

Virginia Retirement System

Annual Actuarial Valuation

June 30, 2023



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January 9, 2024

Board of Trustees
Virginia Retirement System
1200 E. Main Street
Richmond, VA 23219

**Re: Virginia Retirement System Actuarial Valuation as of June 30, 2023
Actuarial Disclosures – State Pension Plans**

Dear Trustees:

The results of the June 30, 2023 Annual Actuarial Valuation of the Virginia Retirement System (VRS) are presented in this report. This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure each Statewide System's funding progress and to determine the actuarially determined employer contribution rates for the fiscal years ended June 30, 2025 and June 30, 2026. In addition, this report provides select aggregated valuation results for the participating Political Subdivisions. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The employer contribution rates in this report are determined using the actuarial assumptions and methods as adopted by the Board. This report includes risk metrics on pages 27 through 32 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

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

The findings in this report are based on data and other information through June 30, 2023. The valuation was based upon information furnished by the VRS, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the VRS. For a summary of the benefit provisions used, please refer to the appendix available on the VRS [website](#).

Board of Trustees
Virginia Retirement System
January 9, 2024

Valuation results are developed through the use of multiple models.

Valuation liabilities were prepared using ProVal's valuation model, a software product of Winklevoss Technologies. We are relying on the ProVal model. We performed tests of the ProVal model with this assignment and made a reasonable attempt to understand the developer's intended purpose of, general operation of, major sensitivities and dependencies within, and key strengths and limitations of the ProVal model. In our professional judgment, the ProVal valuation model has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses.

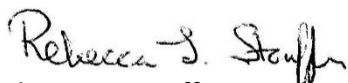
Financial results were prepared using our financing model which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. The combined effect of the assumptions is expected to have no significant bias (i.e., not significantly optimistic or pessimistic). All actuarial assumptions and methods used in the valuation follow the guidance in the applicable Actuarial Standards of Practice. For a full list of the assumptions and methods used, please refer to the appendix available on the VRS website.

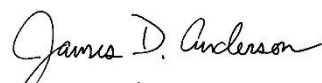
This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the VRS as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Rebecca L. Stouffer, James D. Anderson, Richard C. Koch Jr., and Michael D. Kosciuk are members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

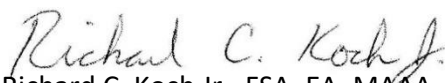
Respectfully submitted,
Gabriel, Roeder, Smith & Company



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RLS/JDA/RCK/MDK:rmn



SECTION A

EXECUTIVE SUMMARY

Executive Summary

1. Introduction

Each year actuarial valuations are prepared for the Virginia Retirement System (VRS). This report contains the results of the June 30, 2023 actuarial valuation for each of the Statewide Retirement Systems administered by the VRS.

As referenced throughout this report, the Statewide Retirement Systems are as follows:

- Virginia Retirement System
 - State Employees
 - Teachers
 - Political Subdivisions
- State Police Officer’s Retirement System (State Police)
- Judicial Retirement System (Judicial)
- Virginia Law Officers’ Retirement System (Virginia Law Officers)

In addition, the report presents aggregated results for the participating Political Subdivisions within the agent-multiple employer plan. The funded status and employer contribution rates for participating Political Subdivisions are developed individually at the employer level.

2. Total Employer Contribution Rates to Support Retirement System Benefits – Including an Actuarially Determined Employer Contribution (ADEC) Rate

Fiscal Year(s) Ending:	2023 & 2024		Informational	2025 & 2026	
Valuation Date:	June 30, 2021		June 30, 2022	June 30, 2023	
Employer Contribution Rate / System	Board Approved	General Assembly Approved	ADEC For Defined Benefit (DB) Plan ²	Before Funding Policy Change ADEC for Defined Benefit (DB) Plan ^{2,3}	Board Adopted - After Funding Policy Change ADEC for Defined Benefit (DB) Plan ^{2,3}
State Employees	14.13%	14.46%	12.05%	11.78%	12.52%
Teachers	14.76%	16.62%	13.27%	13.40%	14.21%
State Police	29.98%	29.98%	28.88%	29.97%	31.32%
Judicial	30.67%	30.67%	27.11%	27.46%	30.66%
Virginia Law Officers	24.60%	24.60%	21.92%	22.17%	22.81%
Political Subdivisions (Average) ¹	12.36%	N/A	11.07%	11.47%	12.25%

¹ Fiscal years ending 2023 and 2024 were restated as weighted average from prior actuary's published results by individual employer. The General Assembly does not approve the Political Subdivision rates.

² As a result of House Bill 473 (HB 473) and Senate Bill 70 (SB 70), the employer defined contribution rate for Hybrid Members is no longer included in the display.

³ During the 2023 valuation cycle, the Board adopted a change to the VRS Funding Policy Statement which generally reset the remaining amortization period to 20 years for the total unfunded accrued liability as of June 30, 2023.

Executive Summary

The Annual Recommended Contribution rates determined in this report for the Statewide Retirement Systems are reasonable under Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, based on:

- The use of reasonable actuarial assumptions and cost methods,
- The use of reasonable amortization and asset valuation methods; and
- Application of the VRS funding policy which will accumulate sufficient assets to make benefit payments when due, assuming all assumptions will be realized and Annual Recommended Contributions are made when due.

The Employer Defined Benefit Contribution rate for each participating Political Subdivision is determined individually, as this is an agent multiple-employer plan. Commentary regarding the reasonability of these contribution rates is provided under separate cover.

Contribution rates for the VRS employers are established every two years. Odd valuation years are rate setting valuations. A measure of the funded status and recommended employer contribution rates are determined by the Actuary and approved by the Board of Trustees. Actual employer contribution rates (for all except Political Subdivisions) are established by the General Assembly for the biennium, subject to intermediate updates. Even valuation years are considered informational. Even year valuations provide a current measure of the System's funded status and an illustrative measure of the employer contribution rate, after accounting for updates to demographic data, financial data, plan provisions, and assumption and/or method changes since the previous valuation measurement.

The table on the prior page shows the employer contribution rates for fiscal years ending 2023-2026 based on the June 30, 2021 and June 30, 2023 actuarial valuations. The budget maintains funding for fiscal years ending 2023 and 2024 based on the prior biennium's higher contribution rates for State (14.46% vs. 14.13%) and Teachers (16.62% vs. 14.76%). Also, the budget included the additional amounts below, contributed to the Virginia Retirement System trust fund in June 2023 in an effort to address the unfunded liabilities associated with each plan:

System	June 2023 Additional Contribution
State Employees	\$ 73,052,105
Teachers	147,457,029
State Police	3,652,605
Judicial	2,083,338
Virginia Law Officers	6,628,802

Executive Summary

3. Funded Ratio

The funded ratio of the plan is the percentage of the dollar value of the accrued liability that is covered by the actuarial value of assets. While the funded ratio may be a useful plan measurement, understanding a plan's funding trend may be more important than a particular point in time. The chart below compares the funded ratio for the current valuation with the results of the prior valuation.

System	Funded Ratio	
	June 30, 2023	June 30, 2022
State Employees	78.96%	78.90%
Teachers	79.66%	78.85%
State Police	70.28%	70.63%
Judicial	84.20%	85.19%
Virginia Law Officers	71.19%	71.36%
Political Subdivisions	87.84%	88.76%

4. Reasons for Change

There are three general reasons why contribution rates change from one valuation to the next.

- Changes in the benefit or eligibility conditions of the plan;
- Change in the valuation assumptions and/or methods used to project future occurrences; and
- Experience of the plan; the difference during the year between the plan's actual experience and that expected under the actuarial assumptions.

There were no significant changes in plan benefits or eligibility conditions since the prior valuation. Some Political Subdivisions made changes to benefits provided to members in hazardous duty positions. Additionally, some entities became participating Political Subdivisions since the previous valuation. In aggregate the impact of these changes on the Political Subdivision plans is not significant. Please refer to the individual reports for the benefit provisions of each participating Political Subdivision.

Executive Summary

On October 19, 2023, the VRS Board adopted a change to the VRS Funding Policy Statement which generally reset the amortization period to 20 years for the total unfunded accrued liability as of June 30, 2023. There were no other changes in the valuation assumptions or methods since the last valuation. Plan experience differed from expectations as follows:

- For the period ending June 30, 2023, the VRS reported investment return of 6.1% on a market value basis, compared to the assumed level of 6.75%. Under the asset valuation method, investment gains and losses are spread over a 5-year period, subject to a corridor. Partial recognition of this year's loss, combined with the continued phase-in of investment gains and losses from prior years resulted in a net recognized asset gain for the funding value of assets for all plans. In addition, the return on the funding value of assets was approximately 8%.
- Pay increases were greater than assumed.
- Cost of Living Adjustments (COLA) were greater than expected for eligible recipients:
 - An actual COLA of 5.00% for Plan 1 recipients compared to a 2.50% assumption; and
 - An actual COLA of 3.00% for Plan 2 / Hybrid recipients compared to a 2.25% assumption.
- Actual temporary supplement payments increased 15% compared to an assumed increase of 5.1%, for eligible recipients.
- The net impact of plan experience will depend upon the specific make up (demographic and financial) of each Plan and is reflected in the computed Total Employer Contribution Rate determined in this report.

5. General Comments

HB 473 and SB 70 separate the employer contribution into Defined Benefit and Defined Contribution components effective for contribution rates beginning July 1, 2024. The 2022 informational valuation continued to show the Defined Contribution Rate to allow continued communication to employers in the interim. This 2023 rate-setting valuation does not include the estimated Defined Contribution Rate since the rates set herein will be paid beginning July 1, 2024.

Throughout this report, there may be cases when the schedules do not add due to rounding.

Conclusion. Based upon the results of the June 30, 2023 regular annual actuarial valuation, it is our opinion that *the Virginia Retirement System continues to operate in accordance with actuarial principles of level percent-of-payroll financing.*



Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.75% on the actuarial value of assets), it is expected that:

- (1) The normal cost as a percentage of pay will trend to the level associated with Plan 2 and/or Hybrid as members are replaced into the ultimate benefit tier.
- (2) The unfunded liability will decrease in dollar amount until it is fully funded.
- (3) The funded status of the plan will move toward a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded ratio measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amount of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon actuarial assumptions. A funded ratio measurement in this report of 100% is not synonymous with no required future contributions. If the funded ratio were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.



SECTION B

VALUATION RESULTS

Results Summary State Employees

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Members:		
Active	76,876	74,048
Long Term Disability	2,308	2,380
Retirees and Beneficiaries	72,266	71,374
Inactive, Vested	16,005	15,387
Inactive, Non-Vested	35,482	33,016
Inactive, active elsewhere in VRS	9,380	9,393
Total	212,317	205,598
Annual Covered Payroll	\$ 5,448,985	\$ 4,946,307
Annual Retirement Benefits	\$ 1,599,295	\$ 1,546,151
Total Assets:		
Actuarial Value	\$ 22,997,717	\$ 21,917,849
Market Value	23,351,827	22,579,326
Actuarial Accrued Liability	\$ 29,126,311	\$ 27,779,171
Funded Ratio:		
Actuarial Value of Assets	78.96%	78.90%
Market Value of Assets	80.17%	81.28%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 6,128,594	\$ 5,861,321
Employer Contribution Rate Development for Fiscal Year(s) Ending	June 30, 2025 and June 30, 2026	Informational June 30, 2024
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	4.38%	4.48%
Administrative Expense	0.27%	0.29%
Amortization of UAAL ¹	7.87%	7.28%
Annual Recommended Contribution	12.52%	12.05%
DC Contribution for Hybrid Members ²	Separate Requirement	1.14%
Total Employer Contribution Rate Retirement Plans	12.52%	13.19%
Amortization Period (Years)	20	12-21

¹ Includes a timing adjustment factor of 1.018041.

² As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.



Results Summary Teachers

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Members:		
Active	153,107	153,356
Long Term Disability	39	41
Retirees and Beneficiaries	110,676	108,579
Inactive, Vested	34,088	32,031
Inactive, Non-Vested	50,497	46,596
Inactive, active elsewhere in VRS	6,586	6,218
Total	354,993	346,821
Annual Covered Payroll ¹	\$ 10,134,322	\$ 9,713,229
Annual Retirement Benefits	\$ 2,830,621	\$ 2,708,505
Total Assets:		
Actuarial Value	\$ 46,810,231	\$ 43,970,442
Market Value	47,467,405	45,211,731
Actuarial Accrued Liability	\$ 58,761,070	\$ 55,762,533
Funded Ratio:		
Actuarial Value of Assets	79.66%	78.85%
Market Value of Assets	80.78%	81.08%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 11,950,840	\$ 11,792,090
Employer Contribution Rate Development for Fiscal Year(s) Ending	June 30, 2025 and June 30, 2026	Informational June 30, 2024
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	5.68%	5.53%
Administrative Expense	0.28%	0.29%
Amortization of UAAL ²	8.25%	7.45%
Annual Recommended Contribution	14.21%	13.27%
DC Contribution for Hybrid Members ³	Separate Requirement	0.86%
Total Employer Contribution Rate Retirement Plans	14.21%	14.13%
Amortization Period (Years)	20	12-21

¹ Includes an assumed pay increase on the valuation date.

² Includes a timing adjustment factor of 1.018041.

³ As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.



Results Summary State Police

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Members:		
Active	1,882	1,885
Long Term Disability	29	28
Retirees and Beneficiaries	1,806	1,774
Inactive, Vested	196	199
Inactive, Non-Vested	289	271
Inactive, active elsewhere in VRS	248	252
Total	4,450	4,409
Annual Covered Payroll	\$ 168,611	\$ 159,212
Annual Retirement Benefits	\$ 75,937	\$ 71,361
Total Assets:		
Actuarial Value	\$ 1,063,882	\$ 1,001,822
Market Value	1,079,755	1,031,383
Actuarial Accrued Liability	\$ 1,513,881	\$ 1,418,464
Funded Ratio:		
Actuarial Value of Assets	70.28%	70.63%
Market Value of Assets	71.32%	72.71%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 449,999	\$ 416,642
Employer Contribution Rate Development for Fiscal Year(s) Ending	June 30, 2025 and June 30, 2026	Informational June 30, 2024
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	12.29%	12.06%
Administrative Expense	0.35%	0.39%
Amortization of UAAL ¹	18.68%	16.43%
Annual Recommended Contribution	31.32%	28.88%
Amortization Period (Years)	20	12-21

¹ Includes a timing adjustment factor of 1.018041.

Results Summary Judicial

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Members:		
Active	458	461
Retirees and Beneficiaries	592	580
Inactive, Vested	10	9
Inactive, Non-Vested	1	1
Inactive, active elsewhere in VRS	3	4
Total	1,064	1,055
Annual Covered Payroll	\$ 88,391	\$ 80,745
Annual Retirement Benefits	\$ 50,743	\$ 48,226
Total Assets:		
Actuarial Value	\$ 667,563	\$ 637,696
Market Value	677,958	656,964
Actuarial Accrued Liability	\$ 792,794	\$ 748,557
Funded Ratio:		
Actuarial Value of Assets	84.20%	85.19%
Market Value of Assets	85.52%	87.76%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 125,232	\$ 110,861
Employer Contribution Rate Development for Fiscal Year(s) Ending	June 30, 2025 and June 30, 2026	Informational June 30, 2024
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	20.31%	20.49%
Administrative Expense	0.43%	0.49%
Amortization of UAAL ¹	9.92%	6.13%
Annual Recommended Contribution	30.66%	27.11%
DC Contribution for Hybrid Members ²	Separate Requirement	1.99%
Total Employer Contribution Rate Retirement Plans	30.66%	29.10%
Amortization Period (Years)	20	12-21

¹ Includes a timing adjustment factor of 1.018041.

² As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.



Results Summary Virginia Law Officers

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Members:		
Active	7,478	7,289
Long Term Disability	484	489
Retirees and Beneficiaries	6,810	6,545
Inactive, Vested	1,573	1,494
Inactive, Non-Vested	7,186	6,554
Inactive, active elsewhere in VRS	3,882	3,736
Total	27,413	26,107
Annual Covered Payroll	\$ 398,110	\$ 372,486
Annual Retirement Benefits	\$ 143,402	\$ 132,855
Total Assets:		
Actuarial Value	\$ 1,903,501	\$ 1,789,127
Market Value	1,931,061	1,841,041
Actuarial Accrued Liability	\$ 2,673,711	\$ 2,507,144
Funded Ratio:		
Actuarial Value of Assets	71.19%	71.36%
Market Value of Assets	72.22%	73.43%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 770,210	\$ 718,017
Employer Contribution Rate Development for Fiscal Year(s) Ending	June 30, 2025 and June 30, 2026	Informational June 30, 2024
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	9.00%	9.20%
Administrative Expense	0.27%	0.29%
Amortization of UAAL ¹	13.54%	12.43%
Annual Recommended Contribution	22.81%	21.92%
Amortization Period (Years)	20	12-21

¹ Includes a timing adjustment factor of 1.018041.



Results Summary

Political Subdivisions¹

(\$ In Thousands)

	June 30, 2023	June 30, 2022
Number of Political Subdivisions in VRS (with active members)	600	598
Number of Political Subdivisions in VRS (no active members)	13	13
Total Political Subdivisions in VRS with members	613	611
Members ² :		
Active	114,279	109,906
Long Term Disability	104	91
Retirees and Beneficiaries	86,397	83,667
Inactive, Vested	24,000	22,746
Inactive, Non-Vested	55,946	50,565
Inactive, active elsewhere in VRS	39,043	37,906
Total	319,769	304,881
Annual Covered Payroll	\$ 6,762,206	\$ 6,121,691
Annual Retirement Benefits	\$ 1,421,328	\$ 1,315,611
Total Assets:		
Actuarial Value	\$ 26,900,812	\$ 25,288,728
Market Value	27,308,038	26,045,031
Actuarial Accrued Liability	\$ 30,623,222	\$ 28,491,418
Funded Ratio:		
Actuarial Value of Assets	87.84%	88.76%
Market Value of Assets	89.17%	91.41%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 3,722,410	\$ 3,202,690
	June 30, 2025 and June 30, 2026	Informational June 30, 2024³
Average Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	8.14%	8.03%
Administrative Expense	0.25%	0.27%
Amortization Charge/(Credit) ⁴	3.85%	2.76%
Additional Funding Contribution	0.00%	0.00%
Plan Surcharge	0.01%	0.01%
Average Employer Contribution Rate Defined Benefit Plan	12.25%	11.07%
DC Contribution for Hybrid Members ⁵	Separate Requirement	0.82%
Total Employer Contribution Rate Retirement Plans	12.25%	11.89%
Amortization Period (Years)	6-20	7-21

¹ Includes Political Subdivisions with no active members.

² Includes counts for each plan from which members receive pension benefits or are deferred vested. Members with benefits from more than one Political Subdivision are counted more than once.

³ Calculated as a weighted average starting with the June 30, 2022 valuation, consistent with GASB Statement No. 68 reporting.

⁴ Includes a timing adjustment factor of 1.018041.

⁵ As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.



Results Summary – Employer Contribution Rate Detail as a Percent of Active Member Payroll

Employer Contribution Rate	State Employees	Teachers	State Police Officers	Judicial	Virginia Law Officers
Defined Benefit (DB) Plan Component					
Normal Cost					
Service Retirement Benefits	5.54%	7.82%	13.62%	23.80%	6.99%
Disability Benefits	0.89%	0.53%	1.39%	0.00%	3.14%
Survivor Benefits	0.36%	0.15%	0.54%	0.89%	0.29%
Separation Benefits	2.14%	1.80%	1.74%	0.00%	3.58%
Total Normal Cost	8.93%	10.30%	17.29%	24.69%	14.00%
Member Current Contributions	4.55%	4.62%	5.00%	4.38%	5.00%
Employer Normal Cost	4.38%	5.68%	12.29%	20.31%	9.00%
Administrative Expense	0.27%	0.28%	0.35%	0.43%	0.27%
Amortization of UAAL	7.87%	8.25%	18.68%	9.92%	13.54%
Employer DB Plan Contribution Rate	12.52%	14.21%	31.32%	30.66%	22.81%

Note: Unfunded Actuarial Accrued Liability amortization detail is shown on the following pages.

Amortization of Unfunded Accrued Liability State

Description	Original Amount	Outstanding Balance as of June 30, 2022	BOY 2022/2023 Amortization Payment	Outstanding Balance as of June 30, 2023	BOY 2023/2024 Amortization Payment	Years Remaining June 30, 2023
2023 (Gain)/Loss	\$ 6,128,594,227			\$ 6,128,594,227	\$ 421,383,930	20 years
Total		\$ 5,861,321,439	\$ 353,856,820	\$ 6,128,594,227	\$ 421,383,930	

Amortization of Unfunded Accrued Liability Teachers

Description	Original Amount	Outstanding Balance as of June 30, 2022	BOY 2022/2023 Amortization Payment	Outstanding Balance as of June 30, 2023	BOY 2023/2024 Amortization Payment	Years Remaining June 30, 2023
2023 (Gain)/Loss	\$ 11,950,839,635			\$ 11,950,839,635	\$ 821,704,226	20 years
Total		\$ 11,792,090,417	\$ 710,499,497	\$ 11,950,839,635	\$ 821,704,226	

Amortization of Unfunded Accrued Liability State Police

Description	Original Amount	Outstanding Balance as of June 30, 2022	BOY 2022/2023 Amortization Payment	Outstanding Balance as of June 30, 2023	BOY 2023/2024 Amortization Payment	Years Remaining June 30, 2023
2023 (Gain)/Loss	\$ 449,998,635			\$ 449,998,635	\$ 30,940,569	20 years
Total		\$ 416,641,624	\$ 25,689,755	\$ 449,998,635	\$ 30,940,569	

Amortization of Unfunded Accrued Liability Judicial

Description	Original Amount	Outstanding Balance as of June 30, 2022	BOY 2022/2023 Amortization Payment	Outstanding Balance as of June 30, 2023	BOY 2023/2024 Amortization Payment	Years Remaining June 30, 2023
2023 (Gain)/Loss	\$ 125,231,919			\$ 125,231,919	\$ 8,610,575	20 years
Total		\$ 110,861,479	\$ 4,861,605	\$ 125,231,919	\$ 8,610,575	

Amortization of Unfunded Accrued Liability Virginia Law Officers

Description	Original Amount	Outstanding Balance as of June 30, 2022	BOY 2022/2023 Amortization Payment	Outstanding Balance as of June 30, 2023	BOY 2023/2024 Amortization Payment	Years Remaining June 30, 2023
2023 (Gain)/Loss	\$ 770,210,200			\$ 770,210,200	\$ 52,957,365	20 years
Total		\$ 718,017,125	\$ 45,491,023	\$ 770,210,200	\$ 52,957,365	

Unfunded Accrued Liability Changes Fiscal Year Ending 2023 (\$ In Thousands)

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions	Total
A. Calculation of Expected Unfunded Actuarial Accrued Liability							
1. UAAL as of June 30, 2022	\$ 5,861,321	\$ 11,792,090	\$ 416,642	\$ 110,861	\$ 718,017	\$ 3,202,690	\$ 22,101,621
2. Normal Cost for previous year	488,774	1,024,580	28,765	21,948	56,532	854,067	2,474,666
3. Actual contributions during the year	(976,168)	(2,160,930)	(57,944)	(29,731)	(114,756)	(1,023,426)	(4,362,955)
4. Interest at previous year's rate of 6.75%							
a. on UAAL	395,639	795,966	28,123	7,483	48,466	216,182	1,491,859
b. on normal cost	32,992	69,159	1,942	1,481	3,816	57,649	167,039
c. on contributions	(32,946)	(72,931)	(1,956)	(1,003)	(3,873)	(34,541)	(147,250)
d. total: (a) + (b) + (c)	395,685	792,194	28,109	7,961	48,409	239,290	1,511,648
5. Expected UAAL as of June 30, 2023							
A1 + A2 + A3 + A4	5,769,612	11,447,934	415,572	111,039	708,202	3,272,621	21,724,980
6. Actual UAAL as of June 30, 2023	6,128,594	11,950,840	449,999	125,232	770,210	3,722,410	23,147,285
7. Total Gain/(Loss): A5 - A6	(358,982)	(502,906)	(34,427)	(14,193)	(62,008)	(449,789)	(1,422,305)
B. Calculation of Asset Gain/(Loss)							
1. Actuarial Value of Assets (AVA) as of June 30, 2022	\$ 21,917,849	\$ 43,970,442	\$ 1,001,822	\$ 637,696	\$ 1,789,127	\$ 25,288,728	\$ 94,605,664
2. Contributions during the year	976,168	2,160,930	57,944	29,731	114,756	1,023,426	4,362,955
3. Benefit payments and refunds during the year	(1,641,279)	(2,819,118)	(75,819)	(50,587)	(143,013)	(1,438,516)	(6,168,332)
4. Interest at previous year's rate of 6.75%							
a. on AVA at beginning of year	1,479,455	2,968,005	67,623	43,044	120,766	1,706,989	6,385,882
b. on contributions	32,946	72,931	1,956	1,003	3,873	34,541	147,250
c. on benefit payments	(55,393)	(95,145)	(2,559)	(1,707)	(4,827)	(48,550)	(208,181)
d. total: (a) + (b) + (c)	1,457,008	2,945,791	67,020	42,340	119,812	1,692,980	6,324,951
5. Expected AVA as of June 30, 2023							
B1 + B2 + B3 + B4	22,709,746	46,258,045	1,050,967	659,180	1,880,682	26,566,618	99,125,238
6. Actual AVA as of June 30, 2023	22,997,717	46,810,231	1,063,882	667,563	1,903,501	26,900,812	100,343,706
7. Total Gain/(Loss): B6 - B5	287,971	552,186	12,915	8,383	22,819	334,194	1,218,468
C. Calculation of Liability Gain/(Loss)							
1. Gain/(Loss) due to plan amendments	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ (3,503)	\$ (3,503)
2. Gain/(Loss) due to change in methods	0	0	0	0	0	0	0
3. Liability Experience Gain/(Loss): A7 - B7 - C1 - C2	\$ (646,953)	\$ (1,055,092)	\$ (47,342)	\$ (22,576)	\$ (84,827)	\$ (780,480)	\$ (2,637,270)



Detailed Gain/Loss Analysis for Fiscal Year Ending 2023 (\$ In Millions)

Type of Activity	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions
1. Retirements (including disability retirement). If members retire at older ages or with lower final average pay than assumed, there is a gain. If younger ages or higher average pays, a loss.	\$1.8	(\$17.0)	\$2.2	\$3.3	(\$0.4)	\$29.7
2. Withdrawal from Employment (including death-in-service). If more liabilities are released by withdrawals and deaths than assumed, there is a gain. If smaller releases, a loss.	(11.6)	71.5	(1.6)	(2.1)	3.6	23.6
3. Pay Increases . If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(368.7)	(454.0)	(21.2)	(12.5)	(20.9)	(340.0)
4. Investment Income . If there is greater investment income than assumed, there is a gain. If less income, a loss.	288.0	552.2	12.9	8.4	22.8	334.2
5. Death After Retirement . If retirants and inactive vested members live longer than assumed, there is a loss. If not as long, a gain.	29.1	23.8	(1.9)	(3.8)	0.9	(11.6)
6. Cost of Living Allowance (COLA) . If COLA and/or Temporary Supplement Increase is greater than expected, there is a loss. If COLA and/or Temporary Supplement is less, a gain.	(370.6)	(693.4)	(30.8)	(11.7)	(56.8)	(454.8)
7. Other . Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	73.1	14.0	6.0	4.3	(11.2)	(30.8)
8. Composite Gain/(Loss) During Year .	(359.0)	(502.9)	(34.4)	(14.2)	(62.0)	(449.8)

Discussion of Risk/Maturity Measures

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

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

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

- ¹ **Investment Risk** – actual investment returns may differ from the expected returns;
- ² **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements; because of the way most public retirement systems invest, this tends to be synonymous with investment risk;
- ³ **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
- ⁴ **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- ⁵ **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- ⁶ **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

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

The contribution rates shown in this report may be considered as minimum contribution rates that comply with the Board's funding policy and statutes. The timely receipt of the actuarially determined contributions is critical to support the financial health of the VRS. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Discussion of Risk/Maturity Measures

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following: ratio of the market value of assets to total payroll, ratio of actuarial accrued liability to payroll, ratio of actives to retirees and beneficiaries, and the ratio of net cash flow to market value of assets.

RATIO OF MARKET VALUE OF ASSETS TO PAYROLL

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

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

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

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

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

ADDITIONAL RISK ASSESSMENT

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. Additional assessment of risk including stress testing for the Virginia Retirement System is regularly conducted by the VRS Staff.



Risk/Maturity Measures

State Employees

\$ In Thousands									
Valuation Date	(1) Actuarial Accrued Liabilities (AAL)	(2) Market Value of Assets (MVA)	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Retiree Liabilities (RetLiab)	(8) RetLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2019	\$ 25,398,188	\$ 19,090,110	\$ 6,308,078	\$ 4,375,061	5.1%	75.2%	\$ 14,549,882	57.3%	580.5%
2020	25,751,335	18,770,068	6,981,267	4,428,496	1.2%	72.9%	15,099,375	58.6%	581.5%
2021	26,727,971	23,112,417	3,615,554	4,594,347	3.7%	86.5%	15,726,839	58.8%	581.8%
2022	27,779,171	22,579,326	5,199,844	4,946,307	7.7%	81.3%	16,351,577	58.9%	561.6%
2023	29,126,311	23,351,827	5,774,484	5,448,985	10.2%	80.2%	17,153,819	58.9%	534.5%

\$ In Thousands								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Asset Portfolio StdDev	(12) StdDev % of Pay (10) x (11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Asset Return	(17) Ratio of Actives to Retirees
2019	436.3%	10.4%	45.4%	144.2%	\$ (653,801)	-3.4%	6.7%	1.1
2020	423.8%	10.4%	44.1%	157.6%	(681,103)	-3.6%	1.4%	1.1
2021	503.1%	11.4%	57.3%	78.7%	(712,813)	-3.1%	27.5%	1.0
2022	456.5%	13.8%	63.0%	105.1%	(511,512)	-2.3%	0.6%	1.0
2023	428.6%	12.6%	54.0%	106.0%	(665,111)	-2.8%	6.1%	1.1

The Risk/Maturity measures shown on this page and the following pages have been developed in response to Actuarial Standard of Practice (“ASOP”) No. 51 entitled “Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.” In a maturing plan, the ratio of retiree liabilities to total liabilities increases, and the ratios of both assets and liabilities to payroll increases, and contribution rates tend to become increasingly volatile. The risk/maturity measures and associated commentary are intended to help keep stakeholders informed of some of the risks that the plan faces, and the potential contribution rate volatility.

Risk/Maturity Measures

Teachers

\$ In Thousands									
Valuation Date	(1) Actuarial Accrued Liabilities (AAL)	(2) Market Value of Assets (MVA)	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Retiree Liabilities (RetLiab)	(8) RetLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2019	\$ 49,303,959	\$ 36,522,769	\$ 12,781,190	\$ 8,240,129	1.9%	74.1%	\$ 27,322,414	55.4%	598.3%
2020	50,834,783	36,449,229	14,385,554	8,498,519	3.1%	71.7%	28,448,471	56.0%	598.2%
2021	52,747,596	45,617,878	7,129,718	8,556,997	0.7%	86.5%	29,671,366	56.3%	616.4%
2022	55,762,533	45,211,731	10,550,802	9,263,309	8.3%	81.1%	30,967,586	55.5%	602.0%
2023	58,761,070	47,467,405	11,293,665	9,666,665	4.4%	80.8%	32,584,423	55.5%	607.9%

\$ In Thousands								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Asset Portfolio StdDev	(12) StdDev % of Pay (10) x (11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Asset Return	(17) Ratio of Actives to Retirees
2019	443.2%	10.4%	46.1%	155.1%	\$ (707,822)	-1.9%	6.7%	1.5
2020	428.9%	10.4%	44.6%	169.3%	(762,552)	-2.1%	1.4%	1.5
2021	533.1%	11.4%	60.8%	83.3%	(718,599)	-1.6%	27.5%	1.4
2022	488.1%	13.8%	67.4%	113.9%	(339,704)	-0.8%	0.6%	1.4
2023	491.0%	12.6%	61.9%	116.8%	(658,188)	-1.4%	6.1%	1.4

Risk/Maturity Measures

State Police

\$ In Thousands									
Valuation Date	(1) Actuarial Accrued Liabilities (AAL)	(2) Market Value of Assets (MVA)	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Retiree Liabilities (RetLiab)	(8) RetLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2019	\$ 1,181,120	\$ 865,273	\$ 315,847	\$ 132,230	4.5%	73.3%	\$ 655,590	55.5%	893.2%
2020	1,206,424	854,762	351,662	131,255	-0.7%	70.9%	680,986	56.4%	919.1%
2021	1,326,646	1,050,148	276,498	142,795	8.8%	79.2%	751,996	56.7%	929.1%
2022	1,418,464	1,031,383	387,081	159,212	11.5%	72.7%	771,290	54.4%	890.9%
2023	1,513,881	1,079,755	434,126	168,611	5.9%	71.3%	808,641	53.4%	897.9%

\$ In Thousands								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Asset Portfolio StdDev	(12) StdDev % of Pay (10) x (11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Asset Return	(17) Ratio of Actives to Retirees
2019	654.4%	10.4%	68.1%	238.9%	\$ (26,221)	-3.0%	6.7%	1.2
2020	651.2%	10.4%	67.7%	267.9%	(26,843)	-3.1%	1.4%	1.2
2021	735.4%	11.4%	83.8%	193.6%	(33,753)	-3.2%	27.5%	1.1
2022	647.8%	13.8%	89.4%	243.1%	(17,863)	-1.7%	0.6%	1.1
2023	640.4%	12.6%	80.7%	257.5%	(17,875)	-1.7%	6.1%	1.0

Risk/Maturity Measures

Judicial

\$ In Thousands									
Valuation Date	(1) Actuarial Accrued Liabilities (AAL)	(2) Market Value of Assets (MVA)	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Retiree Liabilities (RetLiab)	(8) RetLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2019	\$ 669,741	\$ 557,541	\$ 112,200	\$ 76,848	14.0%	83.2%	\$ 425,669	63.6%	871.5%
2020	677,872	549,455	128,417	74,734	-2.8%	81.1%	446,977	65.9%	907.0%
2021	733,408	673,152	60,256	79,125	5.9%	91.8%	494,666	67.4%	926.9%
2022	748,557	656,964	91,593	80,745	2.0%	87.8%	512,895	68.5%	927.1%
2023	792,794	677,958	114,836	88,391	9.5%	85.5%	535,518	67.5%	896.9%

\$ In Thousands								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Asset Portfolio StdDev	(12) StdDev % of Pay (10) x (11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Asset Return	(17) Ratio of Actives to Retirees
2019	725.5%	10.4%	75.5%	146.0%	\$ (17,840)	-3.2%	6.7%	0.8
2020	735.2%	10.4%	76.5%	171.8%	(18,577)	-3.4%	1.4%	0.8
2021	850.7%	11.4%	97.0%	76.2%	(23,504)	-3.5%	27.5%	0.8
2022	813.6%	13.8%	112.3%	113.4%	(15,711)	-2.4%	0.6%	0.8
2023	767.0%	12.6%	96.6%	129.9%	(20,856)	-3.1%	6.1%	0.8

Risk/Maturity Measures

Virginia Law Officers

\$ In Thousands									
Valuation Date	(1) Actuarial Accrued Liabilities (AAL)	(2) Market Value of Assets (MVA)	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Retiree Liabilities (RetLiab)	(8) RetLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2019	\$ 2,211,238	\$ 1,495,990	\$ 715,248	\$ 369,776	6.8%	67.7%	\$ 1,235,247	55.9%	598.0%
2020	2,258,553	1,500,469	758,084	363,896	-1.6%	66.4%	1,290,159	57.1%	620.7%
2021	2,407,153	1,868,924	538,229	351,086	-3.5%	77.6%	1,388,719	57.7%	685.6%
2022	2,507,144	1,841,041	666,103	372,486	6.1%	73.4%	1,474,492	58.8%	673.1%
2023	2,673,711	1,931,061	742,650	398,110	6.9%	72.2%	1,580,660	59.1%	671.6%

\$ In Thousands								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Asset Portfolio StdDev	(12) StdDev % of Pay (10) x (11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Asset Return	(17) Ratio of Actives to Retirees
2019	404.6%	10.4%	42.1%	193.4%	\$ (21,862)	-1.5%	6.7%	1.6
2020	412.3%	10.4%	42.9%	208.3%	(24,099)	-1.6%	1.4%	1.5
2021	532.3%	11.4%	60.7%	153.3%	(36,762)	-2.0%	27.5%	1.3
2022	494.3%	13.8%	68.2%	178.8%	(26,217)	-1.4%	0.6%	1.1
2023	485.1%	12.6%	61.1%	186.5%	(28,257)	-1.5%	6.1%	1.1

Risk/Maturity Measures (Concluded)

Notes:

The measures shown on the previous pages provide information in accordance with Actuarial Standard of Practice No. 51.

Columns (1) to (4). These columns provide various items for comparison in Columns 5 through 17.

Column (5). When payroll grows at or faster than the assumed rate of 3.0%, funding of unfunded accrued liabilities is likely to proceed at least at the scheduled rate. Payroll growing slower than the assumed rate can lead to underfunding of the plan because expected contributions for unfunded liability may not be received.

Column (6). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

Columns (7) and (8). The ratio of Retiree liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the investment policy may need to change. A ratio on the order of 50% indicates a maturing system. Ratios near or above 50% are common today.

Column (9). The ratio of liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

Column (10). The ratio of assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

Columns (11) and (12). The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment volatility and the challenges volatility brings to sustainability.

Column (13). The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

Columns (14) and (15). The ratio of Net External Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

Column (16). Investment return is probably the largest single risk that most systems face. The year by year return gives an indicator of the performance of the portfolio versus the system's assumed return.

Column (17). In the 1970s and 1980s it was common for the ratio of actives to retirees to be 3 or 4 to 1. As plans mature, this ratio can drop significantly. Ratios below 2 are common today. A ratio significantly below 1 usually indicates a closed plan, a shrinking workforce or other special situation.

Low-Default-Risk Obligation Measure

Introduction

In December 2021, the Actuarial Standards Board (ASB) adopted a revision to Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*. The revised ASOP No. 4 requires the calculation and disclosure of a liability referred to by the ASOP as the “Low-Default-Risk Obligation Measure” (LDRM). The rationale that the ASB cited for the calculation and disclosure of the LDRM was included in the Transmittal Memorandum of ASOP No. 4 and is presented below (emphasis added):

“The ASB believes that the calculation and disclosure of this measure provides **appropriate, useful information for the intended user regarding the funded status of a pension plan**. The calculation and disclosure of this additional measure is **not intended to suggest that this is the “right” liability measure** for a pension plan. However, the ASB does believe that **this additional disclosure provides a more complete assessment of a plan’s funded status and provides additional information regarding the security of benefits that members have earned as of the measurement date.**”

Comparing the Accrued Liabilities and the LDRM

One of the fundamental financial objectives of the Virginia Retirement System is to finance each member’s retirement benefits over the period from the member’s date of hire until the member’s projected date of retirement (entry age actuarial cost method) as a level percentage of payroll. To fulfill this objective, the discount rate that is used to value the accrued liabilities of the Virginia Retirement System is set equal to the **expected return** on the System’s diversified portfolio of assets (referred to sometimes as the investment return assumption). For the Virginia Retirement System, the investment return assumption is 6.75%.

- The LDRM is meant to approximately represent the lump sum cost to a plan to purchase low-default-risk fixed income securities whose resulting cash flows essentially replicate in timing and amount the benefits earned (or the costs accrued) as of the measurement date. The LDRM is very dependent upon market interest rates at the time of the LDRM measurement. The lower the market interest rates, the higher the LDRM, and vice versa. The LDRM results presented in this report are based on the entry age actuarial cost method and discount rates based upon the June 2023 Treasury Yield Curve Spot Rates (end of month). The 1-, 5-, 10- and 30-year rates follow: 5.29%, 3.99%, 3.61% and 3.84%; the effective rate ranges from 3.90%-3.93%.
- This measure may not be appropriate for assessing the need for or amount of future contributions.
- This measure may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan’s benefit obligation.
- The difference between the two measures (Valuation and LDRM) is one illustration of the expected savings the Sponsor anticipates by taking on risk in a diversified portfolio. The actual savings, or not, will depend on actual experience.

\$ In Billions						
Measure	State	Teachers	SPORS	ValORS	JRS	Locals
Valuation	\$29.1	\$58.8	\$1.5	\$2.7	\$0.8	\$30.6
LDRM	41.0	86.9	2.2	3.9	1.0	44.5



Sensitivity of Employer Contribution Rate Under Alternate Investment Return Assumptions

Many assumptions are important in determining the total employer contribution rate. In the following tables we show the sensitivity of the employer contribution rates to varying the Assumed Rate of Investment Return Assumption. Lower investment returns would generally result in higher employer contribution rates, and vice versa. The economic scenarios below provide a quantitative risk assessment for the impact of investment returns on the Plan's future financial condition for funding purposes.

The relative impact of the economic scenarios below will vary from year to year, as the participant demographics change. The impact of each scenario should be analyzed for a given year, not from year to year. It is important to note that calculations in this report are mathematical estimates based upon assumptions regarding future events, which may or may not materialize. Actuarial calculations can and do vary from one valuation to the next, sometimes significantly depending on the group's size.

State Employees (\$ In Thousands)

Assumed Rate of Investment Return	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	6.07%	7.31%	8.93%	11.12%	14.06%
Member Contribution Rate	4.55%	4.55%	4.55%	4.55%	4.55%
Employer Normal Cost Rate	1.52%	2.76%	4.38%	6.57%	9.51%
Administrative Expense Load	0.27%	0.27%	0.27%	0.27%	0.27%
Total Employer Normal Cost Rate	1.79%	3.03%	4.65%	6.84%	9.78%
Total Amortization Rate	1.27%	4.54%	7.87%	11.30%	14.84%
Defined Contribution Hybrid Plan ¹	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement
Total Employer Rate	3.06%	7.57%	12.52%	18.14%	24.62%
Change in Employer Rate	(9.46)%	(4.95)%	N/A	5.62%	12.10%
Unfunded Liability	\$ 846,424	\$ 3,259,007	\$ 6,128,594	\$ 9,570,750	\$ 13,732,405
Funded Status	96.5%	87.6%	79.0%	70.6%	62.6%

Teachers (\$ In Thousands)

Assumed Rate of Investment Return	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	6.58%	8.16%	10.30%	13.20%	17.18%
Member Contribution Rate	4.62%	4.62%	4.62%	4.62%	4.62%
Employer Normal Cost Rate	1.96%	3.54%	5.68%	8.58%	12.56%
Administrative Expense Load	0.28%	0.28%	0.28%	0.28%	0.28%
Total Employer Normal Cost Rate	2.24%	3.82%	5.96%	8.86%	12.84%
Total Amortization Rate	0.11%	4.11%	8.25%	12.60%	17.20%
Defined Contribution Hybrid Plan ¹	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement
Total Employer Rate	2.35%	7.93%	14.21%	21.46%	30.04%
Change in Employer Rate	(11.86)%	(6.28)%	N/A	7.25%	15.83%
Unfunded Liability	\$ 138,338	\$ 5,484,906	\$ 11,950,840	\$ 19,849,823	\$ 29,592,745
Funded Status	99.7%	89.5%	79.7%	70.2%	61.3%

¹ As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.

Sensitivity of Employer Contribution Rate Under Alternate Investment Return Assumptions (Continued)

State Police (\$ In Thousands)

Assumed Rate of Investment Return	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	10.47%	13.40%	17.29%	22.50%	29.52%
Member Contribution Rate	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Normal Cost Rate	5.47%	8.40%	12.29%	17.50%	24.52%
Administrative Expense Load	0.35%	0.35%	0.35%	0.35%	0.35%
Total Employer Normal Cost Rate	5.82%	8.75%	12.64%	17.85%	24.87%
Total Amortization Rate	7.51%	13.01%	18.68%	24.56%	30.67%
Defined Contribution Hybrid Plan	N/A	N/A	N/A	N/A	N/A
Total Employer Rate	13.33%	21.76%	31.32%	42.41%	55.54%
Change in Employer Rate	(17.99)%	(9.56)%	N/A	11.09%	24.22%
Unfunded Liability	\$ 154,351	\$ 289,080	\$ 449,999	\$ 643,631	\$ 878,169
Funded Status	87.3%	78.6%	70.3%	62.3%	54.8%

Judicial (\$ In Thousands)

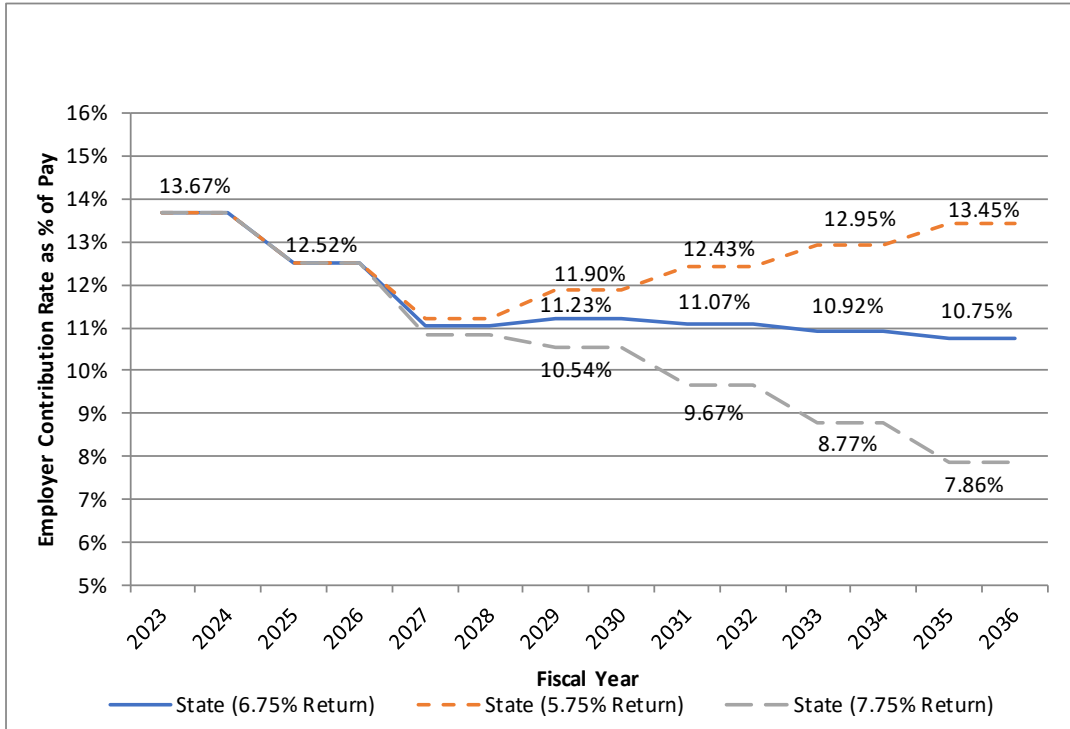
Assumed Rate of Investment Return	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	17.35%	20.65%	24.69%	29.71%	35.95%
Member Contribution Rate	4.38%	4.38%	4.38%	4.38%	4.38%
Employer Normal Cost Rate	12.97%	16.27%	20.31%	25.33%	31.57%
Administrative Expense Load	0.43%	0.43%	0.43%	0.43%	0.43%
Total Employer Normal Cost Rate	13.40%	16.70%	20.74%	25.76%	32.00%
Total Amortization Rate	0.06%	5.02%	9.92%	14.75%	19.54%
Defined Contribution Hybrid Plan ¹	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement	Separate Requirement
Total Employer Rate	13.46%	21.72%	30.66%	40.51%	51.54%
Change in Employer Rate	(17.20)%	(8.94)%	N/A	9.85%	20.88%
Unfunded Liability	\$ 655	\$ 58,492	\$ 125,232	\$ 202,708	\$ 293,213
Funded Status	99.9%	91.9%	84.2%	76.7%	69.5%

Virginia Law Officers (\$ In Thousands)

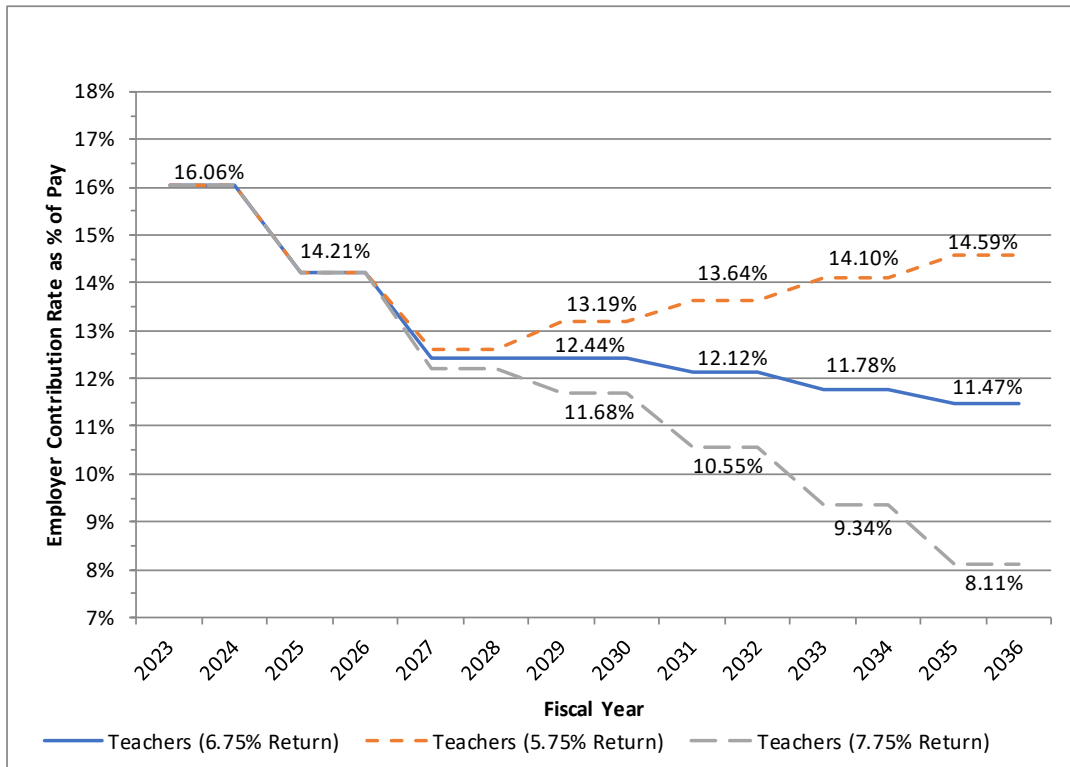
Assumed Rate of Investment Return	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	9.44%	11.39%	14.00%	17.57%	22.55%
Member Contribution Rate	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Normal Cost Rate	4.44%	6.39%	9.00%	12.57%	17.55%
Administrative Expense Load	0.27%	0.27%	0.27%	0.27%	0.27%
Total Employer Normal Cost Rate	4.71%	6.66%	9.27%	12.84%	17.82%
Total Amortization Rate	5.19%	9.26%	13.54%	18.12%	23.05%
Defined Contribution Hybrid Plan	N/A	N/A	N/A	N/A	N/A
Total Employer Rate	9.90%	15.92%	22.81%	30.96%	40.87%
Change in Employer Rate	(12.91)%	(6.89)%	N/A	8.15%	18.06%
Unfunded Liability	\$ 251,831	\$ 485,507	\$ 770,210	\$ 1,121,471	\$ 1,558,248
Funded Status	88.3%	79.7%	71.2%	62.9%	55.0%

¹ As a result of HB 473 and SB 70, the employer defined contribution rate for Hybrid Members is no longer included in the display.

Contribution Projections Including Return Sensitivity State Employees



Teachers



Note: Projections are not predictions. Future valuations will be based on actual future experience.



Actuarial Balance Sheet State Employees

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 22,997,716,641
B. Present Value of Future Member Contributions	1,694,601,785
C. Present Value of Future Employer Contributions	
1. Normal Contributions	1,631,286,993
2. Unfunded Accrued Liability Contributions	6,128,594,227
3. Total Prospective Employer Contributions (C.1. + C.2.)	7,759,881,220
D. Present Assets and Prospective Assets (A. + B. + C.3.)	\$ 32,452,199,646
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 17,153,819,371
B. To Inactive Members ¹	1,720,128,375
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	10,252,363,122
2. Allocated to Service Rendered After the Valuation Date	3,325,888,778
3. Total (C.1. + C.2.)	13,578,251,900
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	\$ 32,452,199,646

¹ Including Long-Term Disability.

Actuarial Balance Sheet Teachers

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 46,810,230,760
B. Present Value of Future Member Contributions	3,682,341,404
C. Present Value of Future Employer Contributions	
1. Normal Contributions	4,527,207,614
2. Unfunded Accrued Liability Contributions	11,950,839,635
3. Total Prospective Employer Contributions (C.1. + C.2.)	16,478,047,249
D. Present Assets and Prospective Assets (A. + B. + C.3.)	\$ 66,970,619,413
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 32,584,422,672
B. To Inactive Members ¹	2,192,457,847
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	23,984,189,876
2. Allocated to Service Rendered After the Valuation Date	8,209,549,018
3. Total (C.1. + C.2.)	32,193,738,894
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	\$ 66,970,619,413

¹ Including Long-Term Disability.

Actuarial Balance Sheet State Police

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 1,063,882,313
B. Present Value of Future Member Contributions	77,662,758
C. Present Value of Future Employer Contributions	
1. Normal Contributions	190,895,059
2. Unfunded Accrued Liability Contributions	449,998,635
3. Total Prospective Employer Contributions (C.1. + C.2.)	640,893,694
D. Present Assets and Prospective Assets (A. + B. + C.3.)	\$ 1,782,438,765
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 808,640,582
B. To Inactive Members ¹	33,041,681
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	672,198,685
2. Allocated to Service Rendered After the Valuation Date	268,557,817
3. Total (C.1. + C.2.)	940,756,502
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	\$ 1,782,438,765

¹ Including Long-Term Disability.

Actuarial Balance Sheet Judicial

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 667,562,547
B. Present Value of Future Member Contributions	27,549,601
C. Present Value of Future Employer Contributions	
1. Normal Contributions	127,747,124
2. Unfunded Accrued Liability Contributions	125,231,919
3. Total Prospective Employer Contributions (C.1. + C.2.)	252,979,043
D. Present Assets and Prospective Assets (A. + B. + C.3.)	\$ 948,091,191
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 535,517,647
B. To Inactive Members ¹	12,509,071
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	244,767,748
2. Allocated to Service Rendered After the Valuation Date	155,296,725
3. Total (C.1. + C.2.)	400,064,473
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	\$ 948,091,191

¹ Including Long-Term Disability.

Actuarial Balance Sheet Virginia Law Officers

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 1,903,501,016
B. Present Value of Future Member Contributions	98,237,103
C. Present Value of Future Employer Contributions	
1. Normal Contributions	176,826,784
2. Unfunded Accrued Liability Contributions	770,210,200
3. Total Prospective Employer Contributions (C.1. + C.2.)	947,036,984
D. Present Assets and Prospective Assets (A. + B. + C.3.)	\$ 2,948,775,103
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 1,580,660,066
B. To Inactive Members ¹	290,861,857
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	802,189,293
2. Allocated to Service Rendered After the Valuation Date	275,063,887
3. Total (C.1. + C.2.)	1,077,253,180
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	\$ 2,948,775,103

¹ Including Long-Term Disability.

Actuarial Balance Sheet Political Subdivisions

Present Assets and Prospective Assets	
A. Present Actuarial Value of Assets	\$ 26,900,812,024
B. Present Value of Future Member Contributions	2,316,054,862
C. Present Value of Future Employer Contributions	
1. Normal Contributions	4,134,361,092
2. Unfunded Accrued Liability Contributions	3,722,410,117
3. Total Prospective Employer Contributions (C.1. + C.2.)	<u>7,856,771,209</u>
D. Present Assets and Prospective Assets (A. + B. + C.3.)	<u><u>\$ 37,073,638,095</u></u>
Present Value of Expected Future Benefit Payments	
A. To Retirees and Beneficiaries	\$ 16,242,943,716
B. To Inactive Members ¹	1,893,012,610
C. To Active Members	
1. Allocated to Service Rendered Prior to the Valuation Date	12,487,265,815
2. Allocated to Service Rendered After the Valuation Date	<u>6,450,415,954</u>
3. Total (C.1. + C.2.)	18,937,681,769
D. Total Actuarial Present Value of Expected Future Benefit Payments (A. + B. + C.3.)	<u><u>\$ 37,073,638,095</u></u>

¹ Including Long-Term Disability.

Solvency Test

State Employees, Teachers, and Political Subdivisions (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active		
6/30/2023	\$ 11,718,388	\$ 71,786,785	\$ 35,005,430	\$ 118,510,603	\$ 96,708,759	100.00%	100.00%	37.72%
6/30/2022	11,415,519	67,605,525	33,012,077	112,033,121	91,177,020	100.00%	100.00%	36.82%
6/30/2021	14,452,659	64,528,079	27,662,643	106,643,382	85,027,965	100.00%	100.00%	21.86%
6/30/2020	14,082,163	60,926,216	26,884,877	101,893,256	78,759,722	100.00%	100.00%	13.95%
6/30/2019	13,613,905	58,337,920	27,182,146	99,133,971	76,244,148	100.00%	100.00%	15.79%

State Employees (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active		
6/30/2023	\$ 2,853,544	\$ 18,873,948	\$ 7,398,819	\$ 29,126,311	\$ 22,997,717	100.00%	100.00%	17.17%
6/30/2022	2,814,123	17,936,921	7,028,127	27,779,171	21,917,849	100.00%	100.00%	16.60%
6/30/2021	3,566,175	17,161,682	6,000,114	26,727,971	20,615,301	100.00%	99.34%	0.00%
6/30/2020	3,514,856	16,410,519	5,825,960	25,751,335	19,333,674	100.00%	96.39%	0.00%
6/30/2019	3,459,343	15,831,694	6,107,151	25,398,188	18,932,104	100.00%	97.73%	0.00%

Teachers (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active		
6/30/2023	\$ 5,905,122	\$ 34,776,881	\$ 18,079,068	\$ 58,761,070	\$ 46,810,231	100.00%	100.00%	33.90%
6/30/2022	5,713,400	32,957,731	17,091,402	55,762,533	43,970,442	100.00%	100.00%	31.01%
6/30/2021	7,036,408	31,496,785	14,214,403	52,747,596	40,725,782	100.00%	100.00%	15.43%
6/30/2020	6,811,064	30,055,902	13,967,817	50,834,783	37,556,121	100.00%	100.00%	4.93%
6/30/2019	6,520,986	28,810,438	13,972,535	49,303,959	36,233,796	100.00%	100.00%	6.46%

¹ Prior to the June 30, 2022 valuation, amounts include contributions for inactive members.

Solvency Test

Political Subdivisions (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active Members		
6/30/2023	\$ 2,959,723	\$ 18,135,956	\$ 9,527,543	\$ 30,623,222	\$ 26,900,812	100.00%	100.00%	60.93%
6/30/2022	2,887,997	16,710,873	8,892,548	28,491,418	25,288,728	100.00%	100.00%	63.98%
6/30/2021	3,850,076	15,869,613	7,448,126	27,167,815	23,686,882	100.00%	100.00%	53.26%
6/30/2020	3,756,243	14,459,794	7,091,101	25,307,138	21,869,927	100.00%	100.00%	51.53%
6/30/2019	3,633,576	13,695,788	7,102,460	24,431,824	21,078,248	100.00%	100.00%	52.78%

State Police (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active Members		
6/30/2023	\$ 105,315	\$ 841,682	\$ 566,884	\$ 1,513,881	\$ 1,063,882	100.00%	100.00%	20.62%
6/30/2022	100,990	803,632	513,842	1,418,464	1,001,822	100.00%	100.00%	18.92%
6/30/2021	106,923	782,487	437,236	1,326,646	937,332	100.00%	100.00%	10.96%
6/30/2020	109,787	707,082	389,555	1,206,424	880,834	100.00%	100.00%	16.42%
6/30/2019	105,943	682,809	392,368	1,181,120	858,632	100.00%	100.00%	17.81%

Judicial (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active Members		
6/30/2023	\$ 41,898	\$ 548,027	\$ 202,869	\$ 792,794	\$ 667,563	100.00%	100.00%	38.27%
6/30/2022	40,990	518,851	188,716	748,557	637,696	100.00%	100.00%	41.25%
6/30/2021	42,082	498,777	192,549	733,408	600,670	100.00%	100.00%	31.06%
6/30/2020	42,320	452,071	183,481	677,872	566,239	100.00%	100.00%	39.16%
6/30/2019	42,660	427,846	199,235	669,741	553,136	100.00%	100.00%	41.47%

¹ Prior to the June 30, 2022 valuation, amounts include contributions for inactive members.



Solvency Test

Virginia Law Officers (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active Members		
6/30/2023	\$ 154,856	\$ 1,871,522	\$ 647,333	\$ 2,673,711	\$ 1,903,501	100.00%	93.43%	0.00%
6/30/2022	157,404	1,718,160	631,580	2,507,144	1,789,127	100.00%	94.97%	0.00%
6/30/2021	251,678	1,640,876	514,599	2,407,153	1,668,802	100.00%	86.36%	0.00%
6/30/2020	250,900	1,498,644	509,009	2,258,553	1,546,528	100.00%	86.45%	0.00%
6/30/2019	244,233	1,432,206	534,799	2,211,238	1,484,995	100.00%	86.63%	0.00%

Grand Total (\$ In Thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1)	(2)	(3)	Total		(1)	(2)	(3)
	Active Member Contributions ¹	Retirees, Survivors and Inactive Members	Active Members (Employer Fin. Portion)			Active Members		
6/30/2023	\$ 12,020,457	\$ 75,048,016	\$ 36,422,517	\$ 123,490,990	\$ 100,343,705	100.00%	100.00%	36.45%
6/30/2022	11,714,903	70,646,168	34,346,216	116,707,287	94,605,665	100.00%	100.00%	35.65%
6/30/2021	14,853,342	67,450,219	28,807,028	111,110,589	88,234,769	100.00%	100.00%	20.59%
6/30/2020	14,485,170	63,584,014	27,966,921	106,036,105	81,753,323	100.00%	100.00%	13.17%
6/30/2019	14,006,741	60,880,781	28,308,548	103,196,070	79,140,911	100.00%	100.00%	15.03%

¹ Prior to the June 30, 2022 valuation, amounts include contributions for inactive members.



SECTION C

FUND ASSETS

Market Value of Asset Reconciliation

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions
(1) Market Value of Assets (MVA) Beginning of Year						
a. MVA as of 6/30/2022	\$ 22,579,326,240	\$ 45,211,730,774	\$ 1,031,383,369	\$ 656,964,466	\$ 1,841,041,323	\$ 26,045,031,171
b. Adjustment	0	0	0	0	0	0
c. Adjusted Beginning of Year MVA	\$ 22,579,326,240	\$ 45,211,730,774	\$ 1,031,383,369	\$ 656,964,466	\$ 1,841,041,323	\$ 26,045,031,171
(2) Additions for the Year						
a. Contributions:						
i. Members	\$ 234,317,431	\$ 465,100,419	\$ 7,951,756	\$ 2,319,934	\$ 18,768,604	\$ 302,890,292
ii. Employers	756,100,648	1,576,963,398	50,589,006	27,788,430	97,062,187	736,844,662
iii. Non-Employer Contributing Entities	0	147,457,029	0	0	0	0
iv. Total [(2)a.i. + (2)a.ii. + (2)a.iii.]	\$ 990,418,079	\$ 2,189,520,846	\$ 58,540,762	\$ 30,108,364	\$ 115,830,791	\$ 1,039,734,954
b. Miscellaneous Revenue	248,065	86,576	(1,485)	0	(12,129)	347,405
c. Net Investment Income	1,437,612,160	2,913,861,987	66,246,282	41,850,104	118,276,272	1,678,096,020
d. Total Additions [(2)a.iv. + (2)b. + (2)c.]	\$ 2,428,278,304	\$ 5,103,469,409	\$ 124,785,559	\$ 71,958,468	\$ 234,094,934	\$ 2,718,178,379
(3) Deductions for the Year						
a. Benefit Payments	\$ 1,610,265,651	\$ 2,773,752,065	\$ 75,578,259	\$ 50,571,965	\$ 138,022,708	\$ 1,395,124,316
b. Refunds	31,013,508	45,366,232	240,463	14,810	4,989,945	43,391,325
c. Transfers	0	0	0	0	0	0
d. Administrative Expenses	14,497,904	28,677,175	595,225	377,858	1,062,934	16,656,238
e. Total Deductions [(3)a. + (3)b. + (3)c. + (3)d.]	\$ 1,655,777,063	\$ 2,847,795,472	\$ 76,413,947	\$ 50,964,633	\$ 144,075,587	\$ 1,455,171,879
(4) Change In Value [(2)d. - (3)e.]	\$ 772,501,241	\$ 2,255,673,937	\$ 48,371,612	\$ 20,993,835	\$ 90,019,347	\$ 1,263,006,500
(5) Market Value of Assets End of Year						
a. MVA as of 6/30/2023 [(1)c. + (4)]	\$ 23,351,827,481	\$ 47,467,404,711	\$ 1,079,754,981	\$ 677,958,301	\$ 1,931,060,670	\$ 27,308,037,671

Actuarial Value of Asset Reconciliation

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions
(1) Actuarial Value Beginning of Year	\$ 21,917,849,261	\$ 43,970,442,446	\$ 1,001,822,399	\$ 637,695,624	\$ 1,789,127,082	\$ 25,288,727,708
(2) Market Value End of Year	23,351,827,481	47,467,404,711	1,079,754,981	677,958,301	1,931,060,670	27,308,037,671
(3) Market Value Beginning of Year						
a. Initial Market Value Beginning of Year	22,579,326,240	45,211,730,774	1,031,383,369	656,964,466	1,841,041,323	26,045,031,171
b. Adjustment to Market Value Beginning of Year	-	-	-	-	-	-
c. Adjusted Market Value Beginning of Year: (3)a + (3)b	22,579,326,240	45,211,730,774	1,031,383,369	656,964,466	1,841,041,323	26,045,031,171
(4) Cash Flow						
a. Contributions	990,418,079	2,189,520,846	58,540,762	30,108,364	115,830,791	1,039,734,954
b. Benefit Payments	(1,641,279,159)	(2,819,118,297)	(75,818,722)	(50,586,775)	(143,012,653)	(1,438,515,641)
c. Administrative Expenses	(14,497,904)	(28,677,175)	(595,225)	(377,858)	(1,062,934)	(16,656,238)
d. Miscellaneous revenue and expenses	248,065	86,576	(1,485)	0	(12,129)	347,405
e. Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	(665,110,919)	(658,188,050)	(17,874,670)	(20,856,269)	(28,256,925)	(415,089,520)
(5) Investment Income						
a. Market total: (2) - (3)c - (4)e	1,437,612,160	2,913,861,987	66,246,282	41,850,104	118,276,272	1,678,096,020
b. Assumed Rate	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%
c. Amount of Immediate Recognition [(3)c x (5)b] + [(4)e x (5)b x 0.5]	1,501,657,028	3,029,577,981	69,015,107	43,641,202	123,316,618	1,744,030,333
d. Amount for Phased-in Recognition: (5)a - (5)c	(64,044,868)	(115,715,994)	(2,768,825)	(1,791,098)	(5,040,346)	(65,934,313)
(6) Phased-In Recognition of Investment Income						
a. Current Year: 0.20 x (5)d	(12,808,974)	(23,143,199)	(553,765)	(358,220)	(1,008,069)	(13,186,863)
b. First Prior Year	(312,880,755)	(626,872,418)	(14,236,758)	(9,076,790)	(25,386,690)	(360,497,634)
c. Second Prior Year	762,448,000	1,490,236,000	34,516,000	22,181,000	61,035,000	872,277,000
d. Third Prior Year	(180,907,000)	(350,108,000)	(8,234,000)	(5,303,000)	(14,318,000)	(203,088,000)
e. Fourth Prior Year	(12,530,000)	(21,714,000)	(572,000)	(361,000)	(1,008,000)	(12,361,000)
f. Total Recognized Investment Gain	243,321,271	468,398,383	10,919,477	7,081,990	19,314,241	283,143,503
(7) Actuarial Value End of Year: [(1) + (3)b + (4)e + (5)c + (6)f]	\$ 22,997,716,641	\$ 46,810,230,760	\$ 1,063,882,313	\$ 667,562,547	\$ 1,903,501,016	\$ 26,900,812,024

Summary of Asset Values

System	Market Value	
	June 30, 2023	June 30, 2022
State Employees	\$ 23,351,827	\$ 22,579,326
Teachers	47,467,405	45,211,731
State Police	1,079,755	1,031,383
Judicial	677,958	656,964
Virginia Law Officers	1,931,061	1,841,041
Political Subdivisions ¹	27,308,038	26,045,031
Total Market Value of Assets	\$ 101,816,044	\$ 97,365,477

System	Actuarial Value	
	June 30, 2023	June 30, 2022
State Employees	\$ 22,997,717	\$ 21,917,849
Teachers	46,810,231	43,970,442
State Police	1,063,882	1,001,822
Judicial	667,563	637,696
Virginia Law Officers	1,903,501	1,789,127
Political Subdivisions ¹	26,900,812	25,288,728
Total Actuarial Value of Assets	\$ 100,343,705	\$ 94,605,665

¹ Includes Political Subdivisions with zero active members.

SECTION D

CENSUS DATA

Retiree and Beneficiary Detail – Tabulated by Type of Retirement June 30, 2023

Retired, Disabled, and Survivor participants included in the valuations totaled 278,547 as follows:

Type of Retirement	System ¹						
	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions ²	Total
Service:							
Number	63,856	102,696	1,340	459	6,133	72,723	247,207
Annual Benefits	\$ 1,455,587	\$ 2,664,658	\$ 62,419	\$ 43,821	\$ 134,995	\$ 1,214,913	\$ 5,576,393
Average Age	73.46	73.14	69.11	76.78	66.23	70.75	72.33
Disability:							
Number	2,799	4,166	177	1	249	7,908	15,300
Annual Benefits	\$ 52,806	\$ 103,564	\$ 7,077	\$ 48	\$ 4,157	\$ 142,853	\$ 310,505
Average Age	72.04	68.93	68.02	61.94	61.41	66.16	67.93
Survivors:							
Number	5,611	3,814	289	132	428	5,766	16,040
Annual Benefits	\$ 90,902	\$ 62,399	\$ 6,441	\$ 6,874	\$ 4,250	\$ 63,562	\$ 234,428
Average Age	75.26	71.96	72.18	78.02	64.95	70.42	72.42
Total:							
Number	72,266	110,676	1,806	592	6,810	86,397	278,547
Annual Benefits	\$ 1,599,295	\$ 2,830,621	\$ 75,937	\$ 50,743	\$ 143,402	\$ 1,421,328	\$ 6,121,326
Average Age	73.55	72.94	69.49	77.03	65.97	70.31	72.10

¹ Includes counts for each plan from which members receive pension benefits. Members with benefits from more than one employer are counted more than once.

² Includes counts for Participating Political Subdivisions with zero active members.



Deferred Detail – Tabulated by Type June 30, 2023

Members with deferred benefits included in the valuations totaled 137,978 as follows:

System ¹	Number	Average Age	Average Service	Average Annual Estimated Benefit
State Employees:				
Inactive, Vested	16,005	51.45	8.48	\$ 6,789
Long Term Disability	2,308	56.05	15.23	\$ 51,055
Inactive, active elsewhere in VRS	9,380	48.47	4.40	\$ 2,682
Teachers:				
Inactive, Vested	34,088	48.27	9.22	\$ 7,842
Long Term Disability	39	49.70	4.71	\$ 23,733
Inactive, active elsewhere in VRS	6,586	48.94	5.84	\$ 4,553
State Police:				
Inactive, Vested	196	44.08	8.82	\$ 8,578
Long Term Disability	29	48.38	12.40	\$ 63,716
Inactive, active elsewhere in VRS	248	41.84	4.39	\$ 3,840
Judicial:				
Inactive, Vested	10	64.34	14.34	\$ 92,245
Long Term Disability	0	N/A	N/A	N/A
Inactive, active elsewhere in VRS	3	58.19	8.22	\$ 43,919
Virginia Law Officers:				
Inactive, Vested	1,573	45.89	6.78	\$ 5,110
Long Term Disability	484	50.82	8.45	\$ 32,991
Inactive, active elsewhere in VRS	3,882	42.97	4.52	\$ 3,485
Political Subdivisions ² :				
Inactive, Vested	24,000	50.46	6.96	\$ 5,316
Long Term Disability	104	54.69	3.83	\$ 14,110
Inactive, active elsewhere in VRS	39,043	46.59	4.27	\$ 3,154
Total:				
Inactive, Vested	75,872	49.58	8.30	\$ 6,777
Long Term Disability	2,964	54.99	13.55	\$ 46,574
Inactive, active elsewhere in VRS	59,142	46.89	4.48	\$ 3,262

¹ Includes counts for each plan from which members are entitled to deferred pension benefits. Members with benefits from more than one employer are counted more than once.

² Includes counts for Participating Political Subdivisions with zero active members.



Active Participant Detail June 30, 2023

Active participants included in the valuations totaled 354,080 with compensation and statistics, as follows:

System	Number	Annual Compensation (\$ in Thousands)	Average				
			Compensation	Age	Employer Type Service	Total Service	Entry Age on Employer Type Service
State Employees	76,876	\$ 5,448,985	\$ 70,880	47.2	10.6	11.5	36.6
Teachers	153,107	9,666,665	63,137	45.1	11.5	11.8	33.6
State Police	1,882	168,611	89,591	41.2	14.3	15.6	26.9
Judicial	458	88,391	192,994	58.0	9.3	14.8	48.7
Virginia Law Officers	7,478	398,110	53,238	39.8	7.9	8.8	31.9
Political Subdivisions	114,279	6,762,206	59,173	45.7	8.8	10.1	36.9
Total	354,080	\$ 22,532,968	\$ 63,638	45.7	10.4	11.1	35.3

Historical active participant member data follows:

Valuation Date	Number	Annual Compensation (\$ in Thousands)	Average Annual Compensation	% Change in Average Annual Compensation
6/30/2023	354,080	\$ 22,532,968	\$ 63,638	5.42%
6/30/2022	346,945	20,943,750	60,366	7.52%
6/30/2021	342,315	19,219,079	56,144	3.20%
6/30/2020	347,531	18,906,440	54,402	2.08%
6/30/2019	345,678	18,422,511	53,294	3.78%



Active Participants – Tabulated by Age and Total Service State Employees

Attained Age	Completed Years of Service							Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Payroll
Under 20	92	0	0	0	0	0	0	92	\$ 3,443,459
20-24	2,407	12	0	0	0	0	0	2,419	109,358,939
25-29	5,141	580	3	0	0	0	0	5,724	307,603,911
30-34	4,982	2,095	332	8	0	0	0	7,417	455,434,289
35-39	4,219	2,469	1,300	450	7	0	0	8,445	579,642,325
40-44	3,544	2,396	1,486	1,408	322	6	0	9,162	666,666,633
45-49	2,922	1,938	1,382	1,463	918	271	10	8,904	675,598,709
50-54	2,868	1,910	1,462	1,611	1,211	875	321	10,258	783,549,639
55-59	2,326	1,722	1,349	1,602	1,262	943	1,277	10,481	787,956,434
60	374	327	267	313	261	205	396	2,143	158,819,124
61	360	279	227	319	252	187	377	2,001	149,900,770
62	318	271	213	291	240	173	384	1,890	141,089,279
63	220	234	177	270	217	141	352	1,611	121,517,241
64	210	185	196	212	186	140	360	1,489	115,731,128
65	139	149	162	180	127	101	242	1,100	86,158,904
66	92	111	134	139	115	83	250	924	73,137,831
67	74	93	76	100	75	55	138	611	48,144,970
68	67	62	72	64	47	29	132	473	36,841,375
69	47	44	35	82	60	26	115	409	34,986,271
70 & Over	112	132	140	214	162	108	455	1,323	113,403,611
Totals	30,514	15,009	9,013	8,726	5,462	3,343	4,809	76,876	\$ 5,448,984,843

Active Participants by Age and Total Service Teachers¹

Attained Age	Completed Years of Service							Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Payroll
Under 20	100	0	0	0	0	0	0	100	\$ 2,224,825
20-24	4,906	19	0	0	0	0	0	4,925	208,019,814
25-29	10,505	3,252	0	0	0	0	0	13,757	700,238,781
30-34	6,477	7,865	2,153	6	0	0	0	16,501	925,845,753
35-39	5,675	4,660	5,661	2,195	9	0	0	18,200	1,107,795,442
40-44	5,468	3,843	3,204	6,548	2,056	8	0	21,127	1,389,946,922
45-49	4,687	3,813	2,580	3,758	4,958	1,316	5	21,117	1,454,285,346
50-54	4,060	3,565	2,866	3,619	3,832	4,064	908	22,914	1,617,574,007
55-59	2,760	2,672	2,290	3,286	2,894	2,006	1,891	17,799	1,206,043,425
60	482	445	378	595	547	306	334	3,087	197,571,991
61	356	347	311	547	530	304	312	2,707	174,806,410
62	358	310	261	459	447	288	299	2,422	154,746,829
63	262	259	242	391	419	256	269	2,098	134,347,562
64	225	236	193	332	331	203	219	1,739	109,584,571
65	152	167	143	255	211	143	160	1,231	78,639,515
66	138	118	105	126	161	84	117	849	52,813,019
67	83	88	65	87	82	57	105	567	35,302,115
68	74	56	48	74	82	48	85	467	28,707,568
69	61	48	34	62	58	26	52	341	20,722,556
70 & Over	235	133	119	165	178	91	238	1,159	67,449,002
Totals	47,064	31,896	20,653	22,505	16,795	9,200	4,994	153,107	\$9,666,665,455

¹ Includes an assumed pay increase on the valuation date.



Active Participants by Age and Total Service State Police

Attained Age	Completed Years of Service							Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Payroll
Under 20	0	0	0	0	0	0	0	0	\$ 0
20-24	78	0	0	0	0	0	0	78	4,631,205
25-29	210	54	0	0	0	0	0	264	17,187,870
30-34	77	140	87	0	0	0	0	304	22,523,935
35-39	39	61	105	59	0	0	0	264	21,453,419
40-44	12	25	48	123	57	0	0	265	24,929,475
45-49	12	8	17	57	119	44	0	257	26,586,568
50-54	7	7	19	29	58	85	13	218	24,066,777
55-59	2	1	13	19	15	24	75	149	17,054,476
60	1	1	0	3	1	2	12	20	2,332,416
61	0	1	6	1	0	1	10	19	2,281,828
62	0	1	2	0	1	1	12	17	2,081,016
63	0	1	0	0	1	1	7	10	1,240,044
64	0	0	0	0	0	0	3	3	392,694
65	0	0	0	0	0	2	5	7	954,201
66	0	0	0	0	0	1	3	4	543,281
67	0	0	0	0	0	0	0	0	0
68	0	0	0	1	0	0	2	3	351,471
69	0	0	0	0	0	0	0	0	0
70 & Over	0	0	0	0	0	0	0	0	0
Totals	438	300	297	292	252	161	142	1,882	\$ 168,610,676



Active Participants by Age and Total Service Judicial

Attained Age	Completed Years of Service							Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Payroll
Under 20	0	0	0	0	0	0	0	0	\$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	5	0	0	0	0	0	0	5	915,935
40-44	30	8	0	0	0	0	0	38	7,187,128
45-49	26	16	2	0	0	0	0	44	8,367,662
50-54	41	25	12	5	0	0	0	83	15,923,470
55-59	23	21	23	9	7	0	0	83	16,061,234
60	6	5	6	1	3	0	0	21	4,056,097
61	5	2	1	3	1	0	0	12	2,369,923
62	2	6	2	2	2	2	0	16	3,169,124
63	10	6	2	4	2	1	0	25	4,835,157
64	2	8	4	2	4	2	0	22	4,226,676
65	3	6	1	4	2	0	0	16	3,108,062
66	1	3	6	6	0	1	1	18	3,489,398
67	0	3	6	2	3	0	0	14	2,762,290
68	4	3	3	3	3	0	0	16	3,144,550
69	2	4	1	0	2	2	0	11	2,137,175
70 & Over	3	5	9	1	5	5	6	34	6,637,557
Totals	163	121	78	42	34	13	7	458	\$ 88,391,438

Active Participants by Age and Total Service Virginia Law Officers

Attained Age	Completed Years of Service							Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Payroll
Under 20	94	0	0	0	0	0	0	94	\$ 4,174,151
20-24	767	10	0	0	0	0	0	777	35,714,642
25-29	856	196	0	0	0	0	0	1,052	51,607,158
30-34	666	372	80	1	0	0	0	1,119	56,665,532
35-39	439	242	152	109	1	0	0	943	50,501,287
40-44	306	175	108	202	41	4	0	836	45,509,550
45-49	230	147	110	190	167	88	1	933	54,684,812
50-54	202	103	97	168	126	59	9	764	43,619,743
55-59	138	81	73	149	70	46	22	579	33,264,186
60	17	9	5	21	11	10	2	75	4,418,209
61	10	10	8	28	11	9	5	81	4,728,695
62	15	5	10	7	11	4	4	56	3,321,493
63	5	7	11	10	10	1	0	44	2,388,355
64	7	2	5	11	4	3	1	33	1,763,017
65	2	4	5	5	3	3	3	25	1,447,806
66	3	1	4	5	2	4	4	23	1,538,666
67	1	2	1	3	1	1	3	12	830,547
68	3	1	1	1	1	2	0	9	549,159
69	4	2	1	0	1	2	1	11	604,931
70 & Over	1	3	1	3	1	2	1	12	778,370
Totals	3,766	1,372	672	913	461	238	56	7,478	\$ 398,110,308

