

EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

REPORT TO BOARD OF TRUSTEES ON THE 96th ANNUAL
ACTUARIAL VALUATION
FOR THE YEAR ENDING JUNE 30, 2021





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.

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.

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.

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.

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.

There have been no changes in the benefit provisions since the prior valuation. See Table 16 of this report for more details on the benefit provisions for members of the ERS. However, the 2017 Legislature passed Act 017 which contained 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 Table 18 of this report.

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.

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 Annual Comprehensive 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,

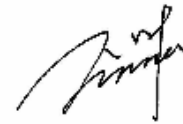
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Table of Contents

Pages

	Cover Letter	
Section A	Executive Summary.....	1
Section B	Introduction	2
Section C	Funded Status	3
Section D	Analysis of Changes.....	5
Section E	ERS Assets	6
Section F	Benefit and Contribution Provisions.....	7
Section G	GASB Disclosure	8
Section H	Actuarial Assumptions and Methods.....	9
Section I	Membership Data	10
Section J	Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.....	11
Section K	Summary and Closing Comments	15
Section L	Actuarial Certification Statement	16
Section M	Valuation Tables.....	18
Section N	Statistical Tables.....	69
Section O	Definition of Actuarial Terms.....	97



SECTION A – 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 <ul style="list-style-type: none"> • Number of <ul style="list-style-type: none"> - Active members - Retirees and beneficiaries - Inactive, vested - Total • Covered payroll for active members • Actual benefit payments and refunds 	65,561 52,618 9,011 <hr style="width: 100%;"/> 127,190 \$4,622 million \$1,675 million	66,750 51,153 9,204 <hr style="width: 100%;"/> 127,107 \$4,523 million \$1,568 million
Assets <ul style="list-style-type: none"> • Actuarial (smoothed) value • Market value • Return on actuarial value • Return on market value • Employer contributions during fiscal year • External cash flow % 	\$19,910 million \$21,936 million 10.8% 26.9% \$1,282 million (0.5%)	\$18,084 million \$17,385 million 5.6% 2.1% \$1,099 million (1.1%)
Actuarial Information <ul style="list-style-type: none"> • Total normal cost % (employee + employer) • Unfunded actuarial accrued liability (UAAL) • Funded ratio (based on smoothed assets) • Funded ratio (based on market assets) • Funding period (years)* • Employer contribution rate <ul style="list-style-type: none"> % of projected payroll Police and Firefighters All Other Employees 	14.06% \$14,229 million 58.3% 64.3% 24 41.00% 24.00%	14.12% \$14,607 million 55.3% 53.2% 26 41.00% 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.



SECTION B – INTRODUCTION

The results of the June 30, 2021 actuarial valuation of ERS are presented in this report.

The primary purpose of the valuation report is to determine the adequacy of the current employer contribution rates through measuring the resulting funding period, to describe the current financial condition of ERS, and to analyze changes in ERS's condition.

In preparing this valuation, Gabriel, Roeder, Smith & Company (GRS) has relied on employee data and asset information provided by the staff of ERS. While not verifying the data at their source, GRS has performed such tests for consistency and reasonableness as has been deemed necessary to be satisfied with the appropriateness of using the data supplied.

Section C discusses the funded status of ERS. Section D analyzes the change in the UAAL. Section G discusses the disclosure requirements of GASB No. 67.

Sections E, F, H, and I discuss background information used in the preparation of this report--benefit provisions, actuarial assumptions and methods, financial information, and membership data. Section J contains a discussion about risk and plan maturity measures and a table showing current and historical risk metrics. Section K contains a final summary and some closing comments about this year's valuation and Section L contains the actuarial certification.

All the tables referenced by the other sections appear in Section M.

SECTION C – FUNDED STATUS

Table 1 shows the development of the Plan's liabilities and funded status for the current year and compares it with those of the prior year.

The calculation of the funded status involves the following steps and includes the following comments:

- The actuarial present value of future benefits is determined for the present members, including retired members, beneficiaries, inactive members, and active members. This amounts to \$39.8 billion. Table 2 shows the development of this total for the current year and the prior year.
- The individual entry age normal funding method is used to allocate the actuarial present value of future benefits between that portion due for the current year (the normal cost), prior years (the actuarial accrued liability) and future years (the present value of future normal cost). Under the individual entry age normal cost method, the current and future normal costs are determined as a level percentage of payroll. Table 3 shows an analysis of the normal cost for the current year and the prior year. The amount needed to fund the current and future normal costs is 26.20% of pay for Police and Fire employees and 12.43% for All Other Employees. It includes all of the employees' contribution (if any) and the employers' normal cost rate.
- The impact of the new tier of benefits can be seen in comparing the normal cost for the employee groups from the prior year to the current year. The change in the Total Normal Cost rate shows the impact of the change in benefits between the old tier and the new tier. The change in the employer normal cost rate shows both the impact on the change in benefits and the larger contribution rates paid by employees in the new tier. We expect a year-to-year decrease in the normal cost and for that to continue for at least the next decade.
- A part of the normal cost is paid by the employee contributions of 12.67% of pay for Police and Firefighters, leaving 13.53% of pay to be funded by the employers. Thus, the current year's employer normal cost for Police and Firefighters is deemed to be 13.53% of the valuation payroll. As for the All Other Employees group, the average weighted effective employee contribution rate is 5.66% of pay, leaving 6.77% of pay to be funded by the employers. This is shown in Line 3 of Table 1.
- The UAAL is \$14.229 billion for 2021, a decrease from \$14.607 billion in 2020. As indicated in Table 1, the UAAL equals the difference between the total actuarial accrued liability (Item 7) and current actuarial assets (Item 8).
- In determining the number of years that will be required to amortize the UAAL, an assumption is made concerning future growth of the ERS covered payroll. Payroll can grow from intrinsic growth in the pay of individual members and it can also grow due to active membership growth. In determining the funding period of the ERS, we have assumed that the number of active members will remain constant in our open group projection.

SECTION C – FUNDED STATUS (CONTINUED)

- As shown in Item 10 of Table 1 and on Table 9c, the period to fund the UAAL is 25 years for the Police and Fire and 23 years for the All Other Employees group (i.e. the UAAL is expected to be paid off in fiscal year 2044). When combining both groups, the aggregate funding period for ERS is 24 years. Since the aggregate funding period based on the contribution rates is less than 30 years, the employer contribution rates are adequate to meet the requirements of Hawaii Revised Statutes §88-122(e)(1). Please note that this statement assumes the current contribution rates will remain in effect throughout the entire funding period.

As of the valuation date, ERS has a funded ratio of 58.3%, based on the actuarial value of assets.

Due to the significant changes in the future contribution rates and benefits for employees hired after June 30, 2012, the ERS funding policy uses an open group projection for determining how many years it will take to eliminate the unfunded liabilities of the ERS. The ERS is expected to be fully funded in 2045 which is 24 years from now. Therefore, the funding period is equal to 24 years. The open group projection assumes that the number of active members will remain constant and that there will be no actuarial gains or losses on liabilities or investments.

SECTION D – ANALYSIS OF CHANGES

Section C has noted that the unfunded actuarial accrued liability (UAAL) is \$14.229 billion as of June 30, 2021 compared to the \$14.607 billion UAAL for 2020.

Table 7 develops the estimated yield for the year based on two measures of asset values. Table 9b takes the information contained in Table 6 and develops the expected value of actuarial assets for this valuation, based on the prior year's investment return assumption of 7.00%.

As shown in Item 6 of Table 9b, the expected value of actuarial assets as of June 30, 2021 is \$19.234 billion. As developed in Table 6, the actual value of actuarial assets as of the valuation date is \$19.910 billion (as repeated in Item 7 of Table 9b). Thus, the gain for the year is the difference between the actual value and the expected value, or \$675.3 million (as shown in Item 8). This asset gain for the year is a direct reflection of the estimated yield for the year based on the value of actuarial assets, namely 10.75% (as shown in Item B4 of Table 7) being greater than the assumed rate of return.

The markets returned a very positive result in FY 2021 with a return of 26.90% on the market value of assets, which is significantly above our benchmark of 7.0%. Therefore, the return for the year was greater than our expectation. The rate of return for the actuarial value was 10.75%, which is less than the market return, due to the smoothing methodology used in the determination of the actuarial value of assets. The actuarial value of assets exceeds the market value of assets by \$2,026 million, so there are \$2,026 million in deferred investment gains still to be recognized in the actuarial value of assets.

Table 9a shows the total unanticipated change in the unfunded actuarial accrued liability was \$447 million (item 7), this means the UAAL decreased \$447 million more than expected from all sources for the 2021 fiscal year. As noted above, the actuarial investment gain was equal to \$675 million. This means that there was a liability loss during the year equal to \$228 million. The liability experience loss is primarily due to larger than expected salary increases for the All Others employee group. For Tier 1 members, the pensionable earnings include overtime, and it is possible a source of the higher salaries was higher than average overtime during the fiscal year. If so, some of the loss from this valuation will likely be offset by a gain in the future if the overtime returns to normal levels.

Table 9c shows the current year's valuation results plus a 30-year open group projection of the ERS's assets and liabilities. As discussed previously, this projection assumes no actuarial gains or losses in the actuarial liabilities or the actuarial value of assets. In addition, the projection assumes the current employer contribution rates will continue and reflects the changes to the benefits and member contribution rates of employees hired after June 30, 2012. As may be seen by examining this table, the unfunded liability of the ERS (Column 7) is expected to grow as a dollar amount until 2024 before beginning to decline and finally being eliminated in 2045.

The June 30, 2045 valuation is 24 years from this valuation. Therefore, for the purpose of satisfying Hawaii Revised Statutes §88-122(e)(1) the funding period is considered to be 24 years.

SECTION E – ERS ASSETS

Table 4 presents a summary of the market value of assets held by the ERS. About 59% of the total invested assets available for benefits are held in equities (including alternative investments) and real estate compared to about 58% last year. Table 5 shows a reconciliation of the assets from the beginning of the prior year to the valuation date.

Table 6 shows the development of the Actuarial Value of Assets (AVA). An actuarial value is used in order to dampen some of the year-to-year fluctuations which would occur if the market value were used instead. The expected actuarial value of assets is calculated and compared to the actual market value of assets. This difference is then compared with the remaining deferrals from the prior years to determine this year's excess/shortfall. The current year's excess/shortfall is offset directly against any prior years' deferrals of the opposite sign (oldest bases first). Any remaining bases are then recognized over a four-year period from the date the base was established. Any remaining deferrals, after the current year's recognition, are then subtracted from the market value of assets to get the final actuarial value of assets. This method has the advantage of more quickly converging towards the market value in years when the returns go in the opposite direction of the prior years.

Table 7 shows an estimate of the ERS's dollar-weighted rate of return for the year. This is shown on (i) the market value of assets (reflecting all realized and unrealized gains and losses), and (ii) the actuarial value of assets. While the dollar-weighted market return this year was 26.90%, the return on the actuarial value was 10.75%. The difference between these is due to the smoothing effect of the AVA valuation method.

Table 9b determines the asset gain or loss for the year, based on the difference between the actual fund return and the actuarial value of assets and the prior year's assumed rate of 7.00%.

Finally, Table 13 shows a history of cash flows for the trust.

SECTION F – BENEFIT AND CONTRIBUTION PROVISIONS

Table 16 summarizes the benefit provisions of ERS used in this valuation. Table 17 is a historical record of prior legislative changes starting with changes effective in 1999. There were significant changes made by the 2011 Legislature to the benefit provisions of the ERS for employees hired after June 30, 2012. Because the Board has chosen to use the Individual Entry Age Normal Cost method, the normal cost and the growth of the accrued liabilities will be slowly impacted by the changes in the benefit provisions, as members under the new tier are hired to replace members who are covered under the older tier of benefits.

There have been no changes to the benefit provisions since the last valuation that had an actuarial impact on the valuation. However, there have been significant changes to the statutory employer contribution rates. The 2017 Legislature enacted ACT 017 which increased the employer contribution rates over a four-year period.

The employer contribution rates for Police and Fire employees are 41% of pay in FY 2021 and beyond while the employer contribution rates for All Other Employees are 24% of pay in FY 2021 and beyond.

This valuation reflects benefits promised to members by the ERS's statutes. There are no ancillary benefits - retirement type benefits not required by the ERS's statutes but which might be deemed an ERS liability if continued beyond the availability of funding by the current funding source.

Act 179/2004 was adopted during FY2003/2004 and established the new Hybrid class that became effective on July 1, 2006. Current participants had the choice to elect to move to the new class or stay in the current plan. There were 26,228 plan members who elected to transfer. The Hybrid class membership has since grown to approximately 50,000 members.

SECTION G – GASB DISCLOSURE

The Governmental Accounting Standards Board (GASB) has issued Statement No. 67 which provides the manner in which the actuarial condition of a public sector retirement plan is to be disclosed in the system's financial statements. This new standard replaces GASB No. 25, and went into effect for the ERS for fiscal years ending on or after June 30, 2014.

Similar to last year, we will provide a separate accounting report with the required disclosures under this new standard.

SECTION H – ACTUARIAL ASSUMPTIONS AND METHODS

In determining costs and liabilities, actuaries use assumptions about the future, such as rates of salary increase, probabilities of retirement, termination, death and disability, and an investment return assumption. The ERS's Board adopts the assumptions used, taking into account the actuary's recommendations.

In addition to the actuarial assumptions, the actuary also makes use of an actuarial funding method to allocate costs to particular years. In common with most public sector plans, ERS uses the entry age normal method (individual normal cost). This method produces a relatively level pattern of funding for individual employees over time. We believe this method is appropriate for ERS.

The ERS's Board adopted new actuarial assumptions on August 12, 2019 to be used effective with the June 30, 2019 actuarial valuation. For a complete description of the recommended assumption changes please see our experience study report dated July 30, 2019.

Please see Table 18 for a complete description of the actuarial assumptions and methods.

SECTION I – MEMBERSHIP DATA

Membership data was provided in electronic files, via a secured file transfer protocol, by the staff. Data for active members include sex, birthdate, service, pay rate as of March 2021, employer entity and accumulated employee contributions. Data for inactive, nonretired members was similar, but also includes the members' unreduced benefit. For retired members, data includes status (service retiree, disabled retiree or beneficiary), sex, birthdate, pension amount, pension COLA amount, form of payment, beneficiary sex and birthdate if applicable, and date of retirement.

While not verifying the correctness of the data at the source, we performed various tests to ensure the internal consistency of the data and its overall reasonableness. Membership statistics are summarized in Table 12a. Table 12b summarizes certain active member data, and the age/service distribution of active members is shown in Table 19. Tables 30-43 show various distributions of retirees.

Since last year, the number of active members decreased by 1,189 members from 66,750 to 65,561. These 65,561 active members are distributed as follows:

Category	Number	% of Total
(1)	(2)	(3)
Police & Fire	4,897	7.4%
Contributory	520	0.8%
Noncontributory	10,341	15.8%
Hybrid	<u>49,803</u>	<u>76.0%</u>
Total	65,561	100.00%

Covered payroll (which is the annualized pay for all active members on the census date) increased by 2.2% since last year. ERS also provided the actual aggregate payroll for fiscal year 2021 on which contributions were received (this includes payroll for members who terminated and retired during the year). The lesser of the covered payroll and the aggregate payroll is adjusted by the payroll growth rate to produce the *projected FY 2022 payroll for contribution purposes*, as shown in Item 1 of Table 1.

Average age of the active members remained unchanged at 48.0 and the average service also remained unchanged at 13.1 years.

SECTION J – 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.

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.

SECTION J – ASSESSMENT AND DISCLOSURE OF RISK ASSOCIATED WITH MEASURING PENSION OBLIGATIONS AND DETERMINING PENSION PLAN CONTRIBUTIONS (CONTINUED)

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.

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%.



SECTION J – ASSESSMENT AND DISCLOSURE OF RISK ASSOCIATED WITH MEASURING PENSION OBLIGATIONS AND DETERMINING PENSION PLAN CONTRIBUTIONS (CONTINUED)

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.

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.

SECTION J – 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

SECTION K – SUMMARY AND CLOSING COMMENTS

To summarize the results of the actuarial valuation of the Employees' Retirement System as of June 30, 2021, it is our opinion that if all assumptions are met going forward, the present assets plus future required contributions will be sufficient to provide the benefits specified in the law.

This year's valuation shows that the ERS is expected to be fully funded in 2045 (24 years from this year's valuation date), which is one year earlier than the projected year in last year's valuation.

Based on this year's valuation results, the statutory contribution rates are sufficient to eliminate the UAAL over a period of 30 years or less as specified by Hawaii Revised Statute 88-122(e)(1).

As noted above it is now expected to take one less year than indicated by last year's valuation to achieve full funding. This is due to the significant actuarial gains on the investments that occurred in FY2021.

Our modeling continues to show that the new contribution levels should be able to absorb material adverse experience without resulting in a need for further contribution rate increases. Moderate adverse experience may result in the date the ERS obtaining a fully funded status in a year later than 2045, but it is not expected to result in a requirement for further contribution rate increases.

The results of this valuation are very good from the financial outlook of the System. The period over which the ERS is expected to achieve full funding decreased primarily due to investment gains. The end date for achieving full funding for All Other Employees decreased by one year when compared with last year (2044 versus 2045), and the length of time for Police and Fire employees decreased by 2 years from 2048 to 2046. Also, the ERS is now deferring over \$2.0 billion in investment gains. If these deferred investment gains are recognized instead of being offset by investment losses, the end date for achieving full funding could be accelerated by several years.

Finally, while this valuation saw the end date for achieving a fully funded status move nearer. It is important to note that these projections assume the current contribution rates will be maintained throughout the funding period. Any reduction in the contribution rates would increase the length of time until the ERS achieves a fully funded status.



SECTION L – ACTUARIAL CERTIFICATION STATEMENT

	Police and Firefighters June 30, 2021 (1)	All Other Employees June 30, 2021 (2)	All Employees June 30, 2021 (3)
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	<u>\$ 8,015,085,569</u>	<u>\$ 31,745,500,517</u>	<u>\$ 39,760,586,086</u>
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 costs (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	<u>\$ 4,235,042,948</u>	<u>\$ 15,674,748,606</u>	<u>\$ 19,909,791,554</u>
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 Fiscal Year 2022	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.



SECTION L – 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

SECTION M – VALUATION TABLES

		Pages
Table 1	Development of Employer Cost.....	19
Table 2	Actuarial Present Value of Future Benefits.....	20
Table 3	Analysis of Normal Cost	21
Table 4	Statement of Net Position	22
Table 5	Statement of Changes in Net Position	23
Table 6	Development of Actuarial Value of Assets	24
Table 7	Estimation of Yields.....	25
Table 8	Allocation of Cash and Investments.....	26
Table 9A	Total Experience Gain or Loss	27
Table 9B	Investment Experience Gain or Loss	28
Table 9C	Projection Results	29
Table 10	Employer Covered Payroll.....	30
Table 11	Schedule of Funding Progress.....	31
Table 12A	Membership Data	32
Table 12B	Historical Summary of Active Member Data	33
Table 13	History of Cash Flow	34
Table 14	Solvency Test.....	35
Table 15	Highlights of Last Five Annual Actuarial Valuations.....	36
Table 16	Summary of Benefit Provisions.....	37
Table 17	Summary of Plan Changes	50
Table 18	Summary of Actuarial Methods and Assumptions	54

TABLE 1

Development of Employer Cost

	Police and Firefighters June 30, 2021 (1)	All Other Employees June 30, 2021 (2)	All Employees June 30, 2021 (3)
1. Projected FY 2022 payroll for contribution purposes	\$ 546,561,229	\$ 4,237,217,252	\$ 4,783,778,481
2. Gross normal cost (Table 3)	26.20%	12.43%	14.06%
3. Employer normal cost rate (Table 3)	13.53%	6.77%	7.57%
4. Present value future benefits (Table 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 (1)	All Other Employees June 30, 2020 (2)	All Employees June 30, 2020 (3)
1. Projected FY 2021 payroll for contribution purposes	\$ 544,830,476	\$ 4,085,399,815	\$ 4,630,230,291
2. Gross normal cost (Table 3)	26.38%	12.44%	14.12%
3. Employer normal cost rate (Table 3)	13.78%	6.90%	7.73%
4. Present value future benefits (Table 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 Table 9c for the full projection.



TABLE 2**Actuarial Present Value of Future Benefits**

	Police and Firefighters June 30, 2021 (1)	All Other Employees June 30, 2021 (2)	All Employees June 30, 2021 (3)
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 (1)	All Other Employees June 30, 2020 (2)	All Employees June 30, 2020 (3)
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

TABLE 3**Analysis of Normal Cost**

	Police and Firefighters June 30, 2021	All Other Employees June 30, 2021	All Employees June 30, 2021
	(1)	(2)	(3)
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)	(2)	(3)
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%

TABLE 4

**Statement of Net Position
(Assets at Market or Fair Value)**

Item	Valuation as of	
	June 30, 2021	June 30, 2020
1. Cash and cash equivalents	\$ 2,725,920,321	\$ 3,312,051,850
2. Receivables:		
a. Accounts receivable and others	\$ 5,981,475	\$ 5,728,204
b. Investment sale proceeds	65,065,111	150,789,478
c. Accrued income	44,912,755	38,399,145
d. Member and employer contributions	90,874,146	54,670,412
e. Subtotal	<u>\$ 206,833,487</u>	<u>\$ 249,587,239</u>
3. Investments		
a. Equity securities	\$ 7,482,033,452	\$ 6,422,516,554
b. Fixed income securities	6,545,141,487	4,131,855,027
c. Real estate investments	1,871,180,686	1,531,902,816
d. Alternative investments	3,600,762,896	2,199,495,724
e. Subtotal	<u>\$ 19,499,118,521</u>	<u>\$ 14,285,770,121</u>
4. Other		
a. Invested securities lending collateral	\$ 1,003,664,522	\$ 992,602,987
b. Equipment at cost, net of depreciation	6,005,533	7,654,129
c. Other assets	-	-
d. Subtotal	<u>\$ 1,009,670,055</u>	<u>\$ 1,000,257,116</u>
5. Total assets	\$ 23,441,542,384	\$ 18,847,666,326
6. Liabilities		
a. Accounts payable	\$ 153,922,392	\$ 128,401,072
b. Investment commitments payable	94,105,759	150,439,791
c. Securities lending collateral	1,003,664,522	992,602,987
d. Notes payable	254,058,000	190,742,000
e. Total liabilities	<u>\$ 1,505,750,673</u>	<u>\$ 1,462,185,850</u>
7. Total market value of assets available for benefits (Item 5 - Item 6e)	\$ 21,935,791,711	\$ 17,385,480,476
% in equities	12,953,977,034 59%	10,153,915,094 58%

TABLE 5

Statement of Changes in Net Position

	Year Ending	
	June 30, 2021	June 30, 2020
1. a. Value of assets at beginning of year	\$ 17,385,480,476	\$ 17,227,026,987
b. Adjustment due to post valuation changes in CAFR assets	-	-
c. Adjusted value of assets at beginning of year	\$ 17,385,480,476	\$ 17,227,026,987
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 300,626,446	\$ 287,398,031
ii. Employer contributions	1,281,558,696	1,098,589,013
iii. Total	\$ 1,582,185,142	\$ 1,385,987,044
b. Income		
i. Interest, dividends, and other income	\$ 635,042,285	\$ 484,153,583
ii. Investment expenses	(119,947,169)	(86,461,633)
iii. Net	\$ 515,095,116	\$ 397,691,950
c. Net realized and unrealized gains/(loss)	\$ 4,147,130,645	\$ (39,409,286)
d. Net income/(loss)	\$ 4,662,225,761	\$ 358,282,664
e. Total revenue	\$ 6,244,410,903	\$ 1,744,269,708
3. Expenditures for the year		
a. Refunds	\$ 23,618,435	\$ 22,443,593
b. Benefit payments	1,651,431,372	1,545,589,761
c. Administrative and miscellaneous expenses	19,049,861	17,782,865
d. Total expenditures	\$ 1,694,099,668	\$ 1,585,816,219
4. Increase/(decrease) in net assets (Item 2e - Item 3d)	\$ 4,550,311,235	\$ 158,453,489
5. Value of assets at end of year (Item 1c + Item 4)	\$ 21,935,791,711	\$ 17,385,480,476

TABLE 6

Development of Actuarial Value of Assets

	Year Ending June 30, 2021
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:	
	Remaining
	Deferrals of Excess
	(Shortfall) of
	Offsetting of
	Net Deferrals
	Years
	Recognized for
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	Investment Income
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TABLE 7

Estimation of Yields

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
A. Market value yield		
1. Beginning of year market assets	\$ 17,385,480,476	\$ 17,227,026,987
2. Investment income		
a. Change in assets (Item 3 - Item 1)	\$ 4,550,311,235	\$ 158,453,489
b. Cash Flow	<u>(111,914,526)</u>	<u>(199,829,175)</u>
c. Total investment income based on market value (Item 2a less Item 2b)	\$ 4,662,225,761	\$ 358,282,664
3. End of year market assets	\$ 21,935,791,711	\$ 17,385,480,476
4. Estimated dollar weighted market value yield (net of investment and administrative expenses)	26.90%	2.09%
B. Actuarial value yield		
1. Beginning of year actuarial assets	\$ 18,084,382,899	\$ 17,322,194,107
2. Investment income (based on asset valuation method)		
a. Change in assets (Item 3 - Item 1)	\$ 1,825,408,655	\$ 762,188,792
b. Cash Flow	<u>(111,914,526)</u>	<u>(199,829,175)</u>
c. Total investment income based on market value (Item 2a less Item 2b)	\$ 1,937,323,181	\$ 962,017,967
3. End of year actuarial assets	\$ 19,909,791,554	\$ 18,084,382,899
4. Estimated actuarial value yield (net of investment and administrative expenses)	10.75%	5.59%

TABLE 8

Allocation of Cash and Investments

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
1. Cash and short-term equivalents	12.3%	18.8%
2. Fixed income securities	29.4%	23.5%
3. Equity securities	33.7%	36.5%
4. Real estate	8.4%	8.7%
5. Other	<u>16.2%</u>	<u>12.5%</u>
6. Total investments	100.0%	100.0%

TABLE 9A**Total Experience Gain or Loss**

Item (1)	Police and Firefighters (2)	All Other Employees (3)	All Employees (4)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued 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 (includes admin expense)	\$ 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 (Table 9b)	\$ 143,651,222	\$ 531,682,164	\$ 675,333,386
9. Gain/(loss) due to change in actuarial assumptions	-	-	-
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

TABLE 9B**Investment Experience Gain or Loss**

Item (1)	June 30, 2021 (2)	June 30, 2020 (3)
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. Administrative expenses 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%)

TABLE 9C

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	14,377	60.8%
2024	25.93%	5,162	1,339	37,933	23,526	14,406	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	14,276	65.8%
2028	25.87%	5,765	1,492	42,967	28,822	14,146	67.1%
2029	25.87%	5,933	1,535	44,217	30,251	13,965	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	13,059	72.8%
2033	25.87%	6,684	1,729	49,186	36,570	12,615	74.4%
2034	25.87%	6,893	1,783	50,423	38,335	12,089	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	9,932	81.7%
2038	25.87%	7,820	2,023	55,414	46,421	8,992	83.8%
2039	25.87%	8,079	2,090	56,687	48,763	7,925	86.0%
2040	25.87%	8,349	2,160	57,981	51,263	6,719	88.4%
2041	25.87%	8,631	2,233	59,301	53,939	5,363	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	(12,640)	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.



TABLE 10**Employer Covered Payroll**

	Police and Firefighters		All Other Employees		All Employees	
	March 31, 2021 (1)	March 31, 2020 (2)	March 31, 2021 (3)	March 31, 2020 (4)	March 31, 2021 (5)	March 31, 2020 (6)
State of Hawaii	\$ 22,434,833	\$ 21,751,747	\$3,382,182,344	\$ 3,312,460,129	\$ 3,404,617,177	\$3,334,211,876
City & County of Honolulu	329,849,886	327,751,567	378,115,044	364,427,889	707,964,930	692,179,456
Board of Water Supply	-	-	40,608,422	39,554,639	40,608,422	39,554,639
County of Hawaii	80,569,443	84,333,316	112,060,580	106,697,395	192,630,023	191,030,711
County of Maui	66,109,789	63,443,252	118,144,436	113,336,252	184,254,225	176,779,504
County of Kauai	29,114,531	29,126,375	62,818,887	60,482,384	91,933,418	89,608,759
Total All Employers	\$ 528,078,482	\$ 526,406,257	\$4,093,929,713	\$ 3,996,958,688	\$ 4,622,008,195	\$4,523,364,945

TABLE 11**Schedule of Funding Progress**

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial		Annual Covered Payroll	UAAL as % of Payroll (4)/(6)
			Accrued Liability (UAAL) (3) - (2)	Funded Ratio (2)/(3)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
June 30, 2006 *	\$ 9,529.4	\$ 14,661.4	\$ 5,132.0	65.0%	\$ 3,238.3	158.5%
June 30, 2007 **	10,589.8	15,696.5	5,106.8	67.5%	3,507.0	145.6%
June 30, 2008	11,381.0	16,549.1	5,168.1	68.8%	3,782.1	136.6%
June 30, 2009	11,400.1	17,636.4	6,236.3	64.6%	4,030.1	154.7%
June 30, 2010	11,345.6	18,483.7	7,138.1	61.4%	3,895.7	183.2%
June 30, 2011 **	11,942.8	20,096.9	8,154.2	59.4%	3,916.0	208.2%
June 30, 2012	12,242.5	20,683.4	8,440.9	59.2%	3,890.0	217.0%
June 30, 2013	12,748.8	21,243.7	8,494.9	60.0%	3,906.7	217.4%
June 30, 2014	13,641.8	22,220.1	8,578.3	61.4%	3,991.6	214.9%
June 30, 2015**	14,463.7	23,238.4	8,774.7	62.2%	4,171.4	210.4%
June 30, 2016**	14,998.7	27,439.2	12,440.5	54.7%	4,258.9	292.1%
June 30, 2017	15,720.6	28,648.6	12,928.0	54.9%	4,265.0	303.1%
June 30, 2018	16,512.7	29,917.4	13,404.7	55.2%	4,383.7	305.8%
June 30, 2019**	17,322.2	31,396.4	14,074.3	55.2%	4,519.7	311.4%
June 30, 2020	18,084.4	32,691.8	14,607.4	55.3%	4,630.2	315.5%
June 30, 2021	19,909.8	34,139.2	14,229.4	58.3%	4,783.8	297.5%

Note : Dollar amounts in millions.

* Assumption changes and new Hybrid class effective June 30, 2006.

** New assumption effective on valuation date.

TABLE 12A**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)	(2)	(3)	(4)	(5)	(6)
1. Active members						
a. Number	4,897	4,940	60,664	61,810	65,561	66,750
b. Total salary	\$ 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

TABLE 12B**Historical Summary of Active Member Data**

Year Ending June 30,	Active Members		Total Salaries		Average Salary		Average Age	Average Service
	Number	Percent Increase	Amount in \$ Millions	Percent Increase	\$ Amount	Percent Increase		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2001	59,992	1.4%	\$ 2,350.2	3.3%	\$ 39,175	1.9%	45.6	13.3
2002	62,208	3.7%	2,568.7	9.3%	41,292	5.4%	45.8	13.2
2003	62,292	0.1%	2,718.4	5.8%	43,640	5.7%	46.0	13.1
2004	62,573	0.5%	2,755.5	1.4%	44,037	0.9%	46.0	13.0
2005	63,073	0.8%	2,924.5	6.1%	46,368	5.3%	46.3	13.0
2006	64,069	1.6%	3,113.7	6.5%	48,599	4.8%	46.4	13.0
2007	65,251	1.8%	3,340.5	7.3%	51,194	5.3%	46.5	13.0
2008	66,589	2.1%	3,601.7	7.8%	54,089	5.7%	46.6	12.9
2009	67,912	2.0%	3,838.0	6.6%	56,514	4.5%	46.8	12.9
2010	65,890	-3.0%	3,713.6	-3.2%	56,360	-0.3%	47.1	13.2
2011	65,310	-0.9%	3,731.4	0.5%	57,133	1.4%	47.4	13.4
2012	65,599	0.4%	3,706.1	-0.7%	56,497	-1.1%	47.6	13.5
2013	66,226	1.0%	3,720.8	0.4%	56,184	-0.6%	47.7	13.5
2014	67,206	1.5%	3,871.0	4.0%	57,600	2.5%	47.8	13.5
2015	67,310	0.2%	3,952.6	2.1%	58,723	1.9%	47.8	13.2
2016	67,377	0.1%	4,118.4	4.2%	61,124	4.1%	47.9	13.3
2017	65,911	-2.2%	4,134.2	0.4%	62,723	2.6%	48.0	13.3
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

TABLE 13**History of Cash Flow**

Year Ending June 30, (1)	Contributions			Expenditures				External Cash Flow for the Year ² (9)	Market Value of Assets (10)	External Cash Flow as Percent of Market Value (11)
	Employee (2)	Employer (3)	Total (4)	Benefit	Administrative		Total (8)			
				Payments (5)	Refunds (6)	Expenses ¹ (7)				
2009	\$ 184.5	\$ 578.6	\$ 763.1	\$ (839.1)	\$ (3.5)	\$ (12.3)	\$ (854.9)	\$ (91.8)	\$ 8,818.0	(1.0%)
2010	360.0	547.6	907.6	(906.4)	(7.8)	(12.2)	(926.4)	(18.8)	9,821.6	(0.2%)
2011	231.0	534.9	765.9	(960.2)	(7.9)	(13.3)	(981.4)	(215.5)	11,642.3	(1.9%)
2012	178.8	548.4	727.2	(1,015.4)	(7.2)	(11.6)	(1,034.2)	(307.0)	11,285.9	(2.7%)
2013	185.8	581.4	767.2	(1,060.6)	(7.2)	(12.3)	(1,080.1)	(312.9)	12,357.8	(2.5%)
2014	206.1	653.1	859.2	(1,122.4)	(8.5)	(12.6)	(1,143.5)	(284.3)	14,203.0	(2.0%)
2015	223.5	717.8	941.3	(1,170.7)	(10.5)	(14.0)	(1,195.2)	(253.9)	14,505.5	(1.8%)
2016	236.8	756.6	993.4	(1,232.6)	(12.9)	(14.0)	(1,259.5)	(266.1)	14,070.0	(1.9%)
2017	250.7	781.2	1,031.9	(1,306.8)	(16.3)	(15.0)	(1,338.1)	(306.2)	15,698.3	(2.0%)
2018	259.4	847.6	1,107.0	(1,395.9)	(20.8)	(15.8)	(1,432.5)	(325.5)	16,598.4	(2.0%)
2019	273.2	922.6	1,195.8	(1,469.6)	(16.5)	(13.8)	(1,499.9)	(304.1)	17,227.0	(1.8%)
2020	287.4	1,098.6	1,386.0	(1,545.6)	(22.4)	(17.8)	(1,585.8)	(199.8)	17,385.5	(1.1%)
2021	300.6	1,281.6	1,582.2	(1,651.4)	(23.6)	(19.0)	(1,694.0)	(111.8)	21,935.8	(0.5%)

Amounts in \$ millions

¹ Excludes investment expenses

² Column (9) = Column (4) + Column (8)



TABLE 14

Solvency Test

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
1. Actuarial accrued liability (AAL)		
a. Active member contributions	\$ 2,243,208,368	\$ 2,231,363,386
b. Retirees and beneficiaries	18,728,922,825	17,720,939,918
c. Active and inactive members	<u>13,167,034,279</u>	<u>12,739,452,540</u>
d. Total	\$ 34,139,165,472	\$ 32,691,755,844
2. Actuarial value of assets	\$ 19,909,791,554	\$ 18,084,382,899
3. Cumulative portion of AAL covered		
a. Active member contributions	100%	100%
b. Retirees and beneficiaries	94%	89%
c. Active and inactive members	0%	0%

TABLE 15**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)	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 an 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 Other Employees.
Beginning July 1, 2017, the employer contribution rate was 28.0% for Police and Fire, 18.0% for All Other Employees.
Beginning July 1, 2018, the employer contribution rate was 31.0% for Police and Fire, 19.0% for All Other Employees.

TABLE 16**Summary of Benefit Provisions
(For Members Hired Prior to 7/1/2012)**

	<u>Noncontributory</u>	<u>Contributory</u>	<u>Hybrid</u>
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 ¼% of average final compensation times years of credited service (Average Final Compensation or 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.)	2% of average final compensation times years of credited service (Average Final Compensation or 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.)	2% of average final compensation times years of credited service, split formula for unconverted noncontributory service at 1 ¼% (Average Final Compensation or 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.)

TABLE 16 (CONTINUED)

	Noncontributory	Contributory	Hybrid
Early Retirement			
Eligibility	Age 55 and 20 years credited service	Any age and 25 years credited service	Age 55 with 20 years credited service
Benefit	Maximum allowance reduced 6% per year under age 62	Maximum allowance reduced 5% per year under age 55 plus 4% per year under age 50	Maximum allowance reduced 5% for each 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 at age 65	Accrued maximum allowance payable at age 55	Accrued maximum allowance payable at age 62
Annuity Savings Account			
Interest	Not applicable	4.5% per annum on employee contributions and accrued interest	4.5% per annum on employee contributions and accrued interest
Eligibility	Not applicable	Requests refund and forfeits future retirement benefit	Requests refund and forfeits future retirement benefit
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, both times 150%. Return of non-Hybrid balance transfers and accrued interest.

TABLE 16 (CONTINUED)

	Noncontributory	Contributory	Hybrid
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1 ¼% of AFC times years of credited service, unreduced for age (Minimum is 12.5% of AFC)	1 ¾% 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 unconverted noncontributory service at 1 ¼% (Minimum is 25% of AFC)
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Accrued maximum allowance, but not less than 15% AFC. For accidents that occur on or after July 1, 2004, lifetime pension of 35% of AFC.	Totally disabled: lifetime pension of 66 2/3% AFC plus annuity. Occupationally disabled: same benefit (66 2/3% pension plus annuity) paid for 3 years and then pension is reduced to 33 1/3% AFC if not totally disabled. For accidents on or after July 7, 1998, 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.

TABLE 16 (CONTINUED)

	Noncontributory	Contributory	Hybrid
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	<p>Surviving spouse/reciprocal beneficiary and dependent children receive a benefit equal to a percentage of member's accrued maximum allowance unreduced for age; or</p> <p>Option B (100% Joint and Survivor) benefit for surviving spouse if member was eligible for retirement at time of death and a percentage of member's accrued maximum allowance unreduced for age for the dependent children</p>	<p>Lump sum payment of member's contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; or</p> <p>Option 3 (50% Joint and Survivor) benefit if member was not eligible for retirement at the time of death, credited with 10 years of service, and one beneficiary designated (benefit calculated using the ordinary disability retirement formula); or</p> <p>Option 2 (100% Joint and Survivor) benefit if member was eligible for retirement at the time of death and one beneficiary designated</p>	<p>Return of member's Hybrid contributions and accrued interest (both times 150%) plus return of non-Hybrid balance transfers and accrued interest; or</p> <p>Option 3 (50% Joint Survivor) lifetime benefit if credited with at least 10 years of service and one beneficiary designated; or</p> <p>Option 2 (100% Joint Survivor) lifetime monthly benefit if member was eligible for service retirement at time of death, and one beneficiary designated</p>

TABLE 16 (CONTINUED)

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

TABLE 16 (CONTINUED)

For members hired after June 30, 2011, the interest crediting rate on employee contributions and accrued interest is 2.0% per annum.

The plan provisions summarized above apply to teachers and most State and County employees. Special provisions applicable to other groups of employees are outlined below:

- A. Police officers, firefighters, investigators of the Department of the Prosecuting Attorney and the Attorney General, narcotic enforcement investigators, and public safety 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 ½% of average final compensation (AFC) for each year of such service up to a maximum of 80% AFC, provided the last 5 years of 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 ½% 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 require 25 years of credited service in order to retire before age 55.
- C. Sewer workers in specified classifications, water safety officers, and emergency medical technicians (EMTs) 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. (The 25-year feature is phased in through 7/1/2008 for EMTs.)
- D. Sewer workers in specified classifications, water safety officers, and emergency medical technicians (EMTs) that transfer to the Hybrid class contribute 9.75% of their monthly salary to the ERS. These members may retire at age 62 with 5 years of credited service or at any age if they are credited with 25 years of such service with the last 5 or more years in these occupations.

TABLE 16 (CONTINUED)
Summary of Benefit Provisions
(For Members Hired After 6/30/2012)

	Contributory (for Police/Fire)	Contributory (for Judges/Elected Officers)	Hybrid
Employee Contributions	14.2% of base pay earnings	9.8% of base pay earnings	8.0% of base pay earnings 11.75% of base pay earnings for Sewer workers, water safety officers, and emergency medical technicians (EMTs)
Normal Retirement Eligibility	Age 60 and 10 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 Sewer workers, water safety officers, and EMTs may retire with 25 years credited service at age 55.
Benefit	2.25% of average final compensation times years of credited service. (Average final compensation or AFC is an average of the highest base pay earnings during any five years of credited service, excluding any salary paid in lieu of vacation.) Maximum is 80% of AFC.	3.0% of average final compensation times years of credited service (Average final compensation or AFC is an average of the highest base pay earnings during any five years of credited service, excluding any salary paid in lieu of vacation.) Maximum is 75% of AFC.	1.75% of average final compensation times years of credited service (Average final compensation or AFC is an average of the highest base pay earnings during any five years of credited service, excluding any salary paid in lieu of vacation.)

TABLE 16 (CONTINUED)

	Contributory (for Police/Fire)	Contributory (for Judges/Elected Officers)	Hybrid
Early Retirement			
Eligibility	Age 55 and 25 years credited service	Age 55 and 25 years credited service Any age with 10 years for elected officers	Age 55 with 20 years credited service Sewer workers, water safety officers, and emergency medical technicians (EMTs) may retire with 25 years credited service.
Benefit	Maximum allowance reduced 6% per year under age 60	Maximum allowance reduced 6% per year under age 60	Maximum allowance reduced 5% for each year under age 65
Deferred Vesting			
Eligibility	10 years credited service and contributions left in the ERS	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 at age 60	Accrued maximum allowance payable at age 60	Accrued maximum allowance payable at age 65
Annuity Savings Account			
Interest	2.0% per annum	2.0% per annum	2.0% per annum
Eligibility	Requests refund and forfeits future retirement benefit	Requests refund and forfeits future retirement benefit	Requests refund and forfeits future retirement benefit
Benefit			
- Terminates with less than 10 years credited service	Return of member's contributions and accrued interest	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	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest, both times 120%

TABLE 16 (CONTINUED)

	Contributory (for Police/Fire)	Contributory (for Judges/Elected Officers)	Hybrid
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1 ¾% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	3.0% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	1 ¾% of AFC times years of credited service, unreduced for age (Minimum is 25% of AFC)
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Lifetime pension of 50% of AFC plus refund of member’s contributions and accrued interest.	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.

TABLE 16 (CONTINUED)

	Contributory (for Police/Fire)	Contributory (for Judges/Elected Officers)	Hybrid
Ordinary Death			
Eligibility	Active employee at time of death with at least 1 years of credited service	Active employee at time of death with at least 1 years of credited service	Active employee at time of death with at least 10 years of service
Benefit	<p>Lump sum payment of member’s contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; or</p> <p>Option 3 (50% Joint Survivor) lifetime benefit if credited with at least 10 years of service and one beneficiary designated; or</p> <p>Option 2 (100% Joint Survivor) lifetime monthly benefit if member was eligible for service retirement at time of death, and one beneficiary designated</p>	<p>Lump sum payment of member’s contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; or</p> <p>Option 3 (50% Joint Survivor) lifetime benefit if credited with at least 10 years of service and one beneficiary designated; or</p> <p>Option 2 (100% Joint Survivor) lifetime monthly benefit if member was eligible for service retirement at time of death, and one beneficiary designated</p>	<p>Return of member’s Hybrid contributions and interest; or</p> <p>Option 3 (50% Joint Survivor) lifetime benefit if credited with at least 10 years of service and one beneficiary designated; or</p> <p>Option 2 (100% Joint Survivor) lifetime monthly benefit if member was eligible for service retirement at time of death, and one beneficiary designated</p>

TABLE 16 (CONTINUED)

	Contributory (for Police/Fire)	Contributory (for Judges/Elected Officers)	Hybrid
Service-Connected Death			
Eligibility	Any age or service	Any age or service	Any age or service
Benefit	<p>Same for all members.</p> <p>Lump sum payment of member’s contributions and interest, plus pension of 50% AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship);</p> <p>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.</p> <p>If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.</p>		

TABLE 16 (CONTINUED)

Post Retirement Benefit

Each retiree's original retirement allowance is increased by 1 ½% (if their membership date is after June 30, 2012) or 2 ½% (if their membership date is before July 1, 2012) on each July 1 beginning the calendar year after retirement. This cumulative benefit is not compounded.

Retirement Options

Contributory or Hybrid Member

Maximum Allowance: The member receives a lifetime maximum allowance and 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 and 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.

Option Two (100% Joint and Survivor with Pop-Up): The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary and at death of the member; the same allowance is paid to the designated beneficiary for life. Should the designated beneficiary predecease the retiree, another beneficiary cannot be named, the benefit will revert back to the Maximum Allowance, and all payments will cease at the retiree's death.

Option Three (50% Joint and Survivor with Pop-Up): This allowance 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 of the member 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, the benefit will revert back to the Maximum Allowance, and all payments will cease at the retiree's death.

Option Four: This option allows the member to devise an allowance 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 allowances 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 contribution, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid class 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 class 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.



TABLE 16 (CONTINUED)

Combination of Options Five and Two: The member receives a reduced lifetime allowance based on ages of both 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 class members are not allowed the 75% option); at death of the member, 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, the benefit will revert back to the Maximum Allowance (as adjusted for the contribution withdrawal), and all payments will cease at the retiree's death.

Combination of Options Five and Three: The member receives a reduced lifetime allowance based on ages of both 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 class members are not allowed the 75% option); at death of the member, 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, the benefit will revert back to the Maximum Allowance (as adjusted for the contribution withdrawal), and all payments will cease at the retiree's death.

Option Five: The member receives a reduced lifetime allowance and is allowed to withdraw all accumulated contributions; at death, the retiree is entitled to the pension for the entire month that death occurs.

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 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 Member

Maximum Allowance: The member receives a lifetime pension and at death, the retiree is entitled to the pension for the entire month that death occurs.

Option A (50% Joint and Survivor with Pop-Up): The member receives a reduced lifetime pension and at death of the member, 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, the benefit will revert back to the Maximum Allowance, and all payments will cease at the retiree's death.

Option B (100% Joint and Survivor with Pop-up): The member receives a reduced lifetime pension and at death of the member, 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, the benefit will revert back to the Maximum Allowance, and all payments will cease at the retiree's death.

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 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 as if death had occurred immediately prior to retirement in lieu of the death benefits described above.



TABLE 17

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 rehire.

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 in 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 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.



TABLE 17 (CONTINUED)

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 ERS's Board of Trustees the authority to set the salary increase assumption. As a result of this 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 ERS. 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% of pay in FY 2013, 23% in FY 2014, 24% in FY 2015, and 25% 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.



TABLE 17 (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 10 years 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 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.

Act 153, 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.

TABLE 17 (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.

TABLE 18

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.

TABLE 18 (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 & 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.

TABLE 18 (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.

TABLE 18 (CONTINUED)

3. Salary increase rates: As shown below

Years of Service	General Employees		Teachers	
	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%

TABLE 18 (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 2.5% 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%

TABLE 18 (CONTINUED)

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%.

TABLE 18 (CONTINUED)

B. Demographic Assumptions

1. Mortality rates:

Active Members: Multiples of the Pub-2010, Employee Tables for active employees based on the occupation of the member as follows:

Type	General Employees		Teachers		Police and Fire	
	Male & Female	Male & Female	Male & Female	Male & Female	Male & Female	Male & Female
Ordinary	94%		92%		83%	
% of Ordinary	41%		52%		24%	
Choosing Annuity						
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)

Age	General Employees		Teachers		Police and Fire	
	Male	Female	Male	Female	Male	Female
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	0	0	0	0	0	0

TABLE 18 (CONTINUED)

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

<u>Life Expectancy for an Age 65 Retiree in Years</u>					
Gender	Year of Retirement				
	2025	2030	2035	2040	2045
<u>General Retirees</u>					
Male	23.8	24.2	24.7	25.2	25.6
Female	26.8	27.2	27.5	27.9	28.2
<u>Teachers</u>					
Male	24.5	25.0	25.4	25.9	26.3
Female	28.2	28.5	28.8	29.1	29.5
<u>Police and Fire</u>					
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:

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

TABLE 18 (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

TABLE 18 (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			

TABLE 18 (CONTINUED)

Noncontributory Members

Age	Expected Retirements per 100 Lives									
	General Employees				Teachers				Reduced Retirement	
	Unreduced		25 & Out		Reduced		Unreduced		Male	Female
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 age 50-54 are 15% for male and 11% for female.

TABLE 18 (CONTINUED)

Hybrid Members

Age	Expected Retirements per 100 Lives							
	General Employees				Teachers			
	Unreduced		Reduced		Unreduced		Reduced	
	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 age 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.

TABLE 18 (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%

TABLE 18 (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.

TABLE 18 (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.

SECTION N – STATISTICAL TABLES

TABLE NO.	PAGE NUMBER	CONTENT OF TABLE
19	70	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – ALL EMPLOYEES
20	71	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – NONCONTRIBUTORY MEMBERS, ALL
21	72	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – NONCONTRIBUTORY MEMBERS, GENERAL EMPLOYEES
22	73	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – NONCONTRIBUTORY MEMBERS, TEACHERS
23	74	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – CONTRIBUTORY MEMBERS, ALL
24	75	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – CONTRIBUTORY MEMBERS, GENERAL EMPLOYEES
25	76	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – CONTRIBUTORY MEMBERS, TEACHERS
26	77	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – CONTRIBUTORY MEMBERS, POLICE AND FIRE
27	78	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – HYBRID MEMBERS, ALL
28	79	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – HYBRID MEMBERS, GENERAL EMPLOYEES
29	80	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE – HYBRID MEMBERS, TEACHERS
30	81	SUMMARY OF PENSION IN FORCE BY TYPE OF RETIREMENT
31	82	SUMMARY OF PENSION IN FORCE BY AGE AND TYPE – GENERAL EMPLOYEES
32	83	SUMMARY OF PENSION IN FORCE BY AGE AND TYPE – TEACHERS
33	84	SUMMARY OF PENSION IN FORCE BY AGE AND TYPE – POLICE AND FIRE
34	85	NONCONTRIBUTORY PENSIONS IN FORCE BY YEARS OF SERVICE
35	86	NONCONTRIBUTORY PENSIONS IN FORCE BY YEARS SINCE RETIREMENT
36-1	87	CONTRIBUTORY PENSIONS IN FORCE BY YEARS OF SERVICE
36-2	88	HYBRID PENSIONS IN FORCE BY YEARS OF SERVICE
37-1	89	CONTRIBUTORY PENSIONS IN FORCE BY YEARS SINCE RETIREMENT
37-2	90	HYBRID PENSIONS IN FORCE BY YEARS SINCE RETIREMENT
38,41	91/94	PENSIONS IN FORCE BY PAYMENT OPTION – GENERAL EMPLOYEES/NEW
39,42	92/95	PENSIONS IN FORCE BY PAYMENT OPTION – TEACHERS/NEW
40,43	93/96	PENSIONS IN FORCE BY PAYMENT OPTION – POLICE AND FIRE/NEW



TABLE 19

**Distribution of Active Members by Age and by Years of Service - All Employees
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	345 \$48,639	236 \$48,771	89 \$48,263	37 \$46,894	12 \$46,327	4 \$51,245	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	723 \$48,522
25-29	647 \$51,385	882 \$50,051	794 \$52,266	570 \$52,293	380 \$55,858	402 \$56,745	1 \$44,069	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	3,676 \$52,443
30-34	489 \$53,532	747 \$52,019	774 \$53,271	735 \$56,519	665 \$57,357	2,324 \$62,498	251 \$77,446	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	5,985 \$58,586
35-39	376 \$53,100	564 \$52,634	655 \$55,948	601 \$57,561	533 \$59,688	2,422 \$65,060	1,746 \$76,980	295 \$79,573	2 \$52,112	0 \$0	0 \$0	0 \$0	7,194 \$65,091
40-44	293 \$52,366	497 \$52,868	523 \$53,707	474 \$57,530	427 \$58,129	1,932 \$64,696	1,994 \$77,299	1,894 \$83,371	255 \$91,614	0 \$0	0 \$0	0 \$0	8,289 \$70,236
45-49	259 \$54,427	383 \$52,468	389 \$57,644	372 \$56,910	367 \$55,738	1,593 \$64,152	1,498 \$75,115	1,930 \$82,114	1,689 \$93,072	231 \$98,276	2 \$59,612	0 \$0	8,713 \$74,768
50-54	205 \$52,282	338 \$53,913	301 \$56,314	332 \$56,303	265 \$58,250	1,282 \$61,509	1,276 \$72,504	1,619 \$78,354	1,784 \$90,136	1,754 \$93,591	337 \$86,394	0 \$0	9,493 \$77,143
55-59	181 \$51,425	256 \$53,789	279 \$53,787	256 \$53,971	214 \$60,197	1,110 \$60,529	1,220 \$67,580	1,367 \$71,772	1,158 \$80,723	1,433 \$87,137	1,396 \$90,617	124 \$89,675	8,994 \$74,327
60-64	97 \$63,565	181 \$57,638	205 \$55,355	166 \$57,798	218 \$60,202	891 \$63,201	938 \$66,240	1,072 \$69,797	944 \$72,937	990 \$81,691	983 \$87,727	551 \$91,886	7,236 \$73,317
65 & Over	64 \$57,400	105 \$52,987	114 \$60,033	101 \$54,919	117 \$59,690	650 \$64,633	715 \$68,777	782 \$73,089	700 \$75,684	575 \$85,454	574 \$90,628	761 \$104,036	5,258 \$78,026
Total	2,956 \$52,596	4,189 \$52,174	4,123 \$54,410	3,644 \$55,919	3,198 \$57,987	12,610 \$63,234	9,639 \$73,329	8,959 \$77,777	6,532 \$85,238	4,983 \$88,649	3,292 \$89,305	1,436 \$98,134	65,561 \$70,499



TABLE 20

**Distribution of Active Members by Age and by Years of Service
Noncontributory Members, All
As of 06/30/2021**

Attained Age	Years of Credited Service												Total Count & Avg. Comp.
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 25	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
25-29	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
30-34	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
35-39	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	12 \$60,532	110 \$66,348	0 \$0	0 \$0	0 \$0	0 \$0	122 \$65,775
40-44	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2 \$25,018	39 \$59,564	733 \$74,582	91 \$72,684	0 \$0	0 \$0	0 \$0	865 \$73,591
45-49	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,311	0 \$0	22 \$66,586	765 \$74,941	533 \$78,240	77 \$77,836	1 \$68,187	0 \$0	1,399 \$76,199
50-54	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	14 \$52,413	612 \$70,929	664 \$77,334	629 \$81,549	143 \$74,399	0 \$0	2,062 \$76,346
55-59	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$35,645	11 \$62,624	600 \$65,300	542 \$73,581	600 \$79,788	556 \$83,038	47 \$81,942	2,357 \$75,384
60-64	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,117	8 \$48,777	425 \$62,483	458 \$68,052	464 \$76,321	442 \$82,758	182 \$86,037	1,980 \$73,640
65 & Over	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2 \$55,964	11 \$68,826	330 \$63,746	340 \$69,171	292 \$80,057	278 \$85,350	303 \$98,304	1,556 \$78,608
Total	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,311	6 \$40,287	117 \$60,549	3,575 \$69,784	2,628 \$73,909	2,062 \$79,510	1,420 \$82,523	532 \$92,662	10,341 \$75,574



TABLE 21

**Distribution of Active Members by Age and by Years of Service
Noncontributory Members, General Employees
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
25-29	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
30-34	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
35-39	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	10 \$59,003	72 \$59,247	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
40-44	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2 \$25,018	23 \$50,560	380 \$69,619	58 \$69,188	0 \$0	0 \$0	0 \$0	0 \$0
45-49	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,311	0 \$0	17 \$64,334	476 \$69,801	274 \$72,718	51 \$70,807	1 \$68,187	0 \$0	0 \$0
50-54	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	13 \$50,457	466 \$65,616	433 \$73,963	359 \$76,865	123 \$72,018	0 \$0	0 \$0
55-59	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$35,645	9 \$60,351	484 \$59,747	429 \$68,694	430 \$75,359	376 \$77,446	40 \$79,110	0 \$0
60-64	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,117	8 \$48,777	351 \$57,803	377 \$63,265	368 \$71,463	346 \$76,854	144 \$82,997	0 \$0
65 & Over	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$41,546	6 \$45,428	271 \$58,173	278 \$62,969	220 \$69,584	217 \$77,165	210 \$87,999	0 \$0
Total	0 \$0	0 \$0	0 \$0	0 \$0	1 \$44,311	5 \$34,269	86 \$54,750	2,500 \$63,798	1,849 \$68,572	1,428 \$73,681	1,063 \$76,559	394 \$85,268	7,326 \$69,807



TABLE 22

**Distribution of Active Members by Age and by Years of Service
Noncontributory Members, Teachers
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
25-29	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
30-34	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
35-39	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2 \$68,176	38 \$79,801	0 \$0	0 \$0	0 \$0	0 \$0	40 \$79,219
40-44	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	16 \$72,507	353 \$79,924	33 \$78,828	0 \$0	0 \$0	0 \$0	402 \$79,539
45-49	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	5 \$74,244	289 \$83,406	259 \$84,081	26 \$91,625	0 \$0	0 \$0	579 \$83,998
50-54	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$77,841	146 \$87,887	231 \$83,653	270 \$87,778	20 \$89,042	0 \$0	668 \$86,398
55-59	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2 \$72,852	116 \$88,470	113 \$92,132	170 \$90,993	180 \$94,720	7 \$98,122	588 \$91,878
60-64	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	74 \$84,681	81 \$90,330	96 \$94,944	96 \$104,038	38 \$97,556	385 \$94,526
65 & Over	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$70,381	5 \$96,903	59 \$89,343	62 \$96,978	72 \$112,060	61 \$114,467	93 \$121,575	353 \$108,204
Total	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$70,381	31 \$76,637	1,075 \$83,704	779 \$86,575	634 \$92,640	357 \$100,282	138 \$113,771	3,015 \$89,587



TABLE 23

**Distribution of Active Members by Age and by Years of Service
Contributory Members, All
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	36 \$73,143	35 \$66,857	17 \$70,679	8 \$66,388	1 \$62,811	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	97 \$69,779
25-29	56 \$70,441	91 \$67,479	84 \$72,088	44 \$67,913	43 \$71,106	50 \$75,558	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	368 \$70,555
30-34	33 \$68,498	84 \$65,903	64 \$65,656	76 \$67,656	69 \$70,494	306 \$80,769	65 \$108,110	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	697 \$77,112
35-39	11 \$65,896	34 \$65,670	34 \$69,011	35 \$72,336	46 \$69,119	262 \$79,196	295 \$105,819	69 \$117,696	0 \$0	0 \$0	0 \$0	0 \$0	786 \$90,461
40-44	6 \$75,136	11 \$67,195	13 \$67,388	18 \$67,643	15 \$79,463	123 \$81,263	290 \$105,934	309 \$119,875	66 \$140,468	0 \$0	0 \$0	0 \$0	851 \$107,525
45-49	8 \$78,347	4 \$64,654	5 \$72,094	7 \$88,802	5 \$82,513	71 \$83,446	151 \$105,714	253 \$119,391	400 \$134,842	55 \$160,038	0 \$0	0 \$0	959 \$122,119
50-54	1 \$197,229	3 \$95,887	4 \$85,959	5 \$66,008	0 \$0	30 \$85,886	73 \$115,876	183 \$114,339	346 \$135,880	214 \$155,370	39 \$159,921	0 \$0	898 \$133,206
55-59	5 \$103,595	4 \$110,069	4 \$133,182	0 \$0	1 \$69,593	9 \$100,348	16 \$115,722	55 \$120,921	91 \$137,036	95 \$149,864	76 \$159,764	20 \$123,811	376 \$139,073
60-64	1 \$197,229	2 \$136,193	3 \$66,757	1 \$75,433	5 \$127,383	7 \$77,094	10 \$121,637	14 \$118,123	18 \$129,728	29 \$133,909	22 \$148,371	89 \$99,898	201 \$115,251
65 & Over	0 \$0	1 \$74,459	1 \$77,240	1 \$209,155	1 \$77,240	4 \$136,236	6 \$110,879	9 \$132,509	15 \$133,988	13 \$148,848	6 \$213,584	127 \$99,983	184 \$112,854
Total	157 \$73,587	269 \$68,111	229 \$70,724	195 \$69,983	186 \$72,861	862 \$80,889	906 \$107,196	892 \$118,598	936 \$135,724	406 \$152,973	143 \$160,312	236 \$101,970	5,417 \$107,447



TABLE 24

**Distribution of Active Members by Age and by Years of Service
Contributory Members, General Employees
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	1 \$63,230	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$63,230
25-29	2 \$66,969	0 \$0	0 \$0	1 \$23,210	1 \$63,230	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	4 \$55,095
30-34	1 \$63,230	0 \$0	0 \$0	0 \$0	2 \$61,887	2 \$81,358	2 \$86,636	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	7 \$74,713
35-39	0 \$0	0 \$0	4 \$66,131	2 \$130,230	3 \$54,560	6 \$80,435	4 \$64,821	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	19 \$75,292
40-44	0 \$0	1 \$63,230	1 \$70,708	0 \$0	1 \$197,324	3 \$47,148	9 \$88,518	7 \$83,156	2 \$80,191	0 \$0	0 \$0	0 \$0	24 \$83,827
45-49	3 \$98,959	0 \$0	1 \$70,708	1 \$197,229	2 \$110,220	3 \$107,896	5 \$87,485	13 \$111,022	9 \$87,746	0 \$0	0 \$0	0 \$0	37 \$102,145
50-54	1 \$197,229	2 \$106,602	1 \$59,146	2 \$54,334	0 \$0	6 \$110,017	10 \$144,573	24 \$111,048	12 \$91,296	8 \$126,278	3 \$103,325	0 \$0	69 \$112,536
55-59	2 \$128,187	1 \$209,155	3 \$156,538	0 \$0	1 \$69,593	6 \$110,183	3 \$156,413	11 \$130,076	7 \$116,630	12 \$111,993	5 \$121,853	10 \$82,562	61 \$117,395
60-64	1 \$197,229	2 \$136,193	1 \$63,230	0 \$0	5 \$127,383	6 \$78,480	8 \$116,934	6 \$120,179	4 \$93,858	7 \$120,748	5 \$138,179	61 \$82,159	106 \$96,420
65 & Over	0 \$0	0 \$0	1 \$77,240	1 \$209,155	1 \$77,240	4 \$136,236	5 \$119,313	8 \$140,277	10 \$139,909	6 \$173,396	3 \$294,124	93 \$88,851	132 \$107,669
Total	11 \$109,828	6 \$126,329	12 \$89,598	7 \$114,103	16 \$97,012	36 \$95,763	46 \$111,166	69 \$115,430	44 \$105,377	33 \$128,477	16 \$155,782	164 \$85,979	460 \$103,016

TABLE 25

**Distribution of Active Members by Age and by Years of Service
Contributory Members, Teachers
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 25	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
25-29	0 \$0	0 \$0	0 \$0	1 \$59,819	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$0
30-34	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
35-39	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$77,961	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$0
40-44	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$72,959	1 \$74,173	0 \$0	0 \$0	0 \$0	0 \$0	2 \$0
45-49	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$86,020	0 \$0	0 \$0	0 \$0	1 \$0
50-54	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$111,419	1 \$102,358	0 \$0	0 \$0	2 \$0
55-59	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$65,027	1 \$74,753	0 \$0	2 \$0
60-64	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	3 \$86,506	4 \$134,414	12 \$96,105	19 \$102,654
65 & Over	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1 \$70,365	0 \$0	2 \$155,669	0 \$0	29 \$121,275	32 \$121,833
Total	0 \$0	0 \$0	0 \$0	1 \$59,819	0 \$0	0 \$0	2 \$75,460	2 \$72,269	2 \$98,719	7 \$105,463	5 \$122,482	41 \$113,908	60 \$109,560



TABLE 26

**Distribution of Active Members by Age and by Years of Service
Contributory Members, Police and Firefighters
As of 06/30/2021**

Attained Age	Years of Credited Service												Total Count & Avg. Comp.	
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.		
Under 25	35 \$73,426	35 \$66,857	17 \$70,679	8 \$66,388	1 \$62,811	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	96 \$69,847
25-29	54 \$70,570	91 \$67,479	84 \$72,088	42 \$69,170	42 \$71,294	50 \$75,558	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	363 \$70,755
30-34	32 \$68,663	84 \$65,903	64 \$65,656	76 \$67,656	67 \$70,751	304 \$80,765	63 \$108,792	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	690 \$77,136
35-39	11 \$65,896	34 \$65,670	30 \$69,395	33 \$68,827	43 \$70,135	256 \$79,167	290 \$106,481	69 \$117,696	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	766 \$90,854
40-44	6 \$75,136	10 \$67,592	12 \$67,111	18 \$67,643	14 \$71,044	120 \$82,116	280 \$106,612	301 \$120,881	64 \$142,352	0 \$0	0 \$0	0 \$0	0 \$0	825 \$108,297
45-49	5 \$65,979	4 \$64,654	4 \$72,440	6 \$70,731	3 \$64,042	68 \$82,367	146 \$106,338	240 \$119,844	390 \$136,054	55 \$160,038	0 \$0	0 \$0	0 \$0	921 \$122,961
50-54	0 \$0	1 \$74,459	3 \$94,896	3 \$73,791	0 \$0	24 \$79,853	63 \$111,321	159 \$114,836	333 \$137,560	205 \$156,764	36 \$164,637	0 \$0	0 \$0	827 \$134,994
55-59	3 \$87,200	3 \$77,040	1 \$63,114	0 \$0	0 \$0	3 \$80,679	13 \$106,332	44 \$118,632	84 \$138,737	82 \$156,441	70 \$163,686	10 \$165,061	313 \$143,740	
60-64	0 \$0	0 \$0	2 \$68,521	1 \$75,433	0 \$0	1 \$68,778	2 \$140,450	8 \$116,581	14 \$139,977	19 \$146,242	13 \$156,585	16 \$170,370	76 \$144,666	
65 & Over	0 \$0	1 \$74,459	0 \$0	0 \$0	0 \$0	0 \$0	1 \$68,711	0 \$0	5 \$122,146	5 \$116,661	3 \$133,044	5 \$183,553	20 \$132,705	
Total	146 \$70,856	263 \$66,783	217 \$69,680	187 \$68,386	170 \$70,588	826 \$80,241	858 \$107,057	821 \$118,977	890 \$137,307	366 \$156,090	122 \$162,457	31 \$170,784	4,897 \$107,837	



TABLE 27

**Distribution of Active Members by Age and by Years of Service
Hybrid Members, All
As of 06/30/2021**

Attained Age	Years of Credited Service												Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 25	309 \$45,784	201 \$45,621	72 \$42,970	29 \$41,517	11 \$44,828	4 \$51,245	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	626 \$45,229
25-29	591 \$49,579	791 \$48,046	710 \$49,921	526 \$50,986	337 \$53,912	352 \$54,073	1 \$44,069	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	3,308 \$50,428
30-34	456 \$52,449	663 \$50,260	710 \$52,155	659 \$55,235	596 \$55,836	2,018 \$59,727	186 \$66,729	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	5,288 \$56,144
35-39	365 \$52,714	530 \$51,798	621 \$55,232	566 \$56,648	487 \$58,797	2,160 \$63,345	1,439 \$71,205	116 \$69,438	2 \$52,112	0 \$0	0 \$0	0 \$0	6,286 \$61,905
40-44	287 \$51,890	486 \$52,544	510 \$53,358	456 \$57,131	412 \$57,353	1,807 \$63,612	1,665 \$72,726	852 \$77,693	98 \$76,291	0 \$0	0 \$0	0 \$0	6,573 \$64,967
45-49	251 \$53,664	379 \$52,339	384 \$57,456	365 \$56,299	361 \$55,399	1,522 \$63,252	1,325 \$71,769	912 \$77,790	756 \$81,430	99 \$79,861	1 \$51,037	0 \$0	6,355 \$67,308
50-54	204 \$51,572	335 \$53,537	297 \$55,915	327 \$56,155	265 \$58,250	1,252 \$60,925	1,189 \$70,078	824 \$75,878	774 \$80,668	911 \$87,394	155 \$78,960	0 \$0	6,533 \$69,689
55-59	176 \$49,943	252 \$52,895	275 \$52,633	256 \$53,971	213 \$60,153	1,100 \$60,225	1,193 \$66,980	712 \$73,429	525 \$78,336	738 \$85,038	764 \$89,254	57 \$84,073	6,261 \$70,041
60-64	96 \$62,172	179 \$56,760	202 \$55,185	165 \$57,691	213 \$58,625	883 \$63,113	920 \$65,790	633 \$73,640	468 \$75,533	497 \$83,658	519 \$89,388	280 \$93,142	5,055 \$71,523
65 & Over	64 \$57,400	104 \$52,781	113 \$59,881	100 \$53,377	116 \$59,539	644 \$64,215	698 \$68,414	443 \$78,842	345 \$79,568	270 \$88,238	290 \$93,143	331 \$110,838	3,518 \$75,947
Total	2,799 \$51,419	3,920 \$51,081	3,894 \$53,451	3,449 \$55,124	3,011 \$57,073	11,742 \$61,950	8,616 \$69,941	4,492 \$76,033	2,968 \$79,348	2,515 \$85,758	1,729 \$89,002	668 \$101,136	49,803 \$65,427



TABLE 28

**Distribution of Active Members by Age and by Years of Service
Hybrid Members, General Employees
As of 06/30/2021**

Attained Age	Years of Credited Service												Total	
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.		
Under 25	147 \$40,903	134 \$42,443	65 \$42,014	28 \$41,437	11 \$44,828	4 \$51,245	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	389 \$41,875
25-29	334 \$47,301	518 \$46,844	433 \$46,615	339 \$48,251	194 \$49,796	232 \$49,346	1 \$44,069	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2,051 \$47,664
30-34	303 \$50,604	507 \$48,752	521 \$49,994	471 \$53,125	399 \$52,824	1,229 \$56,320	118 \$63,836	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	3,548 \$53,254
35-39	261 \$50,545	402 \$48,922	467 \$52,683	428 \$53,275	361 \$56,327	1,490 \$60,837	748 \$69,558	74 \$65,357	2 \$52,112	0 \$0	0 \$0	0 \$0	0 \$0	4,233 \$58,638
40-44	201 \$49,564	365 \$50,198	390 \$50,532	344 \$53,165	317 \$55,088	1,329 \$59,490	1,028 \$70,793	416 \$74,966	59 \$71,920	0 \$0	0 \$0	0 \$0	0 \$0	4,449 \$60,915
45-49	189 \$52,794	290 \$51,269	296 \$54,170	279 \$53,096	281 \$51,551	1,153 \$59,533	916 \$67,258	576 \$74,977	384 \$77,232	55 \$73,086	1 \$51,037	0 \$0	0 \$0	4,420 \$62,748
50-54	156 \$49,800	260 \$52,208	241 \$53,926	255 \$51,556	200 \$55,331	967 \$56,030	909 \$66,274	609 \$71,285	511 \$76,799	451 \$85,365	121 \$76,250	0 \$0	0 \$0	4,680 \$64,820
55-59	141 \$47,270	213 \$51,534	229 \$50,677	215 \$50,415	176 \$58,043	913 \$57,489	946 \$62,762	551 \$68,807	392 \$74,400	490 \$82,108	485 \$84,697	49 \$79,559	49 \$65,510	4,800 \$65,510
60-64	85 \$61,031	153 \$55,364	163 \$52,603	131 \$55,447	186 \$56,346	751 \$59,855	757 \$61,652	494 \$67,305	362 \$68,834	384 \$79,614	378 \$85,719	189 \$87,268	189 \$66,757	4,033 \$66,757
65 & Over	56 \$57,579	82 \$51,272	91 \$57,329	93 \$52,795	97 \$54,981	546 \$61,446	585 \$64,376	360 \$74,612	267 \$72,153	195 \$80,751	202 \$86,233	223 \$101,474	223 \$70,081	2,797 \$70,081
Total	1,873 \$49,719	2,924 \$49,505	2,896 \$51,001	2,583 \$52,111	2,222 \$54,279	8,614 \$58,555	6,008 \$66,234	3,080 \$71,638	1,977 \$74,151	1,575 \$81,950	1,187 \$84,394	461 \$93,320	35,400 \$61,656	

TABLE 29

**Distribution of Active Members by Age and by Years of Service
Hybrid Members, Teachers
As of 06/30/2021**

Attained Age	Years of Credited Service												Total	
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.		
Under 25	162 \$50,214	67 \$51,979	7 \$51,843	1 \$43,760	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	237 \$50,734
25-29	257 \$52,539	273 \$50,327	277 \$55,089	187 \$55,944	143 \$59,496	120 \$63,212	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1,257 \$54,938
30-34	153 \$56,104	156 \$55,162	189 \$58,110	188 \$60,521	197 \$61,938	789 \$65,034	68 \$71,750	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1,740 \$62,036
35-39	104 \$58,158	128 \$60,832	154 \$62,962	138 \$67,108	126 \$65,876	670 \$68,922	691 \$72,988	42 \$76,628	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2,053 \$68,642
40-44	86 \$57,328	121 \$59,622	120 \$62,544	112 \$69,310	95 \$64,908	478 \$75,073	637 \$75,847	436 \$80,294	39 \$82,902	0 \$0	0 \$0	0 \$0	0 \$0	2,124 \$73,455
45-49	62 \$56,316	89 \$55,826	88 \$68,508	86 \$66,688	80 \$68,914	369 \$74,873	409 \$81,873	336 \$82,612	372 \$85,762	44 \$88,330	0 \$0	0 \$0	0 \$0	1,935 \$77,725
50-54	48 \$57,328	75 \$58,145	56 \$64,474	72 \$72,444	65 \$67,232	285 \$77,531	280 \$82,424	215 \$88,886	263 \$88,186	460 \$89,383	34 \$88,604	0 \$0	0 \$0	1,853 \$81,984
55-59	35 \$60,714	39 \$60,331	46 \$62,370	41 \$72,616	37 \$70,191	187 \$73,587	247 \$83,135	161 \$89,246	133 \$89,937	248 \$90,826	279 \$97,176	8 \$111,721	8 \$84,926	1,461 \$84,926
60-64	11 \$70,987	26 \$64,975	39 \$65,978	34 \$66,338	27 \$74,325	132 \$81,650	163 \$85,003	139 \$96,151	106 \$98,410	113 \$97,397	141 \$99,224	91 \$105,341	91 \$90,331	1,022 \$90,331
65 & Over	8 \$56,148	22 \$58,404	22 \$70,436	7 \$61,108	19 \$82,806	98 \$79,641	113 \$89,319	83 \$97,187	78 \$104,948	75 \$107,704	88 \$109,005	108 \$130,173	721 \$98,702	721 \$98,702
Total	926 \$54,858	996 \$55,707	998 \$60,559	866 \$64,109	789 \$64,939	3,128 \$71,300	2,608 \$78,480	1,412 \$85,620	991 \$89,716	940 \$92,139	542 \$99,092	207 \$118,543	14,403 \$74,695	14,403 \$74,695



TABLE 30

Summary of Pensions in Force by Type of Retirement

Employee Group	Contributory		Noncontributory		Hybrid	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
All Employees	17,934	\$ 3,458	16,956	\$ 1,813	12,834	\$ 2,416
	<u>Service</u>		<u>Service</u>		<u>Service</u>	
Total	17,570	\$ 3,494	16,044	\$ 1,856	12,361	\$ 2,449
General Employees - male	3,393	3,096	5,165	1,861	3,663	2,535
General Employees - female	5,288	2,229	6,435	1,430	5,363	2,096
Teachers - male	1,138	3,836	1,408	2,623	973	3,284
Teachers - female	3,774	3,508	3,036	2,394	2,362	2,772
Police and Firefighters	3,977	5,402	-	-	-	-
	<u>Ordinary Disability</u>		<u>Ordinary Disability</u>		<u>Ordinary Disability</u>	
Total	137	\$ 1,141	711	\$ 1,056	349	\$ 1,559
General Employees - male	42	1,147	327	1,048	148	1,445
General Employees - female	43	847	298	934	134	1,510
Teachers - male	4	1,735	31	1,665	16	2,119
Teachers - female	19	1,380	55	1,422	51	1,843
Police and Firefighters	29	1,329	-	-	-	-
	<u>Accidental Disability</u>		<u>Accidental Disability</u>		<u>Accidental Disability</u>	
Total	227	\$ 2,100	201	\$ 1,050	124	\$ 1,558
General Employees - male	80	1,781	104	1,094	54	1,519
General Employees - female	44	1,685	90	965	61	1,555
Teachers - male	-	-	1	1,263	1	1,461
Teachers - female	4	3,977	6	1,521	8	1,863
Police and Firefighters	99	2,466	-	-	-	-

TABLE 31**Summary of Pensions in Force by Age and Type****General Employees**

Age	Type of Pension			
	Total	Service	Ordinary Disability	Accidental Disability
Total	30,732	29,307	992	433
	Contributory			
Total	8,890	8,681	85	124
30-39	-	-	-	-
40-44	1	1	-	-
45-49	4	4	-	-
50-54	9	7	1	1
55-59	80	72	1	7
60-64	344	329	8	7
65-69	885	856	13	16
70-74	1,222	1,187	17	18
75-79	1,456	1,425	10	21
80-84	1,472	1,442	13	17
85-89	1,595	1,571	9	15
90-94	1,248	1,225	10	13
95-99	495	485	3	7
100 & over	79	77	-	2
	Noncontributory			
Total	12,419	11,600	625	194
30-39	-	-	-	-
40-44	1	-	1	-
45-49	11	2	7	2
50-54	29	5	18	6
55-59	306	235	59	12
60-64	1,030	864	127	39
65-69	2,614	2,409	148	57
70-74	3,164	3,001	133	30
75-79	2,884	2,754	100	30
80-84	1,522	1,482	26	14
85-89	630	623	6	1
90-94	202	199	-	3
95-99	26	26	-	-
100 & over	-	-	-	-
	Hybrid			
Total	9,423	9,026	282	115
30-39	1	-	-	1
40-44	7	-	4	3
45-49	4	1	1	2
50-54	32	5	17	10
55-59	460	388	61	11
60-64	1,534	1,440	72	22
65-69	3,396	3,287	75	34
70-74	2,807	2,747	40	20
75-79	970	949	10	11
80-84	174	171	2	1
85-89	32	32	-	-
90-94	6	6	-	-
95-99	-	-	-	-
100 & over	-	-	-	-

TABLE 32**Summary of Pensions in Force by Age and Type****Teachers**

Age	Type of Pension			
	Total	Service	Ordinary Disability	Accidental Disability
Total	12,887	12,691	176	20
Contributory				
Total	4,939	4,912	23	4
30-39	-	-	-	-
40-44	-	-	-	-
45-49	-	-	-	-
50-54	-	-	-	-
55-59	5	5	-	-
60-64	79	79	-	-
65-69	280	278	2	-
70-74	780	774	6	-
75-79	1,131	1,124	5	2
80-84	1,008	1,004	4	-
85-89	975	975	-	-
90-94	519	514	3	2
95-99	136	135	1	-
100 & over	26	24	2	-
Noncontributory				
Total	4,537	4,444	86	7
30-39	-	-	-	-
40-44	-	-	-	-
45-49	-	-	-	-
50-54	4	-	4	-
55-59	77	61	15	1
60-64	213	200	13	-
65-69	640	618	18	4
70-74	1,355	1,335	19	1
75-79	1,339	1,324	14	1
80-84	659	656	3	-
85-89	198	198	-	-
90-94	47	47	-	-
95-99	5	5	-	-
100 & over	-	-	-	-
Hybrid				
Total	3,411	3,335	67	9
30-39	1	-	1	-
40-44	-	-	-	-
45-49	2	-	2	-
50-54	10	-	9	1
55-59	155	144	10	1
60-64	495	472	19	4
65-69	1,096	1,078	17	1
70-74	1,155	1,144	9	2
75-79	402	402	-	-
80-84	78	78	-	-
85-89	15	15	-	-
90-94	2	2	-	-
95-99	-	-	-	-
100 & over	-	-	-	-

TABLE 33**Summary of Pensions in Force by Age and Type****Police and Firefighters**

Age	Type of Pension			
	Total	Service	Ordinary Disability	Accidental Disability
Total	4,105	3,977	29	99
30-39	-	-	-	-
40-44	3	-	-	3
45-49	31	27	2	2
50-54	286	274	5	7
55-59	618	601	6	11
60-64	717	705	1	11
65-69	695	679	4	12
70-74	756	732	4	20
75-79	537	511	4	22
80-84	298	291	2	5
85-89	114	109	1	4
90-94	40	38	-	2
95-99	10	10	-	-
100 & over	-	-	-	-

TABLE 34

**Noncontributory Service Pensions in Force
by Years of Service**

Years of Service	Total		General Employees		Teachers	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	16,044	\$ 1,856	11,600	\$ 1,622	4,444	\$ 2,467
Less than 5	4	752	4	752	-	-
5-9	10	718	7	747	3	652
10-14	3,006	607	2,418	575	588	740
15-19	2,363	997	1,834	935	529	1,211
20-24	2,506	1,335	1,937	1,237	569	1,669
25-29	2,096	1,901	1,581	1,730	515	2,428
30-34	3,689	2,677	2,287	2,455	1,402	3,040
35 and over	2,370	3,534	1,532	3,235	838	4,082

TABLE 35

**Noncontributory Service Pensions in Force
by Years Since Retirement**

Years Since Retirement	Total		General Employees		Teachers	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	16,044	\$ 1,856	11,600	\$ 1,622	4,444	\$ 2,467
Less than 5	3,861	1,716	3,061	1,606	800	2,137
5-9	3,525	1,638	2,639	1,475	886	2,122
10-14	3,214	1,930	2,366	1,673	848	2,645
15-19	3,252	2,025	2,131	1,692	1,121	2,657
20-24	1,395	1,973	928	1,595	467	2,725
25-29	734	2,340	436	2,056	298	2,755
30 -34	62	1,876	38	1,567	24	2,366
35 and over	1	931	1	931	-	-

TABLE 36-1

**Contributory Service Pensions in Force
by Years of Service**

Years of Service	Total		General Employees		Teachers		Police and Firefighters	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	17,570	\$ 3,494	8,681	\$ 2,568	4,912	\$ 3,584	3,977	\$ 5,402
Less than 5	7	1,395	4	1,296	2	783	1	3,015
5-9	455	465	346	528	101	242	8	582
10-14	873	952	691	955	125	779	57	1,287
15-19	1,232	1,526	974	1,451	175	1,459	83	2,555
20-24	1,795	2,088	1,263	1,825	353	2,245	179	3,636
25-29	5,647	3,727	2,062	2,561	1,253	3,095	2,332	5,098
30-34	5,292	4,320	1,999	3,427	2,109	3,914	1,184	6,548
35 and over	2,269	4,757	1,342	4,170	794	5,416	133	6,753

TABLE 36-2**Hybrid Service Pensions in Force****by Years of Service**

Years of Service	Total		General Employees		Teachers	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	12,361	\$ 2,449	9,026	\$ 2,274	3,335	\$ 2,922
Less than 5	5	395	2	-	3	659
5-9	1,144	730	924	726	220	747
10-14	1,702	1,048	1,362	1,007	340	1,212
15-19	1,619	1,501	1,203	1,430	416	1,703
20-24	1,732	1,887	1,202	1,741	530	2,218
25-29	1,668	2,632	1,186	2,467	482	3,039
30-34	2,744	3,470	1,931	3,354	813	3,747
35 and over	1,747	4,599	1,216	4,330	531	5,216

TABLE 37-1

**Contributory Service Pensions in Force
by Years Since Retirement**

Years Since Retirement	Total		General Employees		Teachers		Police and Firefighters	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	17,570	\$ 3,494	8,681	\$ 2,568	4,912	\$ 3,584	3,977	\$ 5,402
Less than 5	1,488	6,227	395	4,758	117	5,269	976	6,937
5-9	1,486	4,851	629	3,533	235	5,010	622	6,125
10-14	2,302	4,262	1,173	3,292	506	4,605	623	5,812
15-19	2,900	3,648	1,400	2,860	935	4,170	565	4,737
20-24	2,405	2,965	1,246	2,257	688	3,468	471	4,106
25-29	3,582	2,971	1,863	2,352	1,262	3,469	457	4,116
30-34	2,137	2,137	1,185	1,695	775	2,574	177	3,184
35 -39	1,270	1,714	790	1,423	394	2,088	86	2,668
40-44	-	-	-	-	-	-	-	-
45 and over	-	-	-	-	-	-	-	-

TABLE 37-2

Hybrid Service Pensions in Force

by Years Since Retirement

Years Since Retirement	Total		General Employees		Teachers	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	12,361	\$ 2,449	9,026	\$ 2,274	3,335	\$ 2,922
Less than 5	5,689	2,449	4,333	2,279	1,356	2,995
5-9	4,218	2,340	2,972	2,162	1,246	2,762
10-14	2,454	2,634	1,721	2,454	733	3,058

TABLE 38**Pensions in Force by Payment Option****General Employees**

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	30,732	\$ 2,061	29,307	\$ 2,103	992	\$ 1,131	433	\$ 1,372	-	\$ -
Contributory										
Total	8,890	\$ 2,541	8,681	\$ 2,568	85	\$ 995	124	\$ 1,747	-	\$ -
Maximum	1,265	2,765	1,237	2,796	15	1,397	13	1,407	-	-
Option 1	503	1,885	480	1,922	15	1,009	8	1,328	-	-
Option 2	632	3,216	609	3,267	7	1,634	16	1,967	-	-
Option 3	341	3,693	335	3,724	3	969	3	2,923	-	-
Option 4	3,876	2,733	3,792	2,761	27	891	57	1,788	-	-
Option 5	2,273	1,875	2,228	1,888	18	562	27	1,685	-	-
Noncontributory										
Total	12,419	\$ 1,581	11,600	\$ 1,622	625	\$ 994	194	\$ 1,034	-	\$ -
Maximum	6,384	1,568	6,056	1,599	241	975	87	1,059	-	-
Option A	2,589	1,675	2,455	1,708	94	1,086	40	1,027	-	-
Option B	2,763	1,517	2,447	1,587	258	967	58	1,021	-	-
Option C	683	1,598	642	1,634	32	1,071	9	913	-	-
Hybrid										
Total	9,423	\$ 2,241	9,026	\$ 2,274	282	\$ 1,476	115	\$ 1,538	-	\$ -
Maximum	3,386	2,189	3,286	2,211	58	1,495	42	1,407	-	-
Option 1	628	2,021	605	2,031	16	1,696	7	1,888	-	-
Option 2	2,086	2,271	1,955	2,326	96	1,405	35	1,555	-	-
Option 3	1,319	2,726	1,278	2,765	26	1,502	15	1,565	-	-
Option 4	1,223	2,216	1,160	2,253	57	1,473	6	2,144	-	-
Option 5	781	1,784	742	1,800	29	1,531	10	1,374	-	-

TABLE 39**Pensions in Force by Payment Option****Teachers**

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	12,887	\$ 2,999	12,691	\$ 3,019	176	\$ 1,652	20	\$ 2,133	-	\$ -
Contributory										
Total	4,939	\$ 3,574	4,912	\$ 3,584	23	\$ 1,442	4	\$ 3,977	-	\$ -
Maximum	764	3,953	756	3,972	7	1,811	1	4,759	-	-
Option 1	204	3,135	202	3,154	2	1,241	-	-	-	-
Option 2	184	3,721	184	3,721	-	-	-	-	-	-
Option 3	151	4,469	150	4,475	1	3,448	-	-	-	-
Option 4	2,055	3,936	2,045	3,947	8	1,462	2	3,056	-	-
Option 5	1,581	2,875	1,575	2,881	5	572	1	5,036	-	-
Noncontributory										
Total	4,537	\$ 2,447	4,444	\$ 2,467	86	\$ 1,509	7	\$ 1,484	-	\$ -
Maximum	2,827	2,499	2,776	2,516	45	1,572	6	1,521	-	-
Option A	785	2,548	777	2,559	7	1,540	1	1,263	-	-
Option B	695	2,158	665	2,192	30	1,407	-	-	-	-
Option C	230	2,333	226	2,347	4	1,518	-	-	-	-
Hybrid										
Total	3,411	\$ 2,899	3,335	\$ 2,922	67	\$ 1,908	9	\$ 1,819	-	\$ -
Maximum	1,415	2,818	1,384	2,839	26	1,929	5	1,712	-	-
Option 1	165	2,765	161	2,783	4	2,046	-	-	-	-
Option 2	713	2,873	693	2,893	16	2,218	4	1,952	-	-
Option 3	475	3,357	468	3,384	7	1,510	-	-	-	-
Option 4	343	3,022	332	3,066	11	1,676	-	-	-	-
Option 5	300	2,551	297	2,559	3	1,676	-	-	-	-

TABLE 40
Pensions in Force by Payment Option
Police and Firefighters

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	4,105	\$ 5,303	3,977	\$ 5,402	29	\$ 1,329	99	\$ 2,466	-	\$ -
Maximum	196	5,921	181	6,203	-	-	15	2,507	-	-
Option 1	52	5,572	45	5,920	1	2,743	6	3,429	-	-
Option 2	295	5,840	274	6,092	9	1,979	12	2,984	-	-
Option 3	135	6,915	131	7,057	2	1,393	2	3,117	-	-
Option 4	2,485	5,652	2,451	5,699	8	1,055	26	2,720	-	-
Option 5	942	3,837	895	3,949	9	752	38	1,927	-	-

TABLE 41**Pensions in Force by Payment Option****General Employees - New Retirees**

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	1,776	\$ 2,106	1,711	\$ 2,130	41	\$ 1,548	24	\$ 1,352	-	\$ -
	Contributory									
Total	86	\$ 4,738	86	\$ 4,738	-	\$ -	-	\$ -	-	\$ -
Maximum	18	5,357	18	5,357	-	-	-	-	-	-
Option 1	5	6,259	5	6,259	-	-	-	-	-	-
Option 2	21	5,004	21	5,004	-	-	-	-	-	-
Option 3	4	6,862	4	6,862	-	-	-	-	-	-
Option 4	30	4,132	30	4,132	-	-	-	-	-	-
Option 5	8	2,910	8	2,910	-	-	-	-	-	-
	Noncontributory									
Total	693	\$ 1,541	669	\$ 1,554	16	\$ 1,097	8	\$ 1,307	-	\$ -
Maximum	322	1,474	314	1,485	4	846	4	1,207	-	-
Option A	153	1,536	147	1,556	4	884	2	1,321	-	-
Option B	180	1,674	172	1,693	7	1,350	1	532	-	-
Option C	38	1,499	36	1,481	1	1,176	1	2,455	-	-
	Hybrid									
Total	997	\$ 2,272	956	\$ 2,299	25	\$ 1,837	16	\$ 1,374	-	\$ -
Maximum	352	2,327	341	2,355	4	1,464	7	1,464	-	-
Option 1	63	1,965	58	1,912	4	2,314	1	3,682	-	-
Option 2	205	2,384	192	2,460	7	1,364	6	1,152	-	-
Option 3	127	2,657	123	2,689	3	1,851	1	1,145	-	-
Option 4	149	2,096	142	2,091	6	2,324	1	1,474	-	-
Option 5	101	1,836	100	1,837	1	1,768	-	-	-	-

TABLE 42**Pensions in Force by Payment Option****Teachers - New Retirees**

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	561	\$ 2,745	555	\$ 2,761	4	\$ 1,012	2	\$ -	-	\$ -
Contributory										
Total	28	\$ 5,357	28	\$ 5,357	-	\$ -	-	\$ -	-	\$ -
Maximum	3	4,123	3	4,123	-	-	-	-	-	-
Option 1	3	7,118	3	7,118	-	-	-	-	-	-
Option 2	2	4,123	2	4,123	-	-	-	-	-	-
Option 3	2	6,316	2	6,316	-	-	-	-	-	-
Option 4	17	5,383	17	5,383	-	-	-	-	-	-
Option 5	1	3,879	1	3,879	-	-	-	-	-	-
Noncontributory										
Total	179	\$ 2,166	178	\$ 2,164	1	\$ 2,611	-	\$ -	-	\$ -
Maximum	92	2,204	92	2,204	-	-	-	-	-	-
Option A	36	2,180	36	2,180	-	-	-	-	-	-
Option B	43	2,042	42	2,029	1	2,611	-	-	-	-
Option C	8	2,330	8	2,330	-	-	-	-	-	-
Hybrid										
Total	354	\$ 2,831	349	\$ 2,857	3	\$ 479	2	\$ 1,831	-	\$ -
Maximum	134	2,774	131	2,799	1	1,437	2	1,831	-	-
Option 1	14	2,613	14	2,613	-	-	-	-	-	-
Option 2	81	2,912	81	2,912	-	-	-	-	-	-
Option 3	53	3,274	53	3,274	-	-	-	-	-	-
Option 4	36	2,613	34	2,633	2	2,277	-	-	-	-
Option 5	36	2,642	36	2,642	-	-	-	-	-	-

TABLE 43**Pensions in Force by Payment Option****Police and Firefighters - New Retirees**

Type of Option	Total		Service		Ordinary Disability		Accidental Disability		Other	
	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
Total	216	\$ 6,560	213	\$ 6,616	2	\$ 1,992	1	\$ 3,628	-	\$ -
Maximum	19	6,103	18	6,240	-	-	1	3,628	-	-
Option 1	5	6,113	5	6,113	-	-	-	-	-	-
Option 2	28	6,622	27	6,753	1	3,085	-	-	-	-
Option 3	9	6,521	9	6,521	-	-	-	-	-	-
Option 4	135	6,848	135	6,848	-	-	-	-	-	-
Option 5	20	5,089	19	5,310	1	899	-	-	-	-

Section O – Definition of Actuarial Terms

1. *Actuarial Accrued Liability* – for benefits payable in the future to present members, it will equal the present value of benefits payable in the future to them less the present value of future normal costs.
2. *Actuarial Assumptions* – assumptions as to future experience under the ERS. Current actuarial assumptions are detailed in Table 18 of the current annual valuation report. Assumptions include future fund earnings rate, rates of future salary increases, and rates of death (both before and after retirement), disability, retirement, and withdrawal.
3. *Actuarial Gain or Actuarial Loss* - a measure of the difference between actual experience and assumed experience of the ERS. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, actuarial liabilities emerge which may be the same as forecasted, or they may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the ERS's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
4. *Actuarial Liabilities* - the actuarially determined present value of future benefits to be provided by the ERS. There are separate actuarially determined present values for retired members and non-retired members (either active or inactive). When applied to active members, it takes into account benefits which will be earned through future service and future salary increases.
5. *Actuarial Value of Present Assets* - the value of present ERS assets for valuation purposes. This value is calculated under a four-year phase-in of the excess (shortfall) between expected and actual income return.
6. *Actuarially Determined* - values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
7. *Decrement* - those types of activities by members of the ERS which cause them no longer to be members, i.e., death, retirement, disability, and withdrawal. It is a general term referring to any or all of these membership-terminating events.
8. *Defined Benefits* - in a retirement plan, benefits which are defined by a specific formula applied to specific member compensation and/or specific years of service. The amount of the benefit is not a function of contributions or actual earnings on those contributions.
9. *Defined Contributions* - in a retirement plan, periodic contributions to the plan which are defined as a specific percent of compensation.

10. *Experience Study* - a periodic review and analysis of the actual experience of the ERS which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
11. *Funding Period* - the number of years in the future that will be required to fund (i.e., pay off or eliminate) the unfunded actuarial accrued liability, based on the actuarial assumptions and assuming no future actuarial gains or losses.
12. *Future Benefits* - benefits specified in the law which will become payable at some time in the future when the member satisfies the requirement to receive such benefits.
13. *Future Contributions* - contributions to be made by the member or the employers in the future.
14. *Normal Cost* - the actuarial cost to fund the benefits provided by the ERS were the funding to begin at date of hire.
15. *Present Value* - the actuarially determined lump sum value as of the valuation date of a series of payments to be made in the future, where the lump sum value is equal to the sum of the discounted value of each future payment. The discounted value of each payment is the product of (a) the amount of the payment, (b) the probability that the payment will be made (based on the current actuarial assumptions as to future experience), and (c) the time value of money (based on the current assumed interest rate).
16. *Unfunded Actuarial Accrued Liability* - that portion of the actuarial accrued liability (including the present value of benefits presently being paid to retired members) that exceeds the value of current assets.
17. *Covered Payroll* - the total annualized payroll of active members as of the valuation date. Used to project individual members pay and benefits.
18. *Projected Payroll for Contributions Purposes* - 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.