Georgia	79.8%	Nevada	75.7%
		Texas	79.8%	Wyoming	74.8%
		Ohio	79.8%	Montana	74.2%
		Virginia	79.7%	California	73.8%
		Maryland	77.1%	Alaska	70.7%
		Oregon	75.9%		
60% to 69%	14	North Dakota	69.9%	New Hampshire	64.8%
		Louisiana	69.6%	Arizona	64.7%
		Alabama	69.5%	Rhode Island	62.0%
		Kansas	68.9%	Colorado	61.7%
		New Mexico	67.1%	Vermont	61.7%
		Indiana	66.7%	Mississippi	61.3%
		Michigan	64.9%	Pennsylvania	60.5%
Less than 60%	7	Massachusetts	58.9%	Illinois	51.2%
		Hawaii	58.3%	Connecticut	48.0%
		South Carolina	56.4%	Kentucky	46.9%
		New Jersey	52.0%		

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,:	2012	2013	2014 **	2015	2016
Additions					
Employer Contributions	$ 548,353,394	$ 581,447,213	$ 653,127,697	$ 717,792,981	$ 756,558,222
Member contributions	182,401,324	185,837,186	206,127,337	223,505,419	236,801,861
Investment income (net of expense)	(57,798,410)	1,331,208,154	2,175,479,961	556,436,475	(169,368,110)
Total additions to plan net assets	672,956,308	2,098,492,553	3,034,734,995	1,497,734,875	823,991,973
Deductions					
Benefits	1,015,447,668	1,060,561,148	1,122,445,642	1,170,744,770	1,232,589,353
Refunds	7,187,606	7,204,411	8,475,969	10,507,888	12,927,672
Administrative expenses	11,634,197	11,941,446	12,626,030	14,032,964	13,960,587
Total deductions from plan net assets	1,034,269,471	1,079,707,005	1,143,547,641	1,195,285,622	1,259,477,612
Net increase (decrease) in net position	(361,313,163)	1,018,785,548	1,891,187,354	302,449,253	(435,485,639)
Net position restricted for pension benefits					
Beginning of year	11,654,355,564	11,293,042,401	12,311,827,949	14,203,015,303	14,505,464,556
End of year	$ 11,293,042,401	$ 12,311,827,949	$14,203,015,303	$14,505,464,556	$ 14,069,978,917

Fiscal Year Ended June 30,:	2017	2018	2019	2020	2021
Additions					
Employer Contributions	$ 781,244,218	$ 847,595,466	$ 922,635,334	$ 1,098,589,013	$ 1,281,558,696
Member contributions	250,704,067	259,427,934	273,223,578	287,398,031	300,626,446
Investment income (net of expense)	1,934,512,507	1,225,572,599	932,696,412	358,282,664	4,662,225,761
Total additions to plan net assets	2,966,460,792	2,332,595,999	2,128,555,324	1,744,269,708	6,244,410,903
Deductions					
Benefits	1,306,788,954	1,395,881,342	1,469,634,809	1,545,589,761	1,651,431,372
Refunds	16,340,290	20,846,500	16,502,635	22,443,593	23,618,435
Administrative expenses	14,986,159	15,784,490	13,798,866	17,782,865	19,049,861
Total deductions from plan net assets	1,338,115,403	1,432,512,332	1,499,936,310	1,585,816,219	1,694,099,668
Net increase (decrease) in net position	1,628,345,389	900,083,667	628,619,014	158,453,489	4,550,311,235
Net position restricted for pension benefits					
Beginning of year	14,069,978,917	15,698,324,306	16,598,407,973	17,227,026,987	17,385,480,476
End of year	$ 15,698,324,306	$ 16,598,407,973	$ 17,227,026,987	$ 17,385,480,476	$ 21,935,791,711

** 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.

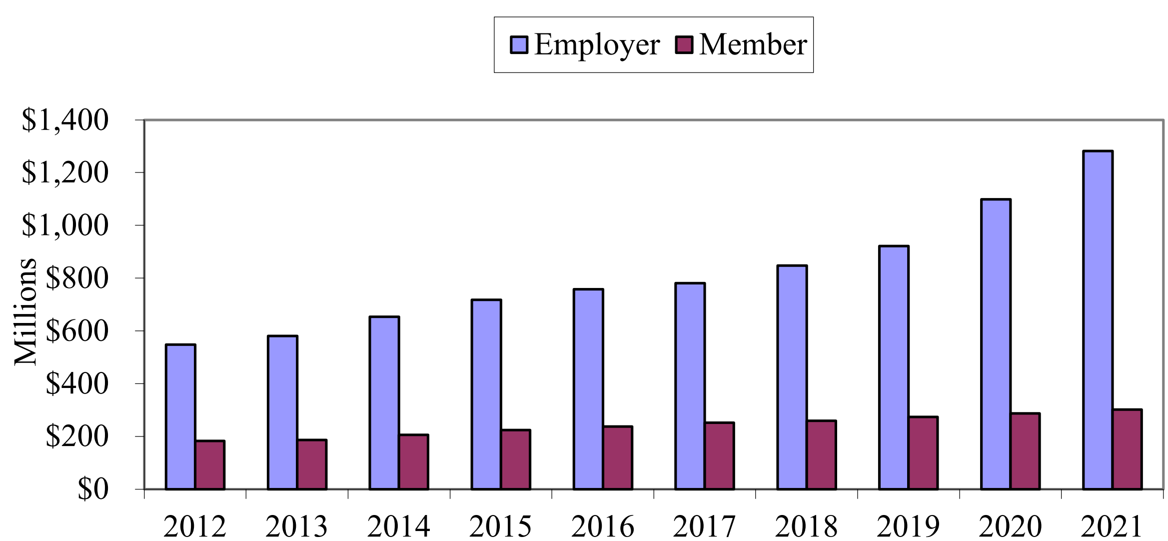
Contributions

Employer Contribution Rates as a Percentage of Payroll **

Fiscal Year		Police & Firefighters	All Other Employees	Composite Rate
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%
2021		41.00%	24.00%	25.94%

** 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

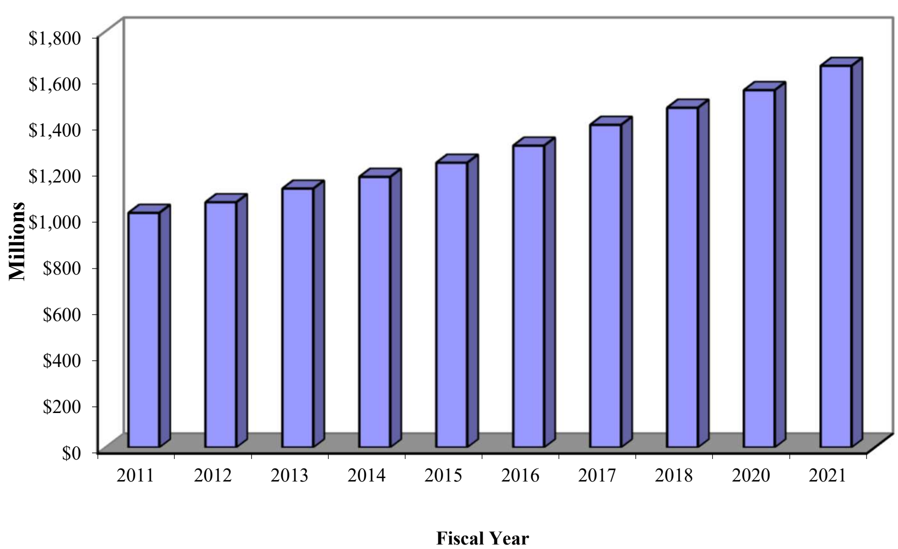
Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2012	2013	2014	2015	2016
Recurring benefit payments					
Service	$ 917,840,937	$ 963,894,245	$ 1,016,912,124	$ 1,058,688,356	$ 1,111,416,262
Disability	17,877,572	18,987,509	19,835,520	20,732,259	21,437,486
Death	43,053,039	45,948,656	53,324,252	59,238,051	65,568,232
subtotal	978,771,548	1,028,830,410	1,090,071,896	1,138,658,666	1,198,421,980
Refund Option payments (one-time)	36,676,120	31,730,738	32,373,746	32,086,104	34,167,373
Total benefit payments	$ 1,015,447,668	$ 1,060,561,148	$ 1,122,445,642	$1,170,744,770	$ 1,232,589,353

Fiscal Year Ended June 30,:	2017	2018	2019	2020	2021
Recurring benefit payments					
Service	$ 1,175,380,410	$ 1,241,819,373	$ 1,306,624,918	$ 1,373,747,686	$ 1,449,789,546
Disability	22,303,070	23,739,337	25,035,782	26,793,410	28,111,724
Death	71,889,117	77,507,539	83,117,245	90,145,618	97,946,864
subtotal	1,269,572,597	1,343,066,249	1,414,777,945	1,490,686,714	1,575,848,134
Refund Option payments (one-time)	37,216,357	52,815,093	54,856,864	54,903,047	75,583,238
Total benefit payments	$ 1,306,788,954	$ 1,395,881,342	$ 1,469,634,809	$ 1,545,589,761	$ 1,651,431,372

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

Benefit Payments



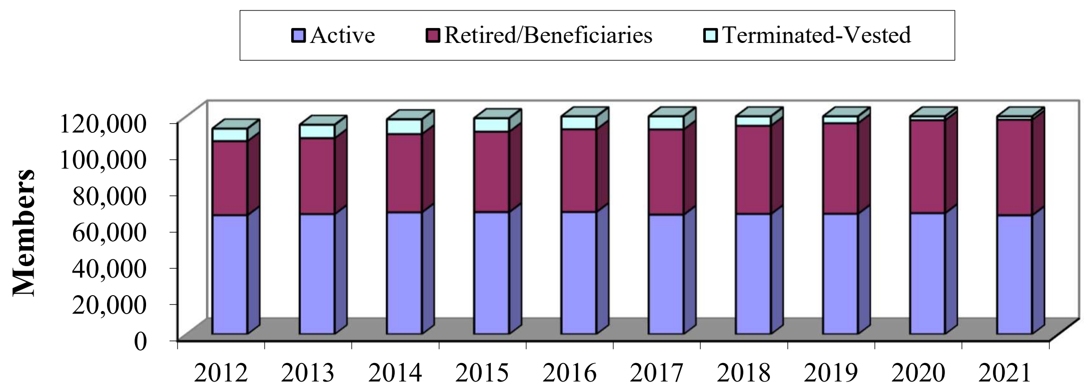
Participating Employers and Membership in ERS
Last Ten Fiscal Years

ERS Membership

As of March 31,:	Active	Retired/ Beneficiaries	Terminated- Vested	Inactive- Non-Vested	Totals
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
2021	65,561	52,618	9,011	22,226	149,416

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

ERS Membership



Participating Employers and Active Members

As of March 31,:	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
State of Hawaii	50,604	51,176	51,875	51,791	51,723	50,288	50,719	50,788	51,008	49,852
City & County of Honlulu	8,451	8,457	8,625	8,727	8,807	8,740	8,709	8,713	8,757	8,739
- Board of Water Supply	505	532	551	558	558	572	570	581	574	576
Hawaii County	2,427	2,446	2,489	2,550	2,596	2,561	2,553	2,579	2,649	2,647
Kauai County	1,201	1,227	1,244	1,234	1,244	1,246	1,247	1,248	1,276	1,260
Maui County	2,411	2,388	2,422	2,450	2,449	2,504	2,473	2,474	2,486	2,487
Total	65,599	66,226	67,206	67,310	67,377	65,911	66,271	66,383	66,750	65,561

Benefit Payments by Retirement Type and Option

As of March 31, 2021

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	930	690	14	8	1	217	186	172	148	56	172	196	-
500 - 1,000	1,547	1,135	60	17	12	323	163	94	122	55	621	488	4
1,000 - 1,500	1,675	1,284	30	54	14	293	189	95	136	58	712	483	2
1,500 - 2,000	1,843	1,505	15	43	9	271	181	65	134	64	874	521	4
2,000 - 2,500	1,767	1,515	9	35	6	202	133	52	139	49	804	587	3
2,500 - 3,000	2,012	1,803	3	23	8	175	165	56	101	41	869	773	7
3,000 - 3,500	2,103	1,928	6	15	6	148	181	52	125	61	990	689	5
3,500 - 4,000	1,831	1,689	-	13	5	124	199	45	97	51	1,045	390	4
4,000 - 4,500	1,464	1,366	-	12	3	83	176	43	89	64	850	241	1
4,500 - 5,000	1,051	998	-	5	2	46	158	26	79	54	602	131	1
5,000	3,812	3,657	-	2	7	146	494	98	411	238	2,274	297	-
	20,035	17,570	137	227	73	2,028	2,225	798	1,581	791	9,813	4,796	31

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	725	639	4		28	54	288	86	162	98	43	48	-
500 - 1,000	2,198	1,953	75	12	55	103	817	155	508	242	240	236	-
1,000 - 1,500	2,179	1,884	115	58	31	91	769	114	515	260	291	230	-
1,500 - 2,000	1,702	1,501	75	33	16	77	567	101	435	198	225	176	-
2,000 - 2,500	1,367	1,258	39	11	14	45	438	76	342	210	208	92	1
2,500 - 3,000	1,232	1,170	28	3	13	18	431	63	304	184	169	79	2
3,000 - 3,500	1,119	1,076	9	5	8	21	402	59	258	187	146	67	-
3,500 - 4,000	863	842	2	1	7	11	335	38	195	147	101	47	-
4,000 - 4,500	668	658	-	1	2	7	261	32	134	128	71	42	-
4,500 - 5,000	425	419	1	-	2	3	157	30	104	84	30	20	-
5,000	984	961	1	-	5	17	336	49	232	219	104	44	-
	13,462	12,361	349	124	181	447	4,801	803	3,189	1,957	1,628	1,081	3

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	2,419	1,625	109	47	130	508	942	584	660	112	121
500 - 1,000	4,563	3,555	302	43	97	566	2,159	908	1,221	197	78
1,000 - 1,500	3,215	2,648	155	73	36	303	1,500	664	877	154	20
1,500 - 2,000	2,213	1,910	88	26	14	175	993	450	658	109	3
2,000 - 2,500	1,851	1,681	33	7	12	118	843	402	492	114	-
2,500 - 3,000	1,757	1,658	16	3	6	74	975	324	332	125	1
3,000 - 3,500	1,296	1,238	4	-	6	48	770	247	213	66	-
3,500 - 4,000	771	741	3	2	7	18	447	157	131	36	-
4,000 - 4,500	436	416	1	-	1	18	258	87	74	17	-
4,500 - 5,000	240	229	-	-	1	10	133	54	46	7	-
5,000	360	343	-	-	6	11	191	84	75	10	-
	19,121	16,044	711	201	316	1,849	9,211	3,961	4,779	947	223

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

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

Average Monthly Service Pensions

by Years of Credited Service

	As of March 31,	Years of Credited Service 0-9	10-14	15-19	20-24	25-29	30-34	35+	All
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
2021	Average Monthly Benefit	$658	$795	$1,278	$1,718	$3,126	$3,604	$4,260	$2,641
	Number of Active Retirants	1,625	5,581	5,214	6,033	9,411	11,725	6,386	45,975

Retirees and Beneficiaries

(Recurring Benefit Payments)

Tabulated by Fiscal Year that Payments Started as of March 31, 2021

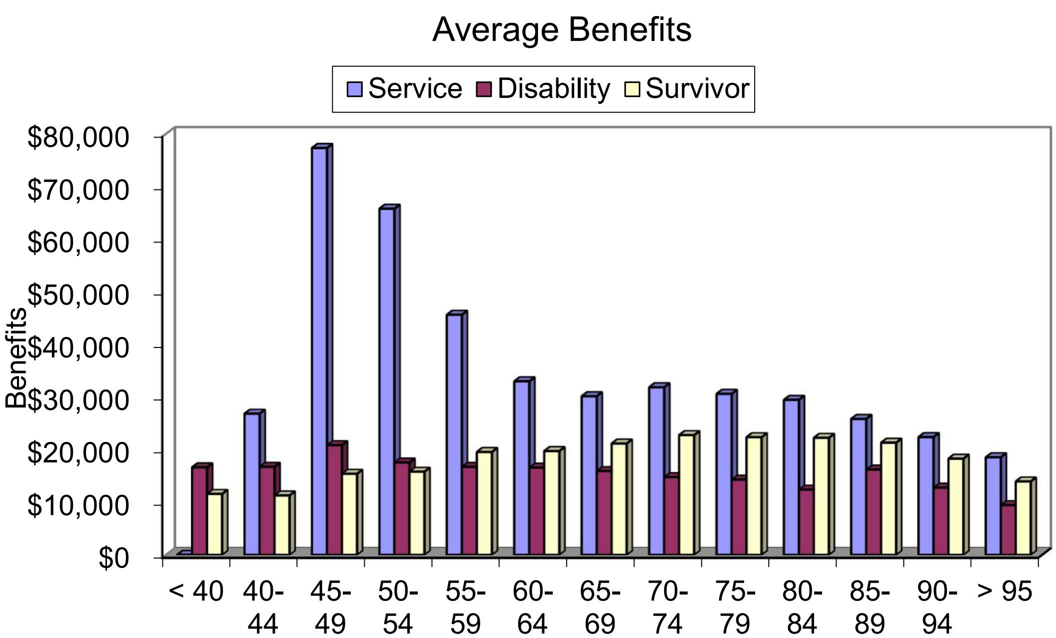
Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit
1959	1	$ 4,618	$385
1960	1	699	$58
1962	1	6,146	$512
1964	1	13,079	$1,090
1966	1	7,559	$630
1967	2	25,006	$1,042
1968	2	21,081	$878
1969	1	7,204	$600
1970	2	15,432	$643
1971	3	27,779	$772
1972	5	46,846	$781
1973	9	96,543	$894
1974	10	120,930	$1,008
1975	8	86,756	$904
1976	16	199,267	$1,038
1977	24	350,390	$1,217
1978	24	386,273	$1,341
1979	46	702,090	$1,272
1980	67	1,158,066	$1,440
1981	98	1,671,084	$1,421
1982	131	2,319,848	$1,476
1983	139	2,819,032	$1,690
1984	184	3,750,897	$1,699
1985	227	5,129,470	$1,883
1986	305	7,502,224	$2,050
1987	513	12,900,086	$2,096
1988	311	6,287,338	$1,685
1989	413	9,782,462	$1,974
1990	477	12,804,861	$2,237
1991	588	15,520,074	$2,200
1992	581	$ 16,662,745	$2,390
1993	629	19,873,468	$2,633
1994	663	20,087,101	$2,525
1995	1,366	49,442,391	$3,016
1996	1,413	49,286,955	$2,907
1997	513	13,137,886	$2,134
1998	539	14,359,161	$2,220
1999	819	24,001,055	$2,442
2000	1,048	31,951,707	$2,541
2001	1,227	37,243,671	$2,529
2002	1,056	32,468,550	$2,562
2003	1,402	47,083,497	$2,799
2004	1,377	43,345,395	$2,623
2005	1,469	47,404,736	$2,689
2006	1,470	44,751,889	$2,537
2007	1,605	48,189,703	$2,502
2008	1,580	45,719,263	$2,411
2009	1,521	44,129,381	$2,418
2010	2,191	75,151,637	$2,858
2011	2,014	70,269,927	$2,908
2012	1,974	60,939,136	$2,573
2013	1,979	57,429,488	$2,418
2014	2,075	58,759,459	$2,360
2015	2,342	64,513,967	$2,296
2016	2,391	66,112,087	$2,304
2017	2,570	76,573,953	$2,483
2018	2,891	90,499,938	$2,609
2019	2,658	80,346,543	$2,519
2020	2,721	83,775,569	$2,566
2021	2,924	89,227,061	$2,543
Total	52,618	$ 1,586,500,459	$2,513

Total Benefits Payable

(Recurring Benefit Payments)

Tabulated by Attained Ages of Benefit Recipients as of March 31, 2021

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	-	-	-	-	45	$ 369,806	45	$ 369,806
20-24	-	-	-	-	18	170,549	18	170,549
25-29	-	-	1	17,533	45	623,674	46	641,207
30-34	-	-	-	$ -	59	790,982	59	790,982
35-39	-	-	6	98,895	98	1,113,247	104	1,212,142
40-44	3	$ 80,453	15	250,918	123	1,388,798	141	1,720,169
45-49	129	9,974,674	59	1,229,216	174	2,679,649	362	13,883,539
50-54	691	45,456,905	124	2,176,244	226	3,569,736	1,041	51,202,885
55-59	2,237	102,023,580	315	5,268,117	322	6,292,092	2,874	113,583,789
60-64	6,470	213,280,127	379	6,281,182	522	10,293,294	7,371	229,854,603
65-69	10,289	310,091,677	361	5,746,878	657	13,896,659	11,307	329,735,214
70-74	10,402	331,163,463	251	3,707,150	769	17,491,008	11,422	352,361,621
75-79	6,855	209,665,152	135	1,929,826	637	14,238,186	7,627	225,833,164
80-84	4,354	128,225,629	45	557,785	510	11,339,548	4,909	140,122,962
85-89	2,920	75,402,013	36	583,482	423	9,013,471	3,379	84,998,966
90-94	1,290	28,866,887	17	217,232	223	4,076,288	1,530	33,160,407
95-99	306	5,836,726	5	47,266	40	509,008	351	6,393,000
100 & over	29	374,565	-	-	3	90,869	32	465,434
Total	45,975	$ 1,460,441,851	1,749	$ 28,111,724	4,894	$ 97,946,864	52,618	$ 1,586,500,439



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