Legislative Retirement System of North Carolina

Principal Results of Actuarial Valuation as of December 31, 2021

October 27, 2022, Board of Trustees Meeting

Tonya Manning, FSA, EA, MAAA, FCA
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Elizabeth Wiley, FSA, EA, MAAA, FCA

Valuation input

Member data

Inputs

Membership Data

Asset Data

Benefit Provisions

Assumptions

Funding Methodology

Results

Actuarial Value of Assets

Actuarial Accrued Liability

Net Actuarial Gain or Loss

Funded Ratio

Employer Contributions

Benefit Enhancement

Additional Disclosures

Projection

The table below provides a summary of the membership data used in this valuation compared to the prior valuation.

Number as of	12/31/2021	12/31/2020
Active members	170	170
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	113	110
Retired members and survivors of deceased members currently receiving benefits	290	286
Total	573	566
Active Reported Compensation	3,589,669	3,526,167
Active Valuation Compensation	3,735,709	3,738,339
Annual Retirement Allowances	2,275,574	2,259,482

A detailed summary of the membership data used in this valuation is provided in Section 3 and Appendix B.

The number of retired members and survivors of deceased members currently receiving benefits increased by 1.4% from the previous valuation date.

Valuation input

Asset data

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Additional Disclosures

Projection

The table below provides details of the Market Value of Assets for the current and prior year's valuations.

Asset Data as of	12/31/2021	12/31/2020
Beginning of Year Market Value of Assets	$ 30,702,732	$ 28,800,055
Employer Contributions	987,764	971,088
Employee Contributions	253,291	252,888
Benefit Payments	(2,340,355)	(2,328,044)
Refunds	(185,310)	(49,708)
Administrative Expense	(14,733)	(12,787)
Investment Income	2,861,466	3,069,240
Net Increase/(Decrease)	1,562,123	1,902,677
End of Year Market Value of Assets	$ 32,264,855	$ 30,702,732
Estimated Net Investment Return	9.52%	10.88%

A detailed summary of the market value of assets is provided in Section 4.

LRS assets are held in trust and are invested for the exclusive benefit of plan members.

Over the long term, benefit payments and administrative expenses not covered by contributions are expected to be covered with investment income, illustrating the benefits of following actuarial pre-funding since inception.

Valuation results

Net actuarial gain or loss

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Assumptions
Funding Methodology

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The table below provides a reconciliation of the prior year's unfunded actuarial accrued liability to the current year's unfunded actuarial accrued liability.

(in millions)		
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2020	$	0.6
Normal Cost and Administrative Expense during 2021		0.8
Reduction due to Actual Contributions during 2021		(1.2)
Interest on UAAL, Normal Cost, and Contributions		0.0
Asset (Gain)/Loss		(0.7)
Actuarial Accrued Liability (Gain)/Loss		(0.2)
Impact of Assumption Changes		0.0
Impact of Benefit Changes		0.1
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2021	$	(0.6)

A detailed summary of the net actuarial gain or loss is provided in Section 5.

The gain recognized in the actuarial value of assets of $0.7 million and the gain recognized in the Actuarial Accrued Liability of $0.2 million lowered the UAAL by a combined $0.9 million.

Benefit changes (one-time supplement payable in October 2022) increased the UAAL by $0.1 million.

Valuation results

Employer contributions

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The table below provides a reconciliation of the actuarially determined employer contribution.

Fiscal year ending June 30, 2023 Preliminary ADEC (based on December 31, 2020 valuation)	22.05%
Impact of Benefit Changes	2.56%
Fiscal year ending June 30, 2023 Final ADEC	24.61%
Change Due to Anticipated Reduction in UAAL*	(0.40%)
Change Due to Demographic (Gain)/Loss	(0.70%)
Change Due to Investment (Gain)/Loss	(3.23%)
Change Due to Contribution Experience	1.19%
Impact of Assumption Changes	0.00%
Reversal of one-time Legislative Cost	(2.56%)
Impact of Benefit Changes	0.31%
Impact of Direct Rate Smoothing	(0.61%)
Fiscal year ending June 30, 2024 Preliminary ADEC (based on December 31, 2021 valuation)	18.61%

** Amortization of the UAAL is determined as a level dollar amount with payments expected to remain the same over the amortization period but was calculated as a percentage of valuation payroll in the previous valuation. Payroll is expected to increase annually while the expected amortization payment does not increase. This causes the expected amortization payment to be a lesser percentage of the expected payroll.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 6.

The change in rate due to investment gains is based on the actuarial value of assets return of 9.12%, which was greater than the 6.50% assumed return.

Key takeaways

- Key results of the December 31, 2021 valuation were:
  - Market value returns of 9.52% compared to 6.50% assumed
  - Continuation of direct-rate smoothing of the change in the employer contribution rate due to changes in assumptions and methods over a 5-year period beginning with the December 31,2020 valuation
  - Recent legislation signed into law since the prior valuation
    - One-time supplement payment for LRS payees of 4% of their annual retirement allowance, payable in October 2022

Key takeaways (continued)

- When compared to the December 31, 2020 actuarial valuation, the above resulted in:
  - Higher funded ratio (101.9% in the December 31, 2021 valuation compared to 97.8% in the December 31, 2020 valuation)
  - Lower actuarially determined employer contribution rate (18.61% for fiscal year ending June 30, 2024 compared to the preliminary contribution rate of 22.05% calculated in the December 31, 2020 valuation for fiscal year ending June 30, 2023)

Key takeaways (continued)

- LRS is well funded compared to its peers. This is due to:
  - Stakeholders working together to keep LRS well-funded since inception
  - A history of appropriating and contributing the recommended contribution requirements
  - Assumptions that in aggregate are more conservative than peers
  - A funding policy that aggressively pays down unfunded liability over a 12-year period
  - An ad hoc cost-of-living adjustment that supports the health of the system
  - Modest changes in benefits when compared to peers
- Continued focus on these measures will be needed to maintain the solid status of LRS well into the future.

ASOP 27/35 disclosures

ASOPs 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the plan sponsor do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. In the case of the plan sponsor's selection of expected return on assets ("EROA"), the signing actuaries have used economic information and tools provided by Buck's Financial Risk Management ("FRM") practice. A spreadsheet tool created by the FRM team converts averages, standard deviations, and correlations from Buck's Capital Markets Assumptions ("CMA") that are used for stochastic forecasting into approximate percentile ranges for the arithmetic and geometric average returns. It is intended to suggest possible reasonable ranges for EROA without attempting to predict or select a specific best estimate rate of return. It takes into account the duration (horizon) of investment and the target allocation of assets in the portfolio to various asset classes. Based on the actuary's analysis, including consistency with other assumptions used in the valuation and the percentiles generated by the spreadsheet described above, the actuary believes the EROA, in the actuary's professional judgment, is reasonable for the purpose of the measurement.

ASOP 56 disclosure

Actuarial Standard of Practice No. 56 (“ASOP 56”) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the Plan using data and assumptions as of the measurement date under the accounting rules specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable accounting rules to the liabilities derived and other inputs, such as Plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other accounting outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. The review is performed by experts within the company who are familiar with applicable accounting rules as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked and reviewed by multiple experts within the company who are familiar with the details of the required changes.

Certification

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: fund experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law. Such changes in law may include additional costs resulting from future legislated benefit improvements or cost-of-living pension increases or supplements, which are not anticipated in the actuarial valuation. Because of limited scope, Buck performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information. Information contained in our report for plan years from December 31, 2017, to December 31, 2020, is based on valuations performed by the prior actuarial firm.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, Members of the American Academy of Actuaries, and Fellows of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to discuss this report with you at your convenience.

Michael A. Ribble, FSA, EA, MAAA, FCA

Elizabeth A. Wiley, FSA, EA, MAAA, FCA

BUCK

Legislative Retirement System of North Carolina

Report on the Actuarial Valuation
Prepared as of December 31, 2021

October 2022

October 11, 2022

Board of Trustees
Legislative Retirement System
of North Carolina
3200 Atlantic Avenue
Raleigh, NC 27604

Members of the Board:

We submit herewith our report on the actuarial valuation of the Legislative Retirement System of North Carolina (referred to as “LRS” or the “Legislative Retirement System”) prepared as of December 31, 2021. Information contained in our report for plan years from December 31, 2017, to December 31, 2020, is based on valuations performed by the prior actuarial firm.

The primary purpose of the valuation report is to determine the required member and employer contribution rates, to describe the current financial condition of LRS, and to analyze changes in such condition. In addition, the report provides information that the Office of the State Controller (OSC) requires for its Annual Comprehensive Financial Report, and it summarizes census data. Use of this report for any other purposes or by anyone other than OSC and its auditors, or North Carolina Retirement Systems Division and Department of State Treasurer staff may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. The attached pages should not be provided without a copy of this cover letter. Because of the risk of misinterpretation of actuarial results, you should ask Buck Global, LLC (Buck) to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without prior review.

The valuation is based upon membership data and financial information as furnished by the Retirement Systems Division and the Financial Operations Division and as summarized in this report. Although we reviewed for reasonableness and consistency with the prior valuation, these elements have not been audited by Buck and we cannot certify as to the accuracy and completeness of the data supplied. The valuation is also based on benefit and contribution provisions as presented in this report. If you have reason to believe that the plan provisions are incorrectly described, that important plan provisions relevant to this valuation are not described, or that conditions have changed since the calculations were made, you should contact the authors of this actuarial report prior to relying on this information.

The valuation is further based on the actuarial valuation assumptions, approved by the Board of Trustees, as presented in this report. We believe that these assumptions are reasonable and comply with the Actuarial Standards of Practice (“ASOPs”) 27 and 35 and the requirements of Governmental Accounting Standards Board (GASB) Statement No. 67. We prepared this valuation in accordance with the requirements of this standard and in accordance with all applicable ASOPs.

The assumptions used for the December 31, 2021, actuarial valuation are based on the experience study prepared as of December 31, 2019, and adopted by the Board of Trustees on January 28, 2021. All assumptions other than the investment return assumption (i.e., the valuation interest rate) are discussed annually with the appropriate parties, and actuarial gain/loss experience is reviewed during each valuation, to see if any changes are needed. The economic assumptions with respect to investment yield, salary increase, and inflation have been based upon a review of the existing portfolio structure as well as recent and anticipated experience. All assumptions represent an estimate of future experience.

ASOPs 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the plan sponsor do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. In the case of the Board's selection of the investment return assumption, the signing actuaries have used economic information and tools provided by Buck's Financial Risk Management ("FRM") practice. A spreadsheet tool created by the FRM team converts averages, standard deviations, and correlations from Buck's Capital Markets Assumptions ("CMA") that are used for stochastic forecasting into approximate percentile ranges for the arithmetic and geometric average returns. It is intended to suggest possible reasonable ranges for the investment return assumption without attempting to predict or select a specific best estimate rate of return. It takes into account the duration (horizon) of investment and the target allocation of assets in the portfolio to various asset classes. Based on the actuaries' analysis, including consistency with other assumptions used in the valuation, the percentiles generated by the spreadsheet described above, and review of actuarial gain/loss experience, the actuaries believe the assumptions, in the actuaries' professional judgment, is reasonable for the purpose of the measurement.

Where presented, references to "funded ratio" and "unfunded accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented may be appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities. In various places in the report the results also show funded ratios and unfunded liabilities based upon varying sets of assumptions as well as market values of assets as that is required for certain disclosure information required per accounting rules or statutes. Where this has been done it has been clearly indicated.

Actuarial Standard of Practice No. 56 ("ASOP 56") provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. In addition to the spreadsheet model discussed above, Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the Plan using data and assumptions as of the measurement date under the accounting rules specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable accounting rules to the liabilities derived and other inputs, such as Plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other accounting outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to

the software. The review is performed by experts within the company who are familiar with applicable accounting rules as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked and reviewed by multiple experts within the company who are familiar with the details of the required changes.

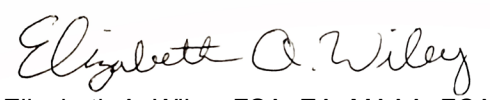
Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: fund experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law. Such changes in law may include additional costs resulting from future legislated benefit improvements or cost-of-living pension increases or supplements, which are not anticipated in the actuarial valuation. Because of limited scope, Buck performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, Members of the American Academy of Actuaries, and Fellows of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to discuss this report with you at your convenience.

Respectfully submitted,

Buck Global, LLC (Buck)

Michael A Ribble, FSA, EA, MAAA, FCA
Principal, Retirement Actuary



Elizabeth A. Wiley, FSA, EA, MAAA, FCA
Senior Consultant, Retirement Actuary

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Executive Summary

Overview

The North Carolina Retirement Systems Division (RSD) was established in 1941 to provide retirement benefits for public servants in the State of North Carolina. Today, under the management of the Department of State Treasurer, RSD administers seven public pension plans (defined benefit plans), three supplemental retirement plans (voluntary defined contributions plans), a health trust fund, a disability income plan, death benefit funds and a number of other benefit programs. As of December 31, 2021, the RSD defined benefit plans cover over one million current and prior public servants of the state of North Carolina. During the fiscal year ending June 30, 2022, RSD paid over $7.1 billion in pensions to more than 330,000 retirees. And as of June 30, 2022, RSD's defined benefit plan assets were valued at over $110 billion.

Under the supplemental retirement plans, the amount of contributions in any given year is defined by law. The amount of benefits derived is dependent on the investment returns the individual achieves. Conversely, under the pension plans, the amount of the benefit paid to a member upon retirement, termination, death or disability is defined by law. The amount of contributions needed to fund these benefits cannot be known with certainty. In North Carolina, like other states, these contributions are paid during a public servant's career so that upon retirement, termination, death, or disability, there are funds available to pay these benefits. These amounts are determined through an actuarial valuation. Actuarial valuations are performed for each of the pension plans administered by RSD and the results are contained in actuarial valuation reports like this.

The Legislative Retirement System ("LRS") provides benefits to all members of the General Assembly. LRS has over $32 million in assets and 573 members as of December 31, 2021. This actuarial valuation report is our annual analysis of the financial health of LRS. This report, prepared as of December 31, 2021, presents the results of the actuarial valuation of the Retirement System.

Purpose

An actuarial valuation is performed on LRS annually as of the end of the calendar year. The actuary determines the amount of contributions to be made to LRS during each member's career that, when combined with investment return, will be sufficient to pay for retirement benefits.

In addition, the annual actuarial valuation is performed to:

- Determine the progress on funding LRS,

  Explore why the results of the current valuation differ from the results of the valuation of the previous year, and
- Satisfy regulatory and accounting requirements.

A detailed summary of the valuation process and a glossary of actuarial terms are provided in Appendix A.

Executive Summary (continued)

Risk

Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from expected. Actuarial valuations include the risk that actual future measurements will deviate from expected future measurements due to actual experience that is different than the actuarial assumptions. The primary areas of risk in this actuarial valuation are:

- Investment Risk – the potential that investment returns will be different than expected.
- Longevity and Other Demographic Risks – the potential that mortality or other demographic experience will be different than expected.
- Interest Rate Risk – To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results.
- Contribution Risk – The potential that actual contributions are different than the actuarially determined contributions.

Annual actuarial valuations are performed for RSD which re-measure the assets and liabilities and compute a new actuarially determined contribution. RSD also has experience studies performed every five years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and periodic experience studies are practical ways to monitor and reassess risk.

Executive Summary (continued)

Key Takeaways

The actuarial valuation is performed each year to replace the estimates the actuary assumed for the prior valuation with the actual events that happened. This past year, as expected, some of the assumptions used in the prior valuation were not realized. Key results of the December 31, 2021 valuation as compared to the December 31, 2020 valuation were:

- Market value returns of 9.52% during calendar year 2021 compared to 6.50% assumed
- Continuation of direct-rate smoothing of the change in the employer contribution rate due to the changes in assumptions and methods over a 5-year period beginning with the December 31, 2020 valuation
- Recent legislation signed into law since the prior valuation
  - One-time supplement payment for LRS payees of 4% of their annual retirement allowance, payable in October 2022

When compared to the December 31, 2020 actuarial valuation, the above resulted in:

- Higher funded ratio (101.9% in the December 31, 2021 valuation compared to 97.8% in the December 31, 2020 valuation)
- Lower actuarially determined employer contribution rate (18.61% for fiscal year ending June 30, 2024 compared to the contribution rate of 24.61% based on the December 31, 2020 valuation for fiscal year ending June 30, 2023)

LRS is well funded compared to its peers. This is due to:

- Stakeholders working together to keep LRS well-funded since inception
- A history of appropriating and contributing the recommended contribution requirements
- Assumptions that in aggregate are more conservative than peers
- A funding policy that aggressively pays down unfunded liability over a 12-year period
- An ad hoc cost-of-living adjustment that supports the health of the system
- Modest changes in benefits when compared to peers

Continued focus on these measures will be needed to maintain the solid status of LRS well into the future.

More details can be found later in this report. We encourage readers to start with Sections 1 and 2 and refer to other sections for additional details as needed.

Section 1: Principal Results

This report, prepared as of December 31, 2021, presents the results of the actuarial valuation of the system. The principal results of the valuation and a comparison with the preceding year's results are summarized below.

Table 1: Summary of Principal Results

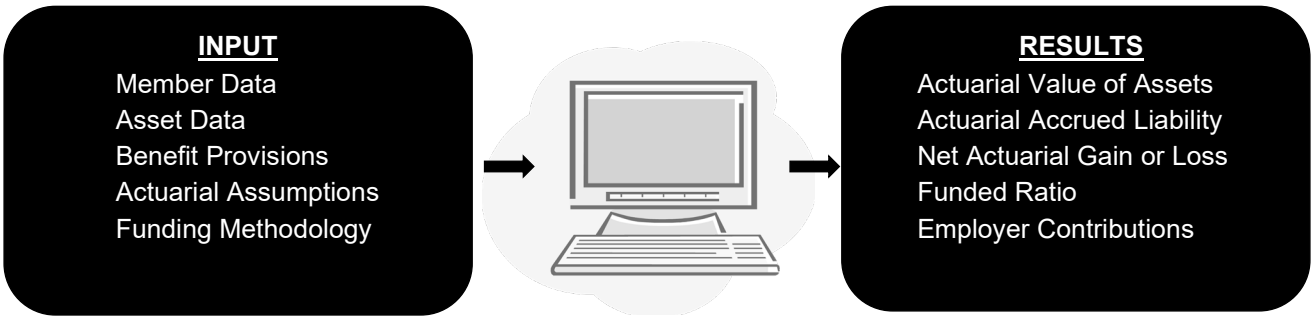
Valuation results as of	12/31/2021	12/31/2020
Active Members		
Number	170	170
Reported Compensation	$ 3,589,669	$ 3,526,167
Valuation Compensation*	$ 3,735,709	$ 3,738,339
Retired Members and Survivors of Deceased Members Currently Receiving Benefits		
Number	290	286
Annual Allowances	$ 2,275,574	$ 2,259,482
Assets		
Actuarial Value (AVA)	$ 30,561,851	$ 29,252,976
Market Value	$ 32,264,855	$ 30,702,732
Actuarial Accrued Liability (AAL)	$ 29,989,368	$ 29,898,096
Unfunded Accrued Liability (AAL-AVA)	$ (572,483)	$ 645,120
Funded Ratio (AVA/AAL)**	101.9%	97.8%
Results for Fiscal Year Ending	**6/30/2024**	**6/30/2023**
Actuarially Determined Employer Contribution (ADEC) of employer, as a percentage of payroll		
Normal Cost	17.51%	17.16%
Accrued Liability	-0.73%	2.45%
Total	16.78%	19.61%
Total with Direct Rate Smoothing	18.61%	22.05%
Impact of Benefit Changes	N/A	2.56%
Final ADEC	N/A	24.61%
Appropriations Act for Fiscal Year Ending	**6/30/2024**	**6/30/2023**
Employer Contribution Rate as a percentage of payroll		
Normal Cost	17.51%	17.16%
Accrued Liability	N/A	7.75%
Total	N/A	24.91%

* Reported compensation annualized for new hires and projected for valuation purposes.

** The Funded Ratio on a Market Value of Assets basis is 107.6% as of December 31, 2021.

Section 2: Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process.



A more detailed description of the valuation process is provided in Appendix A.

Valuation Input: Membership Data

As with any estimate, the actuary collects information that we know now. Under the actuarial valuation process, current information about LRS members is collected annually by the Retirement Systems Division staff at the direction of the actuary. Membership data will assist the actuary in estimating benefits that could be paid in the future. Information about benefit provisions and assets held in the trust as of the valuation date is also collected.

The member information the actuary collects includes data elements such as current service, salary and benefit group identifier for members that have not separated service, and actual benefit amounts and form of payment for members that have separated service. Data elements such as gender and date of birth are used to determine when a benefit might be paid and for how long.

The table below provides a summary of the membership data used in this valuation compared to the prior valuation.

Number as of	12/31/2021	12/31/2020
Active members	170	170
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	113	110
Retired members and survivors of deceased members currently receiving benefits	290	286
Total	573	566
Active Reported Compensation	3,589,669	3,526,167
Active Valuation Compensation	3,735,709	3,738,339
Annual Retirement Allowances	2,275,574	2,259,482

Commentary: The number of retired members and survivors of deceased members currently receiving benefits increased by 1.4% from the previous valuation date.

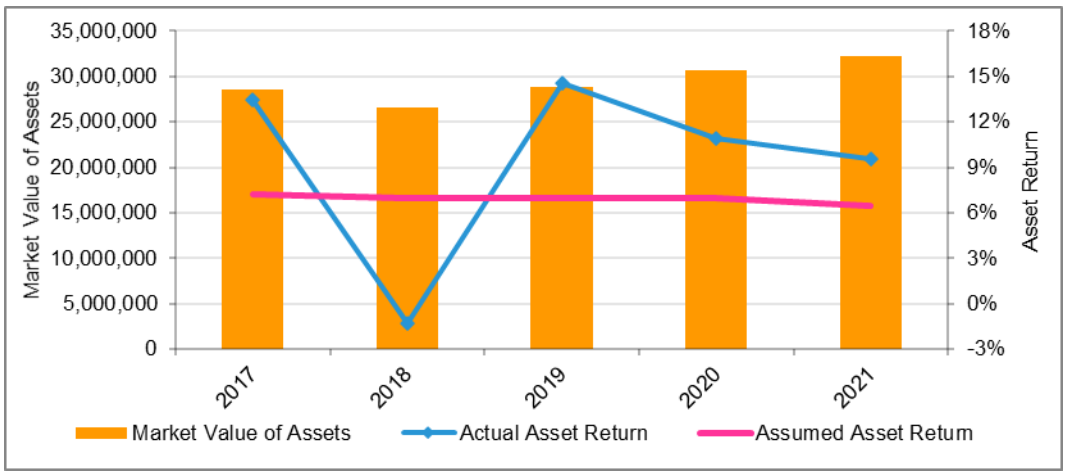
Section 2: Valuation Process (continued)

Valuation Input: Asset Data

LRS assets are held in trust and are invested for the exclusive benefit of plan members. The Market Value of Assets is $32.3 million as of December 31, 2021 and was $30.7 million as of December 31, 2020. The investment return for the market value of assets for calendar year 2021 was 9.52%.

Graph 1: Market Value of Assets and Asset Returns

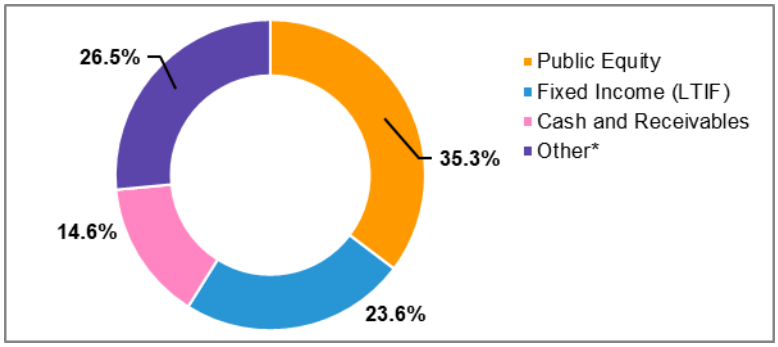
The graph below provides a history of the market value of assets and asset returns over the past five years.



Commentary: Market value returns during 2021 were greater than the 6.50% assumed rate of return, resulting in lower required contributions and a higher funded ratio than anticipated.

Graph 2: Allocation of Investments by Category

The graph below provides the breakdown of the market value of assets as of December 31, 2021 by asset category.



* Real Estate, Alternatives, Inflation and Credit

Commentary: Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the last experience study, the 6.50% discount rate used in this valuation is reasonable and appropriate.

A detailed summary of the market value of assets is provided in Section 4 of this report.

Section 2: Valuation Process (continued)

Valuation Input: Benefit Provisions

Benefit provisions are described in North Carolina General Statutes, Chapter 120.

There were no significant changes in benefit provisions from the prior year's valuation, other than a one-time benefit supplement payment equal to 4% of the member's annual retirement allowance for the fiscal year ending June 30, 2023, payable in October 2022. The one-time supplements do not change the ongoing monthly benefits, and absent additional action by governing authorities, the payments will not recur in future years.

Highlights of the benefit provisions are described below.

- An unreduced retirement allowance is payable to members who retire from service after attaining age 65 and five years of creditable service
- The unreduced retirement allowance is equal to 4.02% of a member's highest annual compensation multiplied by the number of years of creditable service, with a maximum annual allowance of 75% of a member's highest annual compensation.
- A reduced retirement allowance is payable to members who retire from service:
  - after attaining age 50 and 20 years of creditable service; or
  - after attaining age 60 and five years of creditable service
- Benefits are also payable upon the death or disability of a member
- LRS does not provide for automatic cost of living increases as part of the benefit package. Instead, increases may be provided if certain financial conditions are met and/or the legislature passes a budget that provides for a cost-of-living adjustment.

Commentary: Many Public Sector Retirement Systems in the United States have undergone pension reform where the benefits of members (current retirees and active or future members) have been reduced. Because of the well-funded status of LRS due to the legislature contributing the actuarially determined employer contribution when such contribution is required, benefit cuts have not been made in North Carolina as they have been in most other states. However, if North Carolina's investment policy shifts substantively, or if the system incurs other unfavorable investment, economic, or demographic experience, the system should review likely impacts of the shift and consider corresponding changes to actuarial assumptions, funding policy and/or benefit levels.

A detailed summary of the benefit provisions is provided in Appendix C of this report.

Valuation Input: Actuarial Assumptions

Actuarial assumptions bridge the gap between the information that we know with certainty as of the valuation date (age, gender, service, and benefits of the members) and what may happen in the future. The actuarial assumptions of LRS are reviewed at least every five years. Based on this review, the actuary will make recommendations on the demographic and economic assumptions.

Demographic assumptions describe future events that relate to people such as retirement rates, termination rates, disability rates, and mortality rates. Economic assumptions describe future events that relate to the assets such as the interest rate, salary increases, the real return and payroll growth.

The assumptions used for the December 31, 2021 actuarial valuation are based on the experience study prepared as of December 31, 2019 and adopted by the Board of Trustees on January 28, 2021. No assumption changes have been made since the prior valuation.

Section 2: Valuation Process (continued)

Valuation Input: Funding Methodology

The Funding Methodology is the payment plan for LRS and is composed of the following three components:

- Actuarial Cost Methods allocate costs to the actuarial accrued liability (i.e. the amount of money that should be in the fund) for past service and normal cost (i.e. the cost of benefits accruing during the year) for current service.
  - The Board of Trustees has adopted Entry Age Normal as its actuarial cost method
  - Develops normal costs that stay level as a percent of payroll
- Asset Valuation Methods smooth or average the market value returns over time to alleviate contribution volatility that results from market returns. The Board of Trustees has adopted the following:
  - Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period
  - Assets corridor: not greater than 120% of market value and not less than 80% of market value
- Amortization Methods determine the payment schedule for unfunded actuarial accrued liability (i.e. the difference between the actuarial accrued liability and actuarial value of assets). The Board of Trustees has adopted the following:
  - Payment level: the payment is determined as a level dollar amount, similar to a mortgage payment
  - Payment period: a 12-year closed amortization period was adopted for fiscal year ending 2018. A new amortization base is created each year based on the prior year experience

Commentary: When compared to other Public Sector Retirement Systems in the United States, the funding policy for LRS is quite aggressive in that the policy pays down the unfunded actuarial accrued liability over a much shorter period of time (12 years) compared to most other Public Sector Retirement Systems. As such it is a best practice in the industry.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of this report.

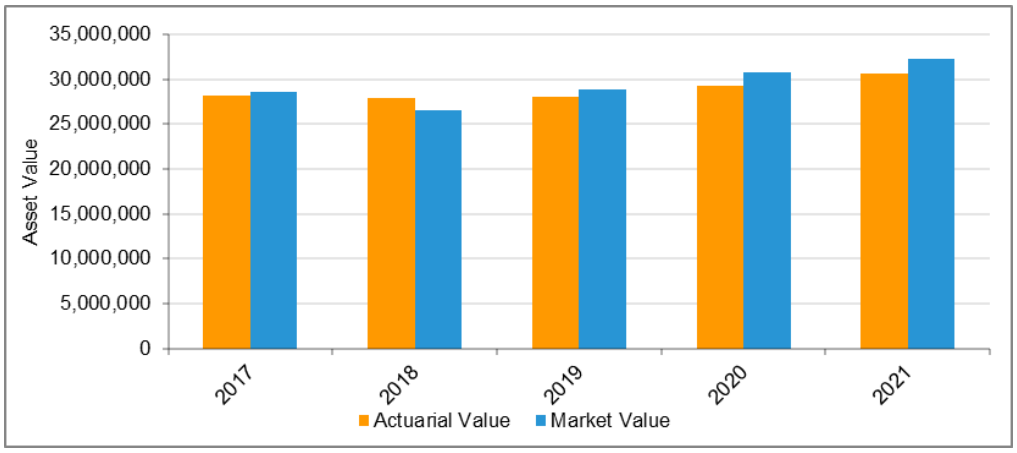
Section 2: Valuation Process (continued)

Valuation Results: Actuarial Value of Assets

In order to reduce the volatility that investment gains and losses can have on required contributions and funded status of LRS, the Board adopted an asset valuation method to determine the Actuarial Value of Assets used for funding purposes. The Actuarial Value of Assets is $30.6 million as of December 31, 2021 and $29.3 million as of December 31, 2020.

Graph 3: Actuarial Value and Market Value of Assets

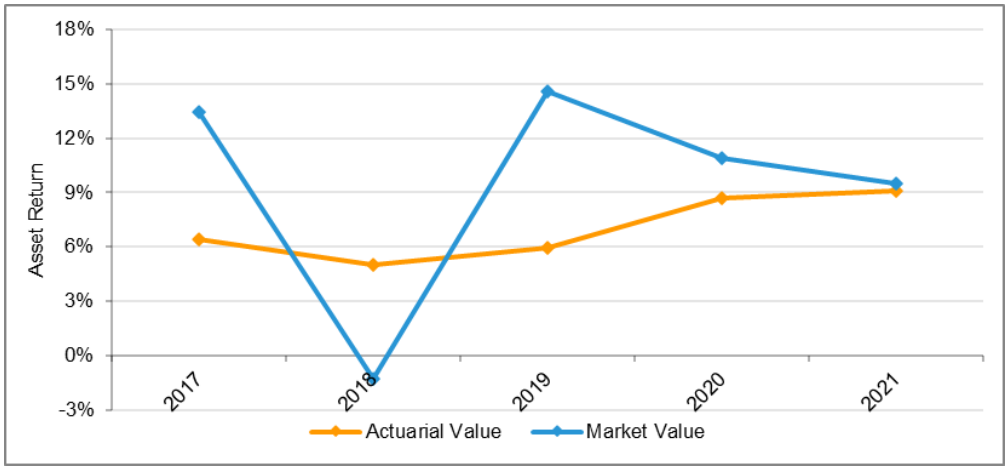
The graph below provides a history of the market value and actuarial value of assets over the past five years.



Commentary: The market value of assets is higher than the actuarial value of assets, which is used to determine employer contributions. This indicates that overall, there are unrecognized asset gains to be recognized in future valuations.

Graph 4: Asset Returns

The graph below provides a history of the market value and actuarial value of asset returns over the past five years.



Commentary: The investment return for the market value of assets for calendar year 2021 was 9.52%. The actuarial value of assets smooths investment gains and losses. Higher than expected market returns in 2019, 2020, and 2021 resulted in an actuarial value of asset return for calendar year 2021 of 9.12% and a recognized actuarial asset gain of $0.7 million during 2021. After recognizing this gain, the assets at actuarial value were $0.6 million more than the actuarial accrued liability as of December 31, 2021.

A detailed summary of the Actuarial Value of Assets is provided in Section 4 of this report.

Section 2: Valuation Process (continued)

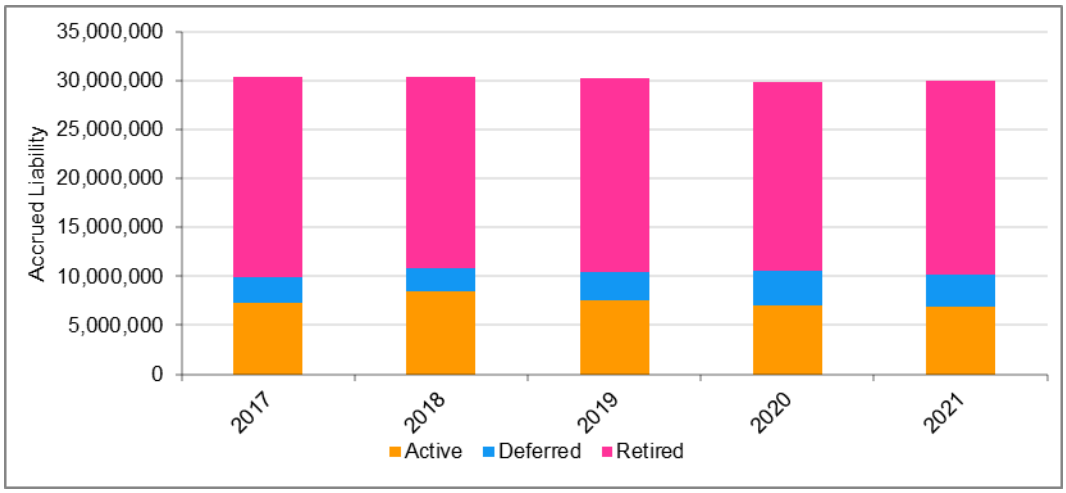
Valuation Results: Actuarial Accrued Liability

Using the provided membership data, benefit provisions, and actuarial assumptions, the future benefit payments of LRS are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of LRS. The PVFB is an estimate of the current value of the benefits promised to all members as of a valuation date.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), normal cost (NC) and present value of future normal costs (PVFNC). The AAL is also referred to as the amount of money LRS should ideally have in the trust. The NC is also referred to as the cost of benefits accruing during the year.

Graph 5: Actuarial Accrued Liability

The graph below provides a history of the actuarial accrued liability over the past five years.



Commentary: The AAL increased slightly from $29.9 million in 2020 to $30.0 million in 2021. LRS is an open plan, which means that new members enter the plan each year. In an open plan, liabilities are expected to grow from one year to next as more benefits accrue and the membership approaches retirement. The AAL was $0.2 million less than expected due to demographic experience.

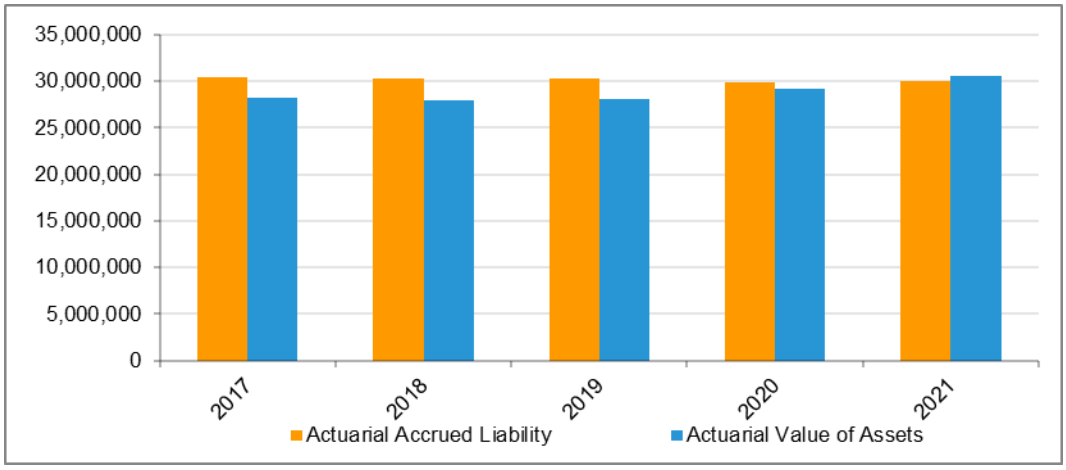
A detailed summary of the AAL is provided in Section 5 of this report.

Section 2: Valuation Process (continued)

Valuation Results: Funded Ratio

Graph 6: Actuarial Accrued Liability and Actuarial Value of Assets

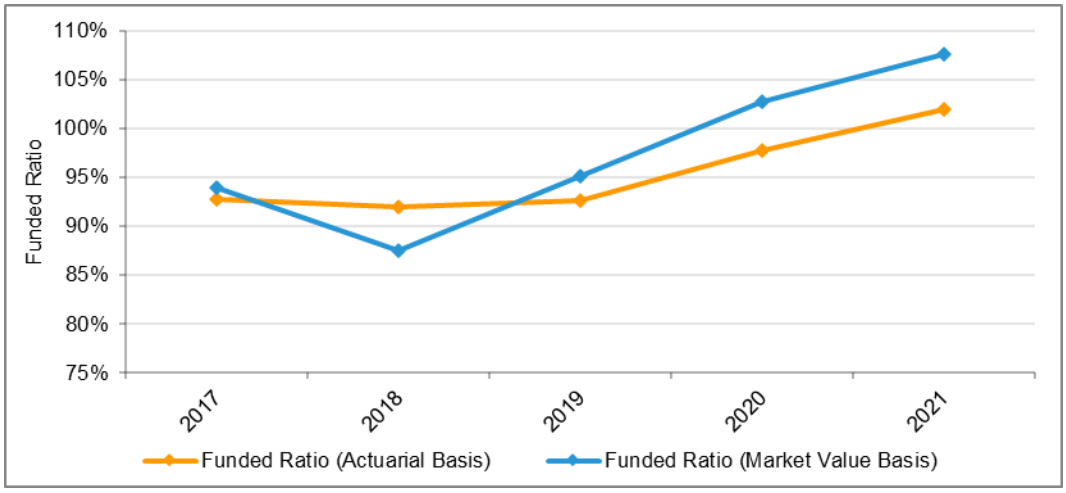
The graph below provides a history of the actuarial accrued liability compared to the actuarial value of assets over the past five years.



Commentary: The actuarial value of assets basis is used for computing contributions to alleviate contribution volatility. The difference in the actuarial accrued liability and the actuarial value of assets is the amount of unfunded actuarial accrued liability to be paid off in 12 years.

Graph 7: Funded Ratios

The graph below provides a history of the funded ratio on a market and actuarial basis over the past five years.



Commentary: The ratio of assets to liabilities shows the health of the plan on an accrued basis. The funded ratio on an actuarial basis increased from 97.8% as of December 31, 2020 to 101.9% at December 31, 2021.

Valuation Process (continued)

Valuation Results: Employer Contributions

G.S. 120-4.20 provides that the contributions of employers shall consist of a normal contribution and an accrued liability contribution.

The December 31, 2020 valuation suggested that the preliminary total employer contribution rate be set at 22.05% of payroll for the fiscal year ending June 30, 2023. This rate was increased by 2.56% as a result of the enactment of the one-time pension supplement to be paid in October 2022. As a result of this December 31, 2021 valuation, the preliminary actuarially determined employer contribution rate is 18.61% of payroll for the fiscal year ending June 30, 2024, subject to the impact of any future legislative changes effective during that fiscal year.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 6 of this report.

Valuation Results: Accounting Information

The Governmental Accounting Standards Board (GASB) issues statements which establish financial reporting standards for defined benefit pension plans and accounting for pension expenditures and expenses for governmental employers.

The valuation has been prepared in accordance with the parameters of Statement No. 67 of the GASB and all applicable Actuarial Standards of Practice. The Net Pension Liability (Asset) under GASB 67 for the fiscal year ending June 30, 2022, is $1,530,000 (compared to $(1,921,000) for fiscal year ending June 30, 2021). The required financial reporting information for the Retirement System under GASB No. 67 can be found in Section 7 of this report.

Section 3: Membership Data

The Retirement Systems Division provided membership data as of the valuation date for each member of the Retirement System. The membership data assists the actuary in estimating benefits that could be paid in the future. The tables below provide a summary of the membership data used in this valuation. Detailed tabulations of data are provided in Appendix B.

Table 2: Active Member Data

	Member Count	Average Age	Average Service	Reported Compensation
Male	125	58.48	6.72	$ 2,645,100
Female	45	60.47	6.99	944,569
Total	170	59.01	6.79	$ 3,589,669

Table 3: Vested Terminated Member Data

	Member Count	Average Age	Average Service	Deferred Retirement Allowance
Male	43	57.21	8.34	$ 322,758
Female	12	57.25	8.72	86,924
Total	55	57.22	8.42	$ 409,682

The table above includes terminated members entitled to retirement benefits but not yet receiving benefits.

Table 4: Non-Vested Terminated Member Data

	Member Count	Average Age	Average Service	Accumulated Contributions
Male	50	54.02	2.59	$ 267,481
Female	8	58.50	1.83	32,598
Total	58	54.64	2.49	$ 300,079

The table above includes non-vested terminated members who have not received a refund of contributions.

Section 3: Membership Data (continued)

Table 5: Data for Members Currently Receiving Benefits

	Member Count	Average Age	Annual Retirement Allowances
Retired Members (Healthy at Retirement)			
Male	171	78.22	$ 1,380,112
Female	56	77.66	436,068
Total	227	78.08	$ 1,816,180
Survivors of Deceased Members			
Male	2	64.50	$ 23,964
Female	61	77.70	435,430
Total	63	77.28	$ 459,394
Grand Total	290	77.91	$ 2,275,574

Section 4: Asset Data

Assets are held in trust and are invested for the exclusive benefit of LRS members. The tables below provide the details of the Market Value of Assets for the current and prior years' valuations.

Table 6: Market Value of Assets

Asset Data as of	12/31/2021	12/31/2020
Beginning of Year Market Value of Assets	$ 30,702,732	$ 28,800,055
Employer Contributions	987,764	971,088
Employee Contributions	253,291	252,888
Benefit Payments	(2,340,355)	(2,328,044)
Refunds	(185,310)	(49,708)
Administrative Expense	(14,733)	(12,787)
Investment Income	2,861,466	3,069,240
Net Increase/(Decrease)	1,562,123	1,902,677
End of Year Market Value of Assets	$ 32,264,855	$ 30,702,732
Estimated Net Investment Return on Market Value	9.52%	10.88%

Table 7: Allocation of Investments by Category of the Market Value of Assets

Asset Data as of	12/31/2021	12/31/2020
Allocation by Dollar Amount		
Public Equity	$ 11,391,901	$ 11,077,214
Fixed Income (LTIF)	7,609,123	8,043,140
Cash and Receivables	4,726,450	3,414,261
Other*	8,537,381	8,168,117
Total Market Value of Assets	$ 32,264,855	$ 30,702,732
Allocation by Percentage of Asset Value		
Public Equity	35.3%	36.1%
Fixed Income (LTIF)	23.6%	26.2%
Cash and Receivables	14.6%	11.1%
Other*	26.5%	26.6%
Total Market Value of Assets	100.0%	100.0%

* Real Estate, Alternatives, Inflation and Credit

Section 4: Asset Data (continued)

In order to reduce the volatility that investment gains and losses can have on the required contributions and funded status of LRS, the Board adopted an asset valuation method to determine the Actuarial Value of Assets used for funding purposes. The table below provides the calculation of the Actuarial Value of Assets at the valuation date.

Table 8: Actuarial Value of Assets

Asset Data as of	12/31/2021
Beginning of Year Market Value of Assets	$ 30,702,732
Contributions	1,241,055
Benefit Payments, Refunds and Administrative Expenses	(2,540,398)
Net Cash Flow	(1,299,343)
Expected Investment Return	1,954,114
Expected End of Year Market Value of Assets	31,357,503
End of Year Market Value of Assets	32,264,855
Excess of Market Value over Expected Market Value of Assets	907,352
80% of 2021 Asset Gain/(Loss)	725,882
60% of 2020 Asset Gain/(Loss)	656,025
40% of 2019 Asset Gain/(Loss)	781,407
20% of 2018 Asset Gain/(Loss)	(460,310)
Total Deferred Asset Gain/(Loss)	1,703,004
Preliminary End of Year Actuarial Value of Assets	30,561,851
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	30,561,851
Estimated Net Investment Return on Actuarial Value	9.12%

Commentary: The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution. The asset valuation method recognizes asset returns in excess of or less than the expected return on the market value of assets over a five-year period. Actuarial value of assets was reset to the market value of assets at December 31, 2014.

Higher than expected market returns in 2019, 2020, and 2021 resulted in an actuarial value of asset return for calendar year 2021 of 9.12% and a recognized actuarial asset gain of $0.7 billion during 2021. After recognizing this gain, the assets at actuarial value were $0.6 million more than the actuarial accrued liability as of December 31, 2021.

Section 5: Liability Results

Using the provided membership data, benefit provisions, and actuarial assumptions, the future benefit payments of LRS are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits. The Present Value of Future Benefits is allocated to past, current, and future service, respectively known as the actuarial accrued liability, normal cost and present value of future normal costs. The table below provides these liability numbers for the current and prior years' valuations.

Table 9: Liability Summary

Valuation Results as of	12/31/2021	12/31/2020
(a) Present Value of Future Benefits		
(1) Active Members	$ 11,448,549	$ 11,491,666
(2) Terminated Members	3,268,415	3,501,026
(3) Members Currently Receiving Benefits	19,813,571	19,375,257
(4) Total	$ 34,530,535	$ 34,367,949
(b) Present Value of Future Normal Costs	$ 4,541,167	$ 4,469,853
(c) Actuarial Accrued Liability: (a4) - (b)	$ 29,989,368	$ 29,898,096
(d) Actuarial Value of Assets	$ 30,561,851	$ 29,252,976
(e) Unfunded Accrued Liability: (c) - (d)	$ (572,483)	$ 645,120

The table below provides a reconciliation of the prior year's unfunded actuarial accrued liability to the current year's unfunded actuarial accrued liability.

Table 10: Reconciliation of Unfunded Actuarial Accrued Liability (in millions)

(in millions)	
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2020	$ 0.6
Normal Cost and Administrative Expense during 2021	0.8
Reduction due to Actual Contributions during 2021	(1.2)
Interest on UAAL, Normal Cost, and Contributions	0.0
Asset (Gain)/Loss	(0.7)
Actuarial Accrued Liability (Gain)/Loss	(0.2)
Impact of Assumption Changes	0.0
Impact of Benefit Changes	0.1
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2021	$ (0.6)

Commentary: During 2021, the UAAL decreased more than expected due to an asset gain during the year of $0.7 million, along with an Actuarial Accrued Liability gain of $0.2 million.

Section 6: Actuarially Determined Employer Contribution

The actuarially determined employer contribution consists of a normal cost rate and an accrued liability rate. The normal cost rate is the employer's portion of the cost of benefits accruing during the year after reducing for the member contribution. The accrued liability rate is the payment toward the unfunded accrued liability in order to pay off the unfunded accrued liability over 12 years.

The table below provides the calculation of the actuarially determined employer contribution for the current and prior years' valuations.

Table 11: Calculation of the Actuarially Determined Contribution (ADEC)

Valuation Date	12/31/2021	12/31/2020
ADEC for Fiscal Year Ending	6/30/2024	6/30/2023
Normal Cost Rate Calculation		
(a) Total Normal Cost Rate	23.51%	23.16%
(b) Employee Contribution Rate	7.00%	7.00%
(c) Expense Assumption	1.00%	1.00%
(d) Employer Normal Cost Rate: (a) - (b) + (c)	17.51%	17.16%
Accrued Liability Rate Calculation		
(e) Unfunded Accrued Liability	$ (572,483)	$ 645,120
(f) Total Amortization Payments*	$ (28,704)	$ 96,225
(g) Valuation Compensation	$ 3,919,298	$ 3,922,056
(h) Accrued Liability Rate: (f) / (g)	(0.73%)	2.45%
Preliminary ADEC (d) + (h)	16.78%	19.61%
ADEC (with Direct Rate Smoothing)	18.61%	22.05%
Impact of Benefit Changes	N/A	2.56%
Final ADEC	N/A	24.61%

* See Table 14 for more detail
** Beginning with the December 31, 2017 valuation, compensation is projected to the fiscal year over which contributions will occur.

Section 6: Actuarially Determined Employer Contribution (continued)

The table below provides a reconciliation of the actuarially determined employer contribution.

Table 12: Reconciliation of the Change in the ADEC

Fiscal year ending June 30, 2023 Preliminary ADEC (based on December 31, 2020 valuation)	22.05%
Impact of Benefit Changes	2.56%
Fiscal year ending June 30, 2023 Final ADEC	24.61%
Change Due to Anticipated Reduction in UAAL*	(0.40%)
Change Due to Demographic (Gain)/Loss	(0.70%)
Change Due to Investment (Gain)/Loss	(3.23%)
Change Due to Contribution Experience	1.19%
Impact of Assumption Changes	0.00%
Reversal of one-time Legislative Cost	(2.56%)
Impact of Benefit Changes	0.31%
Impact of Direct Rate Smoothing	(0.61%)
Fiscal year ending June 30, 2024 Preliminary ADEC (based on December 31, 2021 valuation)	18.61%

* Amortization of the UAAL is determined as a level dollar amount with payments expected to remain the same over the amortization period but was calculated as a percentage of valuation payroll in the previous valuation. Payroll is expected to increase annually while the expected amortization payment does not increase. This causes the expected amortization payment to be a lesser percentage of the expected payroll.

Section 6: Actuarially Determined Employer Contribution (continued)

Amortization methods determine the payment schedule for the unfunded actuarial accrued liability. LRS adopted a 12-year closed amortization period for fiscal year ending 2012. A new amortization base is created each year based on the prior years' experience. The tables below provide the calculation of the new amortization base and the amortization schedule for the current year's valuation.

Table 13: Calculation of the New Amortization Base

Calculation as of	12/31/2021
(a) Unfunded Actuarial Accrued Liability	$ (572,483)
(b) Prior Years' Outstanding Balances	384,580
(c) New Amortization Base: (a) - (b)	(957,063)
(d) New Amortization Payment	(124,929)

Table 14: Amortization Schedule for Unfunded Accrued Liability

Date Established	Original Balance	12/31/2021 Outstanding Balance	Annual Payment Effective July 1, 2023
December 31, 2015	$ 249,266	$ 197,807	$ 33,097
December 31, 2016	935,816	814,739	123,803
December 31, 2017	908,785	856,237	119,782
December 31, 2018	183,640	185,584	24,161
December 31, 2019	(120,002)	(128,754)	(15,738)
December 31, 2020	(1,446,979)	(1,541,033)	(188,880)
December 31, 2021	(957,063)	(957,063)	(124,929)
Total		$ (572,483)	$ (28,704)

Commentary: This is the payment schedule for the unfunded actuarial accrued liability of LRS.

The following table shows an estimate of the potential cost of adding a permanent one-time cost-of-living increase if it were enacted based on results of the December 31, 2021 or December 31, 2020 valuations.

Table 15: Cost of Benefit Enhancements

Calculation as of	12/31/2021	12/31/2020
Increase in UAAL for a 1% COLA*	207,401	218,000
Increase in ADEC for a 1% COLA*	0.70%	0.74%

* The 1% COLA in the 12/31/2021 column would be effective July 1, 2023 and includes expected costs of COLAs paid for retirements after December 31, 2021 and before June 30, 2023. The COLA would be paid in full to retired members and survivors of deceased members on the retirement roll on July 1, 2022 and would be prorated for retired members and survivors of deceased members who commence benefits after July 1, 2022 but before June 30, 2023. Note that although the plan is over 100% funded, the increase in the ADEC was calculated assuming the full cost of the COLA would be paid for through increased employer contributions.

Section 7: Accounting Results

This section contains the accounting information for Governmental Accounting Standards Board (GASB) Statement No. 67 for fiscal year ending June 30, 2022 based on a valuation date of December 31, 2021.

The June 30, 2022 total pension liability presented in this section was determined by an actuarial valuation as of December 31, 2021, based on the assumptions, methods and plan provisions described in this report. The actuarial cost method used to develop the total pension liability is the Entry Age Normal Cost method, as required by GASB Statement No. 67.

GASB Statement No. 67 set forth certain items of information to be disclosed in the financial statements of the Plan. The tables below provide a distribution of the number of employees by type of membership.

Table 16: Number of Active and Retired Members as of December 31, 2021

Group	Number
Retired members and survivors of deceased members currently receiving benefits	290
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	113
Active members	170
Total	573

Section 7: Accounting Results (continued)

GASB Statement No. 67 set forth certain items of information to be disclosed in the financial statements of the Plan. The tables below provide the schedule of changes in Net Pension Liability (Asset).

Table 17: Schedule of Changes in Net Pension Liability (Asset)

Calculation as of	June 30, 2022
Total Pension Liability	
Service Cost	$ 796,000
Interest	1,925,000
Changes of Benefit Terms	94,000
Difference between Expected and Actual Experience	(281,000)
Change of Assumptions	0
Benefit Payments, including Refund of Member Contributions	(2,358,000)
Net Change in Total Pension Liability	$ 176,000
Total Pension Liability - Beginning of Year	$ 29,974,000
Total Pension Liability - End of Year	$ 30,150,000
Plan Fiduciary Net Position	
Employer Contributions	$ 1,029,000
Member Contributions	253,000
Net Investment Income	(2,183,000)
Benefit Payments, including Refund of Member Contributions	(2,358,000)
Administrative Expenses	(15,000)
Other	(1,000)
Net Change in Fiduciary Net Position	$ (3,275,000)
Plan Fiduciary Net Position - Beginning of Year	$ 31,895,000
Plan Fiduciary Net Position - End of Year	$ 28,620,000

Table 18: Net Pension Liability (Asset)

Calculation as of	June 30, 2022	June 30, 2021
Total Pension Liability	$ 30,150,000	$ 29,974,000
Plan Fiduciary Net Position	28,620,000	31,895,000
Net Pension Liability (Asset)	$ 1,530,000	$ (1,921,000)
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	94.93%	106.41%

Section 8: Accounting Results (continued)

The table below is the sensitivity of the net pension liability to changes in the discount rate.

Table 19: Sensitivity of the Net Pension Liability at June 30, 2022 to Changes in the Discount Rate

	1% Decrease	Current	1% Increase
Discount Rate	5.50%	6.50%	7.50%
Net Pension Liability (Asset)	$ 4,335,000	$ 1,530,000	$ (870,000)

The discount rate used to measure the total pension liability was 6.50%. The projection of cash flows used to determine the discount rate assumed that System contributions will continue to follow the current funding policy, including “direct-rate smoothing” as adopted by the Board of Trustees on January 28, 2021. In addition, assumed contributions include contributions based on payroll from future employees of the System that are not associated with the accumulation of their plan benefits. Investment earnings are based on actual returns through June 30, 2022, and on the assumed investment rate of return thereafter. In addition, future administrative expenses are assumed to equal 1.00% of projected payroll, but are limited to a flat dollar rate per active and in-pay member as of each valuation date. The flat dollar rate is $27 in 2022 and increased by 2.5% each year thereafter. Based on those assumptions, the System’s fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Please see Appendix E for additional detail.

The table below provides the methods and assumptions used to calculate the actuarially determined contribution rate.

Table 20: Additional Information for GASB Statement No. 67

Valuation Date	12/31/2021
Actuarial Cost Method	Entry Age
Amortization Method	Level dollar closed
Amortization Period	12 years
Asset Valuation Method	Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period (not greater than 120% of market value and not less than 80% of market value)
Actuarial Assumptions:	
Investment Rate of Return*	6.50%
Projected Salary Increases**	3.25%
*Includes Inflation of	2.50%
**Includes Inflation and Productivity of	3.25%
Cost-of-living Adjustments	N/A

Appendix A: Valuation Process and Glossary of Actuarial Terms

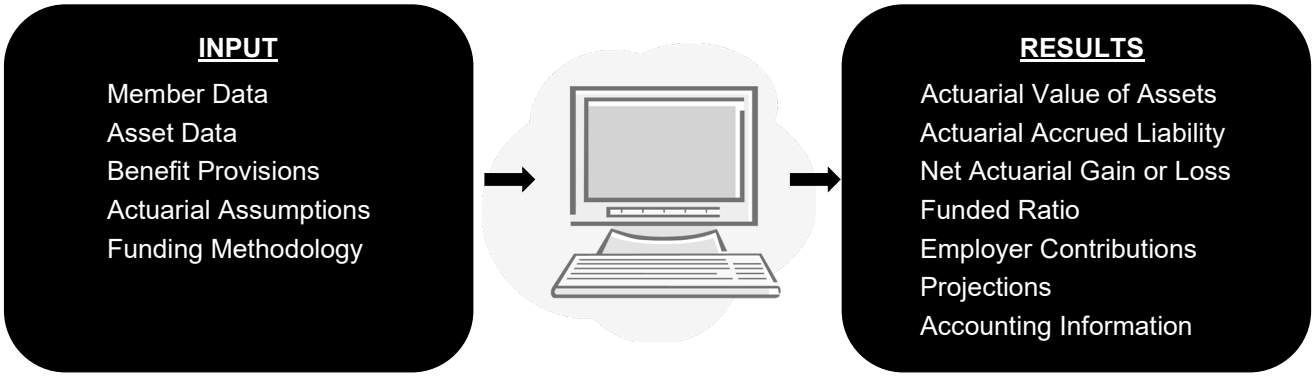
Purpose of an Actuarial Valuation

The majority of Public Sector Retirement Systems in the State of North Carolina are defined benefit (DB) retirement systems. Under a DB retirement system, the amount of benefits payable to a member upon retirement, termination, death or disability is defined in various contracts and legal instruments and is based, in part, on the member's years of credited service and final compensation. The amount of contribution needed to fund these benefits cannot be known with certainty. A primary responsibility of the Board of Trustees of a Retirement System is to establish and monitor a funding policy for the contributions made to the Retirement System.

While somewhat uncommon, in some jurisdictions, contributions are made by the plan sponsor as benefits come due. This is known as pay-as-you-go financing. More commonly, contributions for benefits are made in advance during the course of active employment of the members. This is known as actuarial pre-funding. For example, the State of North Carolina mandates for the Teachers' and State Employees' Retirement System ("TSERS") that "on account of each member there shall be paid into the pension accumulation fund by employers an amount equal to a certain percentage of the actual compensation of each member to be known as the 'normal contribution' and an additional amount equal to a percentage of the member's actual compensation to be known as the 'accrued liability contribution'…The rate per centum of such contributions shall be fixed on the basis of the liabilities of the Retirement System as shown by actuarial valuation, duly approved by the Board of Trustees, and shall be called the 'actuarially determined employer contribution rate'. The actuarially determined employer contribution rate shall be calculated annually by the actuary using assumptions and a cost method approved by the Actuarial Standards Board of the American Academy of Actuaries and selected by the Board of Trustees."

The Actuarial Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process. A narrative of the process follows the diagram. The reader may find it worthwhile to refer to the diagram from time to time.



Under the actuarial valuation process, current information about Retirement System members is collected annually by staff at the direction of the actuary, namely member data, asset data and information on benefit provisions. Member data is collected for each member of the Retirement System. The member data will assist the actuary in estimating benefits that could be paid in the future. The member information the actuary collects to estimate the amount of benefit includes elements such as current service, salary and benefit group identifier for members that have not separated service; for those that have, the actual benefit amounts are collected. The actuary collects information such as gender and date of birth to determine when a benefit might be paid and for how long.

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

The Actuarial Valuation Process (continued)

The actuary collects summary information about assets as of the valuation date and information on cash flows for the year ending on the valuation date. Information about benefit provisions as of the valuation date is also collected. To bridge the gap between the information collected and potential benefits to be paid in the future, the actuary must make assumptions about future activities. These assumptions are recommended by the actuary to the Boards based on the results of an experience review. An experience review is a review of the Retirement System over a period of time, typically five years, where the actuary analyzes the demographic and economic assumptions of the Retirement System. Based on this review, the actuary will make recommendations on the demographic assumptions, such as when members will be projected to retire, terminate, become disabled and/or die in the future, as well as the economic assumptions, such as what rate of return is projected to be earned by the fund based on the Retirement System investment policy and what level of future salary increases is expected for members. To maintain the assumptions, the Board should adopt a prudent policy of having an experience review being performed every five years. The next experience review for the North Carolina Retirement Systems will be based on the five-year period ending on December 31, 2024 and will be presented during 2025. Using these assumptions, the actuary is able to use the member data, asset data and benefit provision information collected to project the benefits that will be paid from the Retirement System to current members. These projected future benefit payments are based not only on service and pay through the valuation date but includes future pay and service, which has not yet been earned by the members but is expected to be earned.

These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is an estimate of the value of the benefits promised to all members as of a valuation date. If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.

The PVFB is a large sum of money, typically much larger than the amount of Retirement System assets held in the trust. The next step is for the actuary to apply the Funding Policy as adopted by the Board to determine the employer contributions to be made to the Retirement System so that the gap between the PVFB and assets is systematically paid off over time. The Funding Policy is adopted by the Board based on discussions with the actuary. When the Board develops a funding policy, a balance between contributions which are responsive to the needs of the Retirement System yet stable should be struck. There are many different funding policies for the Board to consider, and the actuary is responsible for discussing the various features of the funding policies under consideration. Funding Policies are generally reviewed during an experience review, but it is not uncommon to review a funding policy in between, particularly during period where large increases or decreases in contributions are expected. The Funding Policy is composed of three components: the actuarial cost method, the asset valuation method, and the amortization method.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), normal cost (NC) and present value of future normal costs (PVFNC). The actuary computes the liability components (PVFB, NC, AAL, and PVFNC) for each participant in the Retirement System at the valuation date. These liability components are then totaled for the Retirement System. There are many actuarial cost methods. Different actuarial methods will produce different contribution patterns, but do not change the ultimate cost of the benefits. The entry age normal cost method is the most prevalent method used for public sector plans in the United States, because the expected normal cost is calculated in such a way that it will tend to stay level as a percent of pay over a member's career.

The actuarial accrued liability (AAL) is also referred to as the amount of money the Retirement System should ideally have in the trust. The unfunded actuarial accrued liability (UAAL) is the portion of actuarial accrued liability that is not covered by the assets of the Retirement System. The UAAL can be a negative number, which means that the Retirement System has more assets than actuarial accrued liability. We refer to this condition as overfunded liability in this summary. Having UAAL does not indicate that the Retirement System is in failing actuarial health. UAAL is a common occurrence. Currently, many Retirement Systems in the United States have

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

The Actuarial Valuation Process (continued)

UAAL as a result of the Great Recession of 2008. Another related statistic of the Retirement System is the funded ratio. The used for these purposes are an actuarial value of assets (AVA), not market. The actuarial value of assets is based on the asset valuation method as recommended by the actuary and adopted by the Board. An actuarial value of assets is a smoothed, or averaged, value of assets, which is used to limit employer contribution volatility. Typically, assets are smoothed, or averaged, over a period of 3 to 5 years. By averaging returns, the UAAL is not as volatile, which we will see later results in contributions that are not as volatile as well. The North Carolina Retirement Systems use an actuarial value of assets with a smoothing period of 5 years.

While having UAAL is common, it is acceptable only if it is systematically being paid off. The method by which the UAAL is paid off is known as the amortization method. The concept is similar to that of a mortgage payment. The Board adopts the amortization method used to pay off the UAAL over a period of time. The amortization method is composed of the amortization period, the amount of payment increase, whether the period is open or closed and by the amount of amortization schedules. The amortization period is the amount of time over which the UAAL will be paid off. This is generally a period of thirty years or less, but actuaries are beginning to recommend shorter periods. The payments can be developed to stay constant from year to year like a mortgage, but often they are developed to increase each year at the same level payroll increases. Amortization type can be closed or open. Under a closed period, the UAAL is expected to be paid off over the amortization period. This is similar to a typical mortgage. Under an open period, the amortization period remains unchanged year after year. The concept is similar to re-mortgaging annually. In many instances, an amortization schedule is developed, whereby the UAAL is amortized over a closed period from the point the UAAL is incurred. Finally, some amortization methods are defined by a schedule of payments, where a new schedule of payments is added with each valuation. Regardless of the amortization type or period, the funding policy should generate a contribution that pays off the UAAL, which results in the funded ratio trending to 100% over time. Caution should be used when an open method is used, because typically an open amortization policy does not result in the UAAL being paid off. North Carolina pays off a much larger amount of UAAL compared to other states. While many states struggle to pay a 30-year level percent of pay UAAL contribution, which doesn't even reduce the amount of UAAL, North Carolina pays down the UAAL with level dollar payments over 12 years. This aggressive payment schedule of the UAAL results in North Carolina being home to many of the best funded Public Retirement Systems in the United States.

To satisfy the requirements of the State of North Carolina, the actuary calculates the total annual contribution to the Retirement System as the normal cost plus a contribution towards UAAL. Said another way, this contribution is sufficient to pay for the cost of benefits accruing during the year (normal cost) plus the UAAL payment . The total contribution is reduced by the amount of member contributions, if any, to arrive at the employer contribution. Continuing to follow the aggressive North Carolina contribution policy will keep the North Carolina Retirement Systems among the best funded in the United States.

An actuarial valuation report is produced annually, which contains the contribution for the fiscal year as well as the funded ratio of the Retirement System. The primary purpose of performing an actuarial valuation annually is to replace the estimated activities from the previous valuation, which were based on assumptions, with the actual experience of the Retirement System for the prior year. The experience gain (loss) is the difference between the expected and the actual UAAL of the Retirement System. An experience loss can be thought of as the amount of additional UAAL over and above the amount that was expected from the prior year due to deviation of actual experience from the assumption. Similarly, an experience gain can be thought of as having less UAAL than that which was expected from the prior year assumptions. As an example, if the Retirement System achieves an asset return of 15% when the assumption was a 6.50% return, an actuarial gain is said to have happened, which typically results in lower contributions and higher funded ratio, all else being equal. Alternatively, a return of 2% under the same circumstances would result in an actuarial loss, requiring an increase in contributions and a funded ratio that is lower than anticipated. Experience gains and losses are common within the valuation process. Typically gains and losses offset each other over time. To the extent that does not occur, the reasons for the gains and losses should be understood, and appropriate recommendations should be made by the actuary after an experience review to adjust the assumptions.

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

The Actuarial Valuation Process (continued)

The actuarial valuation report will contain histories of key statistics from prior actuarial valuation reports. In particular, a history of the funded ratio of the Retirement System is an important exhibit. Trustees should understand the reason for the trend of the funded ratio of the Retirement System over time. The actuary will discuss the reasons for changes in the funded ratio of the Retirement System with each valuation report. To the extent that there are unexplained changes in funded ratio corrective action should be explored and the actuary will make recommendations as to whether there should be changes in the assumptions, funding policy, or some other portion of the actuarial valuation process.

In addition to historical information, projections of contributions and funded ratio based on current assumptions can sometimes be found in an actuarial valuation report. Projections of contributions can allow the employer to plan their budget accordingly. Surprises in Retirement System contributions to be paid by the employer serve no one. A one-year projection based on “bad” asset returns can provide ample time for the employer to plan or allow for a discussion of changing the funding policy to occur. Contribution surprises are a primary contributor to employers considering pension reform. It is important to keep the employer apprised of future contribution requirements. A projection of funded ratio can serve the Trustees by illustrating the trend of the funded ratio over time. The funded ratio, under a prudent funding policy, should trend to 100% over a period of less than 30 years. (It is worthwhile to note that while 30 years has served as an industry standard for the longest period over which 100% funding should be achieved, that period is coming under scrutiny by the actuarial community and will likely be shortened.) If a projection of funded ratio does not trend to 100% over time, consideration should be given to fixing the funding policy to achieve this goal. For the largest North Carolina Retirement Systems, projections are generally performed for the January board meetings.

The actuarial report will contain schedules of information about the census, plan and asset information submitted by Retirement System staff upon which the actuarial valuation is based. It is important that the Board of Trustees review that information and determine if the information is consistent with their understanding of the Retirement System. If after questioning staff, the Board of Trustees is not comfortable that the information provided is correct, the actuary should be notified to determine if the actuarial valuation report should be corrected.

Finally, the valuation report and/or presentation should contain sufficient information in an understandable fashion to allow the Board to take action and adopt the contribution rate for the upcoming year. It should also allow stakeholders to understand key observations over the past year that resulted in contributions increasing (or decreasing) and where contributions are headed. The actuary is always open to making the results understandable. The actuary works with the North Carolina Retirement Systems Division to make your reports and presentations understandable and actionable. If something doesn’t make sense – speak up!!

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

Glossary

Note that the first definitions given are the "official" definitions of the term. For some terms there is a second definition, in italics, which is the unofficial definition.

Actuarial Accrued Liability (AAL)

The portion of the Present Value of Projected Benefits (PVFB) allocated to past service. Also difference between (i) the actuarial present value of future benefits, and (ii) the present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability." The amount of money that should be in the fund. *The funding target.*

Actuarial Assumptions

Estimates of future plan experience with respect to rates of mortality, disability, retirement, investment income and salary increases. Demographic ("people") assumptions (rates of mortality, separation, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic ("money") assumptions (salary increases and investment income) consist of an underlying rate appropriate in an inflation-free environment plus a provision for a long-term average rate of inflation. *Estimates of future events used to project what we know now- current member data, assets, and benefit provisions – into an estimate of future benefits.*

Actuarial Cost Method

A mathematical budgeting procedure for allocating the dollar amount of the Present Value of Projected Benefits (PVFB) between the normal costs to be paid in the future and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Methods

The collective term for the Actuarial Cost Method, the Amortization Payment for UAAL Method, and the Asset Valuation Method used to develop the contribution requirements for the Retirement System. *The funding policy.*

Actuarial Equivalent

Benefits whose actuarial present values are equal.

Actuarial Present Value

The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Actuarial Value of Assets (AVA)

A smoothed value of assets which is used to limit contribution volatility. Also known as the funding value of assets. *Smoothed value of assets.*

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

Glossary (continued)

Amortization Payment for UAAL

Payment of the unfunded actuarial accrued liability by means of periodic contributions of interest and principal, as opposed to a lump sum payment. The components of the amortization payment for UAAL includes:

- Amortization Period Length

  Generally, amortization periods of up to 15 to 20 years (and certainly not longer than 30) are allowed. Similar to a mortgage, the shorter the amortization period, the higher the payment and the faster the UAAL is paid off.

- Amortization payment increases

  Future payments can be level dollar, like a mortgage, or as a level percent of pay. Most Retirement Systems amortize UAAL as a level percent of pay which when combined with the employer normal cost that is developed as a level percent of pay can result in contributions that are easier to budget.

- Amortization type

  An amortization schedule can be closed or open. A closed amortization schedule is similar to a mortgage – at the end of the amortization period the UAAL is designed to be paid off. An open amortization period is similar to refinancing the UAAL year after year.

- Amortization schedule

  UAAL can be amortized over a single amortization period, or it can be amortized over a schedule

The amortization payment for UAAL can be thought of as the UAAL mortgage payment.

Asset Valuation Method

The components of how the actuarial value of assets is to be developed CJRS uses a five-year smoothing of asset gains and losses, which is the most commonly used method.

Experience Gain (Loss)

A measure of the difference between actual experience and experience anticipated by a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used. *The experience Gain (Loss) represents how much the actuary missed the mark in a given year.*

Funded Ratio

The percent of the actuarial accrued liabilities covered by the actuarial value of assets. Also known as the funded status. *The ratio of how much money you actually have in the fund to the amount you should have in the fund.*

Normal Cost

The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” An amortization payment toward the unfunded actuarial accrued liability is paid in addition to the normal cost to arrive at the total contribution in a given year. *The cost of benefits accruing during the year.*

Appendix A: Valuation Process and Glossary of Actuarial Terms (continued)

Glossary (continued)

Present Value of Future Normal Cost (PVFNC)

The portion of the Present Value of Projected Benefits (PVFB) allocated to future service. *The value in today's dollars of the amount of contribution to be made in the future for benefits accruing for members in the Retirement System as of the valuation date.*

Present Value of Future Benefits (PVFB)

The projected future benefit payments of the plan are discounted into today's dollars using an assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is the discounted value of the projected benefits promised to all members as of a valuation date, including future pay and service for members which has not yet been earned. *If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.*

Reserve Account

An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability (UAAL)

The difference between the actuarial accrued liability (AAL) and actuarial value of assets (AVA). The UAAL is sometimes referred to as "unfunded accrued liability." *Funding shortfall, or prefunded amount if negative.*

Valuation Date

The date that the actuarial valuation calculations are performed as of. *Also known as the "snapshot date".*

Appendix B: Detailed Tabulations of Member Data

Table B-1: The Number and Average Reported Compensation of Active Members Distributed by Age and Service as of December 31, 2021

Age	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	1	0	0	0	0	0	0	0	0	1
	0	20,659	0	0	0	0	0	0	0	0	20,659
30 to 34	0	5	2	0	0	0	0	0	0	0	7
	0	20,659	20,659	0	0	0	0	0	0	0	20,659
35 to 39	0	6	3	0	0	0	0	0	0	0	9
	0	20,659	20,659	0	0	0	0	0	0	0	20,659
40 to 44	0	8	4	0	0	0	0	0	0	0	12
	0	20,587	21,754	0	0	0	0	0	0	0	20,976
45 to 49	0	5	4	2	0	0	0	0	0	0	11
	0	20,659	20,659	26,215	0	0	0	0	0	0	21,669
50 to 54	1	11	5	2	3	0	0	0	0	0	22
	8,030	20,659	21,535	20,659	32,142	0	0	0	0	0	21,850
55 to 59	0	14	6	0	0	1	0	0	0	0	21
	0	20,618	20,659	0	0	20,659	0	0	0	0	20,632
60 to 64	0	6	7	5	1	0	0	0	0	0	19
	0	20,659	20,659	23,758	20,659	0	0	0	0	0	21,475
65 to 69	1	7	10	4	2	1	0	0	0	0	25
	3,443	20,659	20,659	20,659	20,659	55,107	0	0	0	0	21,348
70 & Up	0	6	17	11	6	1	1	1	0	0	43
	0	20,659	20,659	20,659	21,389	20,659	20,659	20,659	0	0	20,761
Total	2	69	58	24	12	3	1	1	0	0	170
	5,737	20,642	20,810	21,768	23,895	32,142	20,659	20,659	0	0	21,116

Appendix B: Detailed Tabulations of Member Data (continued)

Table B-2: Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2021

	Men		Women	
Age	Number	Compensation	Number	Compensation
27	1	$ 20,659		
31	2	41,318	1	20,659
33	1	20,659		
34	3	61,977		
35	1	20,659		
36	1	20,659		
37	2	41,318	1	20,659
38			1	20,659
39	2	41,318	1	20,659
40			1	20,659
41	1	20,659		
42	3	66,358	1	20,081
43	3	61,977	2	41,318
44	1	20,659		
45	1	31,771		
46	1	20,659	1	20,659
47	4	82,636		
48	3	61,977		
49	1	20,659		
50	1	20,659	1	20,659
51	5	142,124		
52	1	20,659	2	41,318
53	6	123,954		
54	4	70,007	2	41,318
55	3	61,977	1	20,659
56	3	61,977	1	20,659
57	4	82,636	2	41,318
58	1	20,659	1	20,659
59	4	82,055	1	20,658
60	5	103,295	1	20,659
61	3	61,977	1	31,771
62	3	61,977	1	20,659
63			2	45,699
64	2	41,318	1	20,659
65	4	65,420	2	41,318
66	4	82,636	2	41,318
67	4	82,636	1	20,659
68	2	41,318	1	20,659
69	4	117,084	1	20,659
70	5	103,295	1	20,659

Appendix B: Detailed Tabulations of Member Data (continued)

Table B-2: Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2021 (continued)

	Men		Women	
Age	Number	Compensation	Number	Compensation
71	4	$ 82,636		
72	5	107,676	1	20,659
73	3	61,977	1	$ 20,659
74	1	20,659	1	20,659
75	3	61,977		
76	2	41,318	1	20,659
77	1	20,659	3	61,977
78	1	20,659	2	41,318
79	1	20,659		
80	2	41,318		
82	3	61,977	1	20,659
85			1	20,659
Total	125	$ 2,645,100	45	$ 944,569

Appendix B: Detailed Tabulations of Member Data (continued)

Table B-3: Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2021

	Men		Women	
Service	Number	Compensation	Number	Compensation
0	2	$ 11,473		
1	19	391,942	12	247,908
2	2	41,318		
3	24	495,815	10	206,012
4			2	41,318
5	19	392,520	4	82,636
6	1	20,660		(1)
7	11	227,249	2	41,318
8	2	45,699	1	20,659
9	15	314,266	3	61,977
10	3	61,977		
11	13	279,678	2	45,699
12	1	20,659	1	20,659
13	3	61,977	1	31,771
15	2	45,699	2	41,318
16	1	20,659		
17	3	61,977	2	41,318
19	1	55,107	1	20,659
21	2	75,766		
23	1	20,659		
25			1	20,659
33			1	20,659
Total	125	$ 2,645,100	45	$ 944,569

Appendix B: Detailed Tabulation of Member Data (continued)

Table B-4: Number and Deferred Retirement Allowance of Terminated Vested Members Distributed by Age as of December 31, 2021

	Men		Women	
Age	Number	Allowance	Number	Allowance
36	1	$ 8,305		
38	1	4,983		
40	1	6,632		
43			1	8,166
44	1	8,997		
47	2	17,025		
48	1	4,706		
49			1	5,052
50	1	4,360		
51	1	12,163	1	4,983
52	2	9,412	1	4,983
53	2	11,627		
54	2	11,627	1	4,983
55	1	6,021	1	4,983
56	1	10,234	1	4,983
57	2	13,079		(1)
58	4	28,790	1	8,720
59	4	28,342		
60	1	11,627		
61	2	25,058		
62	1	4,637	1	10,935
63	1	10,218	1	5,191
64	1	4,983		
65	4	33,913		
66	1	10,653		
67	1	6,298		
69	2	15,503		
70			1	9,343
72	1	6,644		
74	1	6,921	1	14,603
Total	43	$ 322,758	12	$ 86,924

Appendix B: Detailed Tabulation of Member Data (continued)

Table B-5: Number of Accumulated Contributions of Non-Vested Members Distributed by Age as of December 31, 2021

	Men		Women	
Age	Number	Contributions	Number	Contributions
33	1	$ 3,321		
36	1	6,387		
38	3	12,132		
39	2	4,850		
40	1	7,471	1	$ 6,259
42	1	5,284		
44	2	11,098		
46	1	5,746		
47	1	550		
48	2	10,937		
49	3	15,574		
50	2	9,668	1	$ 3,068
51	2	14,665		
53	3	12,363		
54	2	17,428		
56			1	$ 704
57	3	15,291	1	$ 3,318
58	2	12,103		
59	1	9,454		
60	1	5,333		
62	3	14,290		
63	2	16,177		
64	3	14,367	1	$ 6,620
65	2	9,426	2	$ 6,414
67	1	6,834		
69	2	14,487		
71	1	5,746	1	$ 6,215
73	1	3,068		
76	1	3,431		
Total	50	$ 267,481	8	$ 32,598

Appendix B: Detailed Tabulation of Member Data (continued)

Table B-6: Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Age as of December 31, 2021

	Men		Women	
Age	Number	Allowances	Number	Allowances
42			1	$ 28,943
51	1	10,333		
54			2	15,118
59			3	11,912
61	2	9,582		
62			2	21,764
63	2	11,293	1	11,720
64	2	14,573	2	31,738
65	3	17,585	1	1,923
66	6	51,783		
67	1	14,725	2	13,548
68	5	38,757		
69	3	9,883	5	22,878
70	4	27,915	6	31,745
71	7	54,715	1	4,044
72	6	41,627	8	41,964
73	11	93,585	2	26,914
74	6	57,692	6	37,551
75	7	74,988	6	48,693
76	10	87,216	6	39,777
77	9	74,554	6	32,283
78	8	64,318	6	50,505
79	10	70,732	5	28,101
80	9	56,047	2	9,885
81	5	30,048	2	15,092
82	3	33,164	4	37,297
83	7	54,230	4	38,093
84	4	34,418	3	26,549
85	11	101,788	4	32,259
86	3	47,470	3	29,847
87	6	49,748	3	21,021
88	3	30,915	4	26,117
89	7	44,104	1	16,918
90	1	10,657	6	41,171
91	1	15,494	3	39,740

Appendix B: Detailed Tabulation of Member Data (continued)

Table B-6: Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Age as of December 31, 2021 (continued)

	Men		Women	
Age	Number	Allowances	Number	Allowances
92	1	11,358	2	14,164
93	2	1,907	1	551
94	1	3,652	2	9,652
95	1	3,869	1	763
96	2	14,631		
97	1	23,886	1	11,258
98	1	10,188		
99	1	644		
Total	173	$ 1,404,074	117	$ 871,498

Table B-7: Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Annuity Type as of December 31, 2021

	Men		Women	
Annuity Type	Number	Allowances	Number	Allowances
Maximum	68	$ 612,696	47	$ 381,799
Option 2	93	668,610	9	54,269
Option 3	10	98,807		
Survivors of Deceased Members	2	19,233	61	440,160
Total	173	$ 1,399,346	117	$ 876,228

Appendix C: Summary of Main Benefit & Contribution Provisions

All members of the General Assembly are eligible for membership.

"Compensation" means salary and expense allowance paid for service as a legislator in the General Assembly, exclusive of travel and per diem. "Highest annual compensation" means the 12 consecutive calendar months of compensation during a member's final legislative term for the highest position that a member held as a member of the General Assembly. "Creditable service" includes all service rendered as a member of the General Assembly.

Benefits

Service Retirement Allowance

Conditions for Allowance

A service retirement allowance is payable to any member who retires from service and

(a) has attained age 50 and completed 20 or more years of creditable service; or

(b) has attained age 60 and completed five or more years of creditable service.

(c) Members retiring on or after September 1, 2005 are not entitled to a retirement allowance from this system while employed in a contributing position in the Teachers' and State Employees' Retirement System or the Consolidated Judicial Retirement System

Unreduced Allowance

An unreduced annual service retirement allowance is payable to a member who has attained age 65 and completed five years of creditable service.

The Service Retirement Allowance is equal to 4.02% of a member's highest annual compensation multiplied by the number of years of creditable service.

Reduced Allowance

A reduced annual service retirement allowance is payable to a member who retires from service after attaining age 60 and completing five years of creditable service.

The reduced amount is an allowance as computed above reduced by 1/4% for each month that the member's retirement date precedes the date upon which the member would have attained age 65 had he or she remained in service.

OR

A reduced annual service retirement allowance is payable to a member who retires from service after attaining age 50 and completing 20 years of creditable service.

The reduced amount is an allowance as computed above reduced by 5/12 of 1% for each month that the member's retirement date precedes the date upon which the member would have attained age 60, plus 1/4% for each month that the date upon which the member would have attained age 60 precedes the date upon which the member would have attained age 65.

Maximum Amount

The maximum annual service retirement allowance (on an unreduced basis) is 75% of the member's highest annual compensation.

Disability Retirement Allowance

Condition for Allowance

Any member who becomes permanently and totally disabled prior to the attainment of age 60 and who has completed at least five years of creditable service may be retired by the Board of Trustees on a disability retirement allowance.

Appendix C: Summary of Main Benefit & Contribution Provisions (continued)

Amount of Allowance

The disability retirement allowance is computed as an unreduced service retirement allowance based on the number of years of creditable service the member would have had had he or she remained in service to age 60.

Deferred Allowance

Any member who separates from service after completing five years of creditable service and who leaves his or her total accumulated contributions in the system may receive a deferred allowance, beginning at age 50, computed in the same way as a service retirement allowance on the basis of his or her creditable service and compensation to the date of separation.

Return of contributions

Upon the withdrawal of a member without a retirement allowance and upon his or her request, the member's contributions are returned, together with accumulated regular interest.

Upon the death of a member before retirement, the member's contributions, together with the full accumulated regular interest thereon, are paid to the estate or to person(s) designated by the member unless the designated beneficiary, if eligible, elects the survivor's alternate benefit described below.

The current interest rate on member contributions is 4%.

Survivor's Alternate Benefit

Upon the death of a member in service who has met conditions (a) or (b) below, the designated beneficiary may elect to receive a benefit equal to that which would have been payable under the provisions of Option 2 had the member retired on the first day of the month following death and elected such option, in lieu of the member's accumulated contributions, provided the member had not instructed the Board of Trustees in writing that he or she did not wish the alternate benefit to apply

(a) attainment of age 60 and completion of five years of creditable service.

(b) completion of 12 years of creditable service.

Lump Sum Death Benefit

Upon the death of a member in active service after completing one year of creditable service, a lump sum payment equal to the deceased member's highest annual compensation to a maximum of $15,000 is made to his or her designated beneficiary or estate. This benefit is payable from the Teachers' and State Employees' Retirement System Death Benefit Fund.

Death after Retirement

Upon the death of a beneficiary who did not retire under an effective election of Option 2 or Option 3, an amount equal to the excess if any, of his or her accumulated contributions at retirement over the retirement allowance payments received is paid to a designated person or to the beneficiary's estate.

Upon the death of the survivor of a beneficiary who retired under an effective election of Option 2 or Option 3, an amount equal to the excess, if any, of the beneficiary's accumulated contributions at retirement over the total retirement allowance payments received is paid to such other person designated by the beneficiary or to the beneficiary's estate.

Appendix C: Summary of Main Benefit & Contribution Provisions (continued)

Optional Allowances

In lieu of the full retirement allowance, any member may elect to receive a reduced retirement allowance equal in value to the full allowance, with the provision that:

Option 2: At the death of the member his or her allowance shall be continued throughout the life of such other person as the member shall have designated at the time of retirement, or

Option 3: At the death of the member one-half of the allowance shall be continued throughout the life of such other person as the member shall have designated at the time of retirement.

Post-Retirement Increases in Allowance

Future increases in allowances may be granted at the discretion of the State.

Contributions

Member Contributions

Each member contributes 7% of annual compensation.

Employer Contributions

The State makes annual contributions consisting of a normal contribution and an accrued liability contribution. The normal contribution covers the liability on account of current service and is determined by the actuary after each valuation.

The accrued liability contribution covers the liability on account of service rendered before the establishment of the retirement system and the liability on account of increases in benefits for service rendered prior to the effective date of any amendment.

Changes Since Prior Valuation

The December 31, 2021 valuation reflects a one-time supplement for LRS payees that is equal to 4% of their annual allowance and payable in October 2022.

Appendix D: Actuarial Assumptions and Methods

Assumptions are based on the experience investigation prepared as of December 31, 2019 and adopted by the Board of Trustees on January 28, 2021 for use beginning with the December 31, 2020 annual actuarial valuation.

Interest Rate

6.50% per annum, compounded annually.

Price Inflation

2.50% per annum, compounded annually

Real Wage Growth

0.75% per annum.

Annual Rate of Salary Increase

3.25%.

Separations Before Retirement

Representative values of the assumed annual rates of separation are as follows:

Age	Annual Rate of Disability	Base Mortality*		Withdrawal
		Male	Female	
25	.0001	.00028	.00009	.100
30	.0004	.00036	.00015	.100
35	.0010	.00047	.00023	.100
40	.0029	.00066	.00036	.100
45	.0049	.00098	.00056	.100
50	.0084	.00149	.00083	.100
55	.0144	.00219	.00123	.100
60		.00319	.00186	.100
64		.00433	.00269	.100

* Base mortality rates as of 2010

Service Retirement

Representative values of the assumed annual rates of separation for members with at least 5 years of service are as follows:

Annual Rates of Retirement	
Age	Rate
60	0.100
65	0.100
70	0.130
75	0.150
80	1.000

Appendix D: Actuarial Assumptions and Methods

Post-Retirement Mortality

Representative values of the assumed post-retirement mortality rates as of 2010 prior to any mortality improvements are as follows:

Annual Rate of Death after Retirement (Retired Members and Survivors of Deceased Members)						
	Retirees (Healthy at Retirement)		Survivors of Deceased Members		Retirees (Disabled at Retirement)	
Age	Male	Female	Male	Female	Male	Female
55	.00387	.00275	.00824	.00446	.02114	.01742
60	.00552	.00371	.01012	.00622	.02503	.01956
65	.00820	.00595	.01384	.00899	.03044	.02256
70	.01381	.01032	.02129	.01353	.03901	.02862
75	.02437	.01827	.03382	.02151	.05192	.04003
80	.04391	.03260	.05360	.03573	.07348	.06007

Deaths After Retirement (Healthy Members at Retirement)

Mortality rates are based on the Pub-2010 General Retirees Above-Median Amount-Weighted Mortality.

Deaths After Retirement (Disabled Members at Retirement)

Mortality rates are based on the Pub-2010 General Disabled Retirees Amount-Weighted Mortality.

Deaths After Retirement (Survivors of Deceased Members)

Mortality rates are based on the Pub-2010 General Contingent Survivors Amount-Weighted Mortality.

Deaths Prior to Retirement

Mortality rates are based on the Pub-2010 General Employees Amount-Weighted Mortality.

Mortality Projection

All mortality rates are projected from 2010 using generational improvement with Scale MP-2019.

Marriage Assumption

100% married with male spouses three years older than female spouses.

Missing Gender Code

For members reported on the data without a gender code, we use the prior year's code where available or assign a code based on inspection.

Liability for Inactive Members

The liability for members who terminated prior to five years of creditable service is estimated to be 100% of the member's accumulated contributions. The liability for members who terminated after completing five years of creditable service is estimated based on the member's current age and the service and reported compensation at termination of employment.

Appendix D: Actuarial Assumptions and Methods (continued)

Timing of Assumptions

All withdrawals, deaths, disabilities, retirements and salary increases are assumed to occur July 1 of each year. The timing of retirement changes from mid-year to beginning of year at and after the 100% retirement age.

Administrative Expenses

1.00% of payroll added to the normal cost rate.

Reported Compensation

Calendar year compensation as furnished by the system's office.

Valuation Compensation

Reported compensation adjusted to reflect the assumed rate of pay as of the valuation date and the probability of decrement during the year.

Compensation Limits

No compensation limits are applied.

Actuarial Cost Method

Entry age normal cost method. Entry age is established on an individual basis.

Amortization Period

12-year closed, level-dollar amount. The first amortization base was created for the contribution payable for fiscal year ending 2012.

Asset Valuation Method

Actuarial value, as developed in Table 8. Actuarial value of assets is based upon a smoothed market value method. Under this method, asset returns in excess of or less than the expected return on market value of assets will be reflected in the actuarial value of assets over a five-year period. The calculation of the Actuarial Value of Assets is based on the following formula:

$MV - 80\% \times G/(L)_1 - 60\% \times G/(L)_2 - 40\% \times G/(L)_3 - 20\% \times G/(L)_4$

MV = the market value of assets as of the valuation date

$G/(L)_i$ = the asset gain or (loss) for the i-th year preceding the valuation date

Changes in Assumptions and Methods Since Prior Valuation

The assumptions and methods used for the December 31, 2021 actuarial valuation are based on the experience study prepared as of December 31, 2019 and adopted by the Board of Trustees of January 28, 2021.

Since the prior valuation, a transition from the prior actuary to Buck resulted in valuation programming modifications and differences in methodology. The net impact of these changes resulted in no material change to the actuarial accrued liability.

Appendix E: GASB 67 Fiduciary Net Position Projection

Table E-1: Projection of Fiduciary Net Positions (in thousands)

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2022	$ 32,265	$ 230	$ 811	$ 2,811	$ 34	$ (2,206)	$ 28,255
2023	28,255	208	604	2,531	31	1,781	28,286
2024	28,286	186	498	2,541	27	1,778	28,180
2025	28,180	165	446	2,578	24	1,767	27,956
2026	27,956	147	415	2,586	22	1,753	27,663
2027	27,663	132	430	2,588	19	1,732	27,350
2028	27,350	118	476	2,597	17	1,714	27,044
2029	27,044	105	472	2,619	15	1,692	26,679
2030	26,679	92	502	2,621	14	1,668	26,306
2031	26,306	82	294	2,608	12	1,638	25,700
2032	25,700	72	204	2,595	11	1,597	24,967
2033	24,967	63	178	2,577	10	1,548	24,169
2034	24,169	56	240	2,546	10	1,499	23,408
2035	23,408	50	338	2,507	10	1,453	22,732
2036	22,732	44	352	2,482	9	1,411	22,048
2037	22,048	39	423	2,425	9	1,369	21,445
2038	21,445	35	426	2,351	9	1,333	20,879
2039	20,879	31	391	2,287	8	1,298	20,304
2040	20,304	28	329	2,242	8	1,259	19,670
2041	19,670	25	117	2,162	8	1,214	18,856
2042	18,856	22	60	2,082	7	1,161	18,010
2043	18,010	20	39	2,000	7	1,109	17,171
2044	17,171	18	33	1,944	6	1,055	16,327
2045	16,327	16	30	1,880	6	1,001	15,488
2046	15,488	14	24	1,791	6	951	14,680
2047	14,680	13	19	1,710	5	901	13,898
2048	13,898	11	14	1,643	5	851	13,126
2049	13,126	10	5	1,566	5	803	12,373
2050	12,373	9	0	1,499	4	756	11,635
2051	11,635	7	0	1,433	4	710	10,915
2052	10,915	7	0	1,356	4	666	10,228
2053	10,228	6	0	1,296	3	623	9,558
2054	9,558	5	1	1,225	3	583	8,919
2055	8,919	4	2	1,151	3	543	8,314
2056	8,314	4	0	1,103	3	506	7,718
2057	7,718	3	0	1,036	2	469	7,152
2058	7,152	3	0	969	2	434	6,618
2059	6,618	2	0	907	2	401	6,112
2060	6,112	2	0	856	2	369	5,625
2061	5,625	2	0	797	2	339	5,167
2062	5,167	1	0	742	1	313	4,738
2063	4,738	1	0	691	1	286	4,333
2064	4,333	1	0	640	1	261	3,954
2065	3,954	1	0	593	1	238	3,599
2066	3,599	1	0	547	1	216	3,268
2067	3,268	0	1	504	1	196	2,960
2068	2,960	0	1	464	1	177	2,673
2069	2,673	0	1	426	1	160	2,407
2070	2,407	0	1	389	1	144	2,162
2071	2,162	0	1	355	1	129	1,936

Appendix E: GASB 67 Fiduciary Net Position Projection (continued)

Table E-1: Projection of Fiduciary Net Positions (in thousands) (continued)

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2072	$ 1,936	$ 0	$ 1	$ 323	$ 1	$ 115	$ 1,728
2073	1,728	0	0	293	0	104	1,539
2074	1,539	0	0	263	1	93	1,368
2075	1,368	0	0	237	0	81	1,212
2076	1,212	0	0	211	0	73	1,074
2077	1,074	0	0	187	0	63	950
2078	950	0	0	165	0	57	842
2079	842	0	0	145	0	50	747
2080	747	0	0	126	0	45	666
2081	666	0	0	109	0	40	597
2082	597	0	0	93	0	37	541
2083	541	0	0	79	0	33	495
2084	495	0	0	66	0	30	459
2085	459	0	0	55	0	28	432
2086	432	0	0	45	0	27	414
2087	414	0	0	36	0	26	404
2088	404	0	0	29	0	25	400
2089	400	0	0	23	0	25	402
2090	402	0	0	18	0	25	409
2091	409	0	0	14	0	27	422
2092	422	0	0	10	0	26	438
2093	438	0	0	8	0	29	459
2094	459	0	0	6	0	30	483
2095	483	0	0	4	0	31	510
2096	510	0	0	3	0	33	540
2097	540	0	0	2	0	35	573
2098	573	0	0	1	0	37	609
2099	609	0	0	1	0	39	647
2100	647	0	0	1	0	43	689
2101	689	0	0	0	0	44	733
2102	733	0	0	0	0	48	781
2103	781	0	0	0	0	50	831
2104	831	0	0	0	0	54	885
2105	885	0	0	0	0	58	943
2106	943	0	0	0	0	61	1,004
2107	1,004	0	0	0	0	65	1,069
2108	1,069	0	0	0	0	70	1,139
2109	1,139	0	0	0	0	74	1,213
2110	1,213	0	0	0	0	79	1,292
2111	1,292	0	0	0	0	84	1,376
2112	1,376	0	0	0	0	89	1,465
2113	1,465	0	0	0	0	95	1,560
2114	1,560	0	0	0	0	102	1,662
2115	1,662	0	0	0	0	108	1,770
2116	1,770	0	0	0	0	115	1,885
2117	1,885	0	0	0	0	122	2,007
2118	2,007	0	0	0	0	131	2,138
2119	2,138	0	0	0	0	138	2,276
2120	2,276	0	0	0	0	148	2,424
2121	2,424	0	0	0	0	158	2,582

Appendix E: GASB 67 Fiduciary Net Position Projection (continued)

Table E-2: Actuarial Present Value of Projected Benefit Payments (in thousands)

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments: Funded Payments at 6.50%	Present Value of Benefit Payments: Unfunded Payments at 3.54%	Present Value of Benefit Payments: Using Single Discount Rate of 6.50%
2022	$ 32,265	$ 2,811	$ 2,811	$ 0	$ 2,724	$ 0	$ 2,724
2023	28,255	2,531	2,531	0	2,303	0	2,303
2024	28,286	2,541	2,541	0	2,171	0	2,171
2025	28,180	2,578	2,578	0	2,068	0	2,068
2026	27,956	2,586	2,586	0	1,948	0	1,948
2027	27,663	2,588	2,588	0	1,830	0	1,830
2028	27,350	2,597	2,597	0	1,725	0	1,725
2029	27,044	2,619	2,619	0	1,633	0	1,633
2030	26,679	2,621	2,621	0	1,535	0	1,535
2031	26,306	2,608	2,608	0	1,434	0	1,434
2032	25,700	2,595	2,595	0	1,340	0	1,340
2033	24,967	2,577	2,577	0	1,249	0	1,249
2034	24,169	2,546	2,546	0	1,159	0	1,159
2035	23,408	2,507	2,507	0	1,071	0	1,071
2036	22,732	2,482	2,482	0	996	0	996
2037	22,048	2,425	2,425	0	914	0	914
2038	21,445	2,351	2,351	0	832	0	832
2039	20,879	2,287	2,287	0	760	0	760
2040	20,304	2,242	2,242	0	699	0	699
2041	19,670	2,162	2,162	0	633	0	633
2042	18,856	2,082	2,082	0	573	0	573
2043	18,010	2,000	2,000	0	516	0	516
2044	17,171	1,944	1,944	0	471	0	471
2045	16,327	1,880	1,880	0	428	0	428
2046	15,488	1,791	1,791	0	383	0	383
2047	14,680	1,710	1,710	0	343	0	343
2048	13,898	1,643	1,643	0	310	0	310
2049	13,126	1,566	1,566	0	277	0	277
2050	12,373	1,499	1,499	0	249	0	249
2051	11,635	1,433	1,433	0	224	0	224
2052	10,915	1,356	1,356	0	199	0	199
2053	10,228	1,296	1,296	0	178	0	178
2054	9,558	1,225	1,225	0	158	0	158
2055	8,919	1,151	1,151	0	140	0	140
2056	8,314	1,103	1,103	0	126	0	126
2057	7,718	1,036	1,036	0	111	0	111
2058	7,152	969	969	0	97	0	97
2059	6,618	907	907	0	86	0	86
2060	6,112	856	856	0	76	0	76
2061	5,625	797	797	0	66	0	66
2062	5,167	742	742	0	58	0	58
2063	4,738	691	691	0	51	0	51
2064	4,333	640	640	0	44	0	44
2065	3,954	593	593	0	38	0	38
2066	3,599	547	547	0	33	0	33
2067	3,268	504	504	0	29	0	29
2068	2,960	464	464	0	25	0	25
2069	2,673	426	426	0	21	0	21
2070	2,407	389	389	0	18	0	18
2071	2,162	355	355	0	16	0	16

Appendix E: GASB 67 Fiduciary Net Position Projection (continued)

Table E-2: Actuarial Present Value of Projected Benefit Payments (in thousands)

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments: Funded Payments at 6.50%	Present Value of Benefit Payments: Unfunded Payments at 3.54%	Present Value of Benefit Payments: Using Single Discount Rate of 6.50%
2072	$ 1,936	$ 323	$ 323	$ 0	$ 13	$ 0	$ 13
2073	1,728	293	293	0	11	0	11
2074	1,539	263	263	0	10	0	10
2075	1,368	237	237	0	8	0	8
2076	1,212	211	211	0	7	0	7
2077	1,074	187	187	0	6	0	6
2078	950	165	165	0	5	0	5
2079	842	145	145	0	4	0	4
2080	747	126	126	0	3	0	3
2081	666	109	109	0	3	0	3
2082	597	93	93	0	2	0	2
2083	541	79	79	0	2	0	2
2084	495	66	66	0	1	0	1
2085	459	55	55	0	1	0	1
2086	432	45	45	0	1	0	1
2087	414	36	36	0	1	0	1
2088	404	29	29	0	0	0	0
2089	400	23	23	0	0	0	0
2090	402	18	18	0	0	0	0
2091	409	14	14	0	0	0	0
2092	422	10	10	0	0	0	0
2093	438	8	8	0	0	0	0
2094	459	6	6	0	0	0	0
2095	483	4	4	0	0	0	0
2096	510	3	3	0	0	0	0
2097	540	2	2	0	0	0	0
2098	573	1	1	0	0	0	0
2099	609	1	1	0	0	0	0
2100	647	1	1	0	0	0	0
2101	689	0	0	0	0	0	0
2102	733	0	0	0	0	0	0
2103	781	0	0	0	0	0	0
2104	831	0	0	0	0	0	0
2105	885	0	0	0	0	0	0
2106	943	0	0	0	0	0	0
2107	1,004	0	0	0	0	0	0
2108	1,069	0	0	0	0	0	0
2109	1,139	0	0	0	0	0	0
2110	1,213	0	0	0	0	0	0
2111	1,292	0	0	0	0	0	0
2112	1,376	0	0	0	0	0	0
2113	1,465	0	0	0	0	0	0
2114	1,560	0	0	0	0	0	0
2115	1,662	0	0	0	0	0	0
2116	1,770	0	0	0	0	0	0
2117	1,885	0	0	0	0	0	0
2118	2,007	0	0	0	0	0	0
2119	2,138	0	0	0	0	0	0
2120	2,276	0	0	0	0	0	0
2121	2,424	0	0	0	0	0	0

Appendix F: Data for Section 2 Graphs

The tables below provide the numbers associated with the graphs in Section 2 of this report.

Graph 1: Market Value of Assets and Asset Returns

	Market Value of Assets	Asset Return
2017	$ 28,554,239	13.46%
2018	26,543,448	-1.30%
2019	28,800,055	14.58%
2020	30,702,732	10.88%
2021	32,264,855	9.52%

Graph 3: Actuarial Value and Market Value of Assets

	Actuarial Value of Assets	Market Value of Assets
2017	$ 28,193,658	$ 28,554,239
2018	27,909,801	26,543,448
2019	28,028,978	28,800,055
2020	29,252,976	30,702,732
2021	30,561,851	32,264,855

Graph 4: Asset Returns

	Asset Returns (Actuarial Value)	Asset Returns (Market Value)
2017	6.42%	13.46%
2018	5.00%	-1.30%
2019	5.97%	14.58%
2020	8.71%	10.88%
2021	9.12%	9.52%

Graph 5: Actuarial Accrued Liability

	Liability for Active Members	Liability for Deferred Members	Liability for Retired Members	Total Liability
2017	$ 7,357,199	$ 2,556,411	$ 20,483,773	$ 30,397,383
2018	8,428,752	2,404,874	19,494,673	30,328,299
2019	7,514,236	2,877,651	19,877,116	30,269,003
2020	7,021,813	3,501,026	19,375,257	29,898,096
2021	6,907,382	3,268,415	19,813,571	29,989,368

Appendix F: Data for Section 2 Graphs (continued)

Graph 6: Actuarial Accrued Liability and Actuarial Value of Assets

	Actuarial Accrued Liability	Actuarial Value of Assets
2017	$ 30,397,383	$ 28,193,658
2018	30,328,299	27,909,801
2019	30,269,003	28,028,978
2020	29,898,096	29,252,976
2021	29,989,368	30,561,851

Graph 7: Funded Ratios

	Funded Ratio (Actuarial Basis)	Funded Ratio (Market Value Basis)
2017	92.8%	94.0%
2018	92.0%	87.5%
2019	92.6%	95.1%
2020	97.8%	102.7%
2021	101.9%	107.6%