



Cavanaugh Macdonald
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**Virginia
Retirement
System**

**Report on the Actuarial Valuation for
Virginia Retirement System**

Prepared as of June 30, 2018





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

February 20, 2019

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

Dear Trustees:

We are pleased to submit the results of the annual actuarial valuation for the following divisions of the Virginia Retirement System (VRS), prepared as of June 30, 2018.

- State Employees
- Teachers
- State Police (SPORS)
- Judicial
- Virginia Law Officers (VaLORS)

In addition, this report includes information in aggregate on the actuarial valuations of the Political Subdivisions participating in VRS as of June 30, 2018. We have prepared, and provided separately, actuarial valuation reports for each of the Political Subdivisions. Please refer to the individual reports for the valuation results, summary of actuarial assumptions and methods, and plan provisions for each of the Political Subdivision plans.

The purpose of this report is to provide a summary of the funded status of VRS as of June 30, 2018 and to recommend rates of contribution. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The funded status of the Plan is the ratio of the assets to the actuarial accrued liability. While the market value of assets gives an indication of the funded status of a plan at a particular point in time and is used for financial reporting, it is not used directly in the calculation of the employer contribution rates. A less volatile actuarial value of assets, which smooths the effect of market fluctuations over a five year period, is applied to determine the funded status for rate setting purposes. For informational purposes, we exhibit the funded status based on this smoothed actuarial value of assets basis as well as the market value in this report. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

The valuation results indicate that the full employer contribution rates shown in the table below are sufficient to fund the normal cost for all members and finance the unfunded accrued liability of the plans. We also present the expected employer contributions to be actually funded based on the percentage of the full rate adopted by the General Assembly. For comparison, in the table below we present the employer contribution rates for fiscal years ending 2019 and 2020 based on the June 30, 2017 actuarial valuation and the employer contribution rates approved by the General Assembly for fiscal years ending 2017 and 2018.



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The Board of Trustees
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Contribution rates for VRS employers are established every two years. The actuarially calculated employer contribution rates based on the June 30, 2018 valuation presented in this report are for informational purposes only. The total employer rates include the average employer rate for the defined contribution component of the Hybrid Plan.

System	Fiscal Years 2017 & 2018		Fiscal Years 2019 & 2020		Informational Only		
	Board Approved	General Assembly Approved	Board Approved	General Assembly Approved	Full Employer Contribution Rate for Defined Benefit Plan	Employer Rate for Hybrid DC Component	Total Employer Rate for Retirement Plans
	2015 Valuation		2017 Valuation		2018 Valuation		
State	14.46%	13.49%	13.52%	13.52%	12.64%	0.72%	13.36%
Teachers	16.32%	14.66%/16.32%	15.68%	15.68%	14.72%	0.51%	15.23%
SPORS	28.99%	28.54%	24.88%	24.88%	23.87%	N/A	23.87%
VaLORS	22.21%	21.05%	21.61%	21.61%	20.81%	N/A	20.81%
Judicial	45.15%	41.97%	34.39%	34.39%	30.10%	1.31%	31.41%
Political Subdivisions (Average rates)	8.15%	8.15%	7.60%	7.60%	6.76%	0.53%	7.29%

The promised benefits of VRS are included in the calculated contribution rates which are developed using the entry age normal cost method. The valuation takes into account the differentiation between Plan 1 vested members, Plan 1 non-vested members as of January 1, 2013 resulting from HB 1130 and SB 498, Plan 2 members, and the Hybrid Plan. Five-year smoothed market value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability. In accordance with the supplemental contribution provision under the 2011 Appropriation Act, Item 469(1)(6), the portion of the unfunded accrued liability with respect to deferred contributions for the 2010 -2012 biennium is amortized using a level-dollar, closed, 10 year period beginning June 30, 2011. Amendments to the 2016-2017 Virginia budget accelerated the payback of the full outstanding balance of the deferred contributions to all plans except Teachers. In accordance with the funding policy adopted by the Board of Trustees in 2013, the balance of the unfunded accrued liability as of June 30, 2013 is being amortized by regular annual contributions as a level percentage of payroll over a closed 26-year period and changes in the unfunded accrued liability since June 30, 2013 are amortized over a closed 20-year period. The amortization of the unfunded accrued liability assumes that payroll will increase by 3% annually and the amortization period will decrease by one year until reaching 0 years.

We have prepared several supporting schedules shown in the actuarial section of the Comprehensive Annual Financial Report, including the Schedule of Active Member Data and the Analysis of Financial Experience. For completeness, the table of Changes in Unfunded Actuarial Accrued Liabilities in Section VI and the Retiree and Beneficiary Data in Schedule I include the information with respect to the Political Subdivisions participating in VRS.

Our organization has only a contractual relationship with the Virginia Retirement System to provide actuarial consulting services and we do not provide other services to nor have a financial interest in the Virginia Retirement System. There are no known interests or relationships that our firm has with the Virginia Retirement System that may impair or appear to impair the objectivity of our work.



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This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the System and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Future actuarial results may differ significantly from the current results 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; 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

A stylized, handwritten signature in blue ink, consisting of a series of loops and a long horizontal stroke at the end.

Larry Langer, ASA, FCA, EA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, featuring a large, prominent 'J' and a long, sweeping horizontal line.

John Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, written in a cursive style with a clear first and last name.

Micki R. Taylor, ASA, FCA, EA, MAAA
Consulting Actuary



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Section I – Summary of Principal Results

- For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results for State Employees, Teachers, State Police, Judicial and Virginia Law Officers are summarized below. In addition, we present a summary of the valuation results for the political subdivisions.

STATE EMPLOYEES (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2018	June 30, 2017
Members:		
Active	74,582	74,807
Long Term Disability	2,205	2,198
Retirees and Beneficiaries	65,096	63,180
Inactive, Vested	13,108	12,618
Inactive, Non-Vested	27,280	25,730
Inactive, active elsewhere in VRS	<u>9,009</u>	<u>9,089</u>
Total	191,280	187,622
Annual Covered Payroll	\$ 4,161,922	\$ 4,037,072
Annual Retirement Benefits	\$ 1,291,501	\$ 1,223,849
Total Assets:		
Actuarial Value	\$ 18,392,939	\$ 17,547,764
Market Value	18,532,189	17,789,888
Actuarial Accrued Liability	\$ 24,115,157	\$ 23,311,534
Funded Ratio:		
Actuarial Value of Assets	76.27%	75.28%
Market Value of Assets	76.85%	76.31%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>5,722,218</u>	<u>5,763,770</u>
Total UAAL	\$ 5,722,218	\$ 5,763,770
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	For Informational Purposes	2019 & 2020
Employer Contribution Rate Defined Benefit Plan:		
Normal Cost (net of employee contributions)	4.50 %	4.61 %
Administrative Expense	0.28 %	0.29 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>7.86 %</u>	<u>8.04 %</u>
Annual Recommended Contribution	12.64 %	12.94 %
Employer Contribution Rate Defined Contribution	<u>0.72 %</u>	<u>0.58 %</u>
Total Employer Contribution Rate Retirement Plans	13.36 %	13.52 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	16-25	17-26



Section I – Summary of Principal Results

TEACHERS (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2018	June 30, 2017
Members:		
Active	151,585	150,416
Long Term Disability	6	0
Retirees and Beneficiaries	94,983	91,737
Inactive, Vested	24,136	23,150
Inactive, Non-Vested	33,204	31,163
Inactive, active elsewhere in VRS	<u>5,464</u>	<u>5,452</u>
Total	309,378	301,918
Annual Covered Payroll*	\$ 8,479,023	\$ 8,303,502
Annual Retirement Benefits	\$ 2,202,632	\$ 2,090,205
Total Assets:		
Actuarial Value	\$ 34,673,952	\$ 32,684,868
Market Value	34,919,563	33,119,545
Actuarial Accrued Liability	\$ 46,516,176	\$ 45,006,017
Funded Ratio:		
Actuarial Value of Assets	74.54%	72.62%
Market Value of Assets	75.07%	73.59%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 172,451	\$ 222,583
Balance of UAAL	<u>11,669,773</u>	<u>12,098,566</u>
Total UAAL	\$ 11,842,224	\$ 12,321,149
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	For Informational Purposes	2019 & 2020
Employer Contribution Rate Defined Benefit Plan:		
Normal Cost (net of employee contributions)	5.85 %	5.96 %
Administrative Expense	0.25 %	0.26 %
Amortization of Deferred Contributions	0.74 %	0.75 %
Amortization of Balance of UAAL	<u>7.88 %</u>	<u>8.27 %</u>
Annual Recommended Contribution	14.72 %	15.24 %
Employer Contribution Rate Defined Contribution	<u>0.51 %</u>	<u>0.44 %</u>
Total Employer Contribution Rate Retirement Plans	15.23 %	15.68 %
Amortization Period (Years):		
Deferred Contributions	3	4
Balance of UAAL	16-25	17-26

* Includes an assumed pay increase on the valuation date.



Section I – Summary of Principal Results

STATE POLICE (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2018	June 30, 2017
Members:		
Active	1,885	1,882
Long-Term Disability	16	13
Retirees and Beneficiaries	1,549	1,507
Inactive, Vested	160	146
Inactive, Non-Vested	209	210
Inactive, active elsewhere in VRS	<u>245</u>	<u>245</u>
Total	4,064	4,003
Annual Covered Payroll	\$ 126,523	\$ 110,265
Annual Retirement Benefits	\$ 57,572	\$ 55,248
Total Assets:		
Actuarial Value	\$ 830,978	\$ 785,677
Market Value	836,702	796,073
Actuarial Accrued Liability	\$ 1,112,893	\$ 1,040,628
Funded Ratio:		
Actuarial Value of Assets	74.67%	75.50%
Market Value of Assets	75.18%	76.50%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>281,915</u>	<u>254,951</u>
Total UAAL	\$ 281,915	\$ 254,951
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	For Informational Purposes	2019 & 2020
Employer Contribution Rate:		
Normal Cost (net of employee contributions)	11.15 %	11.78 %
Administrative Expense	0.41 %	0.86 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>12.31 %</u>	<u>12.24 %</u>
Annual Recommended Contribution	23.87 %	24.88 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	16-25	17-26



Section I – Summary of Principal Results

JUDICIAL (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2018	June 30, 2017
Members:		
Active	416	421
Retirees and Beneficiaries	544	538
Inactive, Vested	4	5
Inactive, Non-Vested	0	0
Inactive, active elsewhere in VRS	<u>4</u>	<u>3</u>
Total	968	967
Annual Covered Payroll	\$ 67,424	\$ 66,288
Annual Retirement Benefits	\$ 41,562	\$ 40,657
Total Assets:		
Actuarial Value	\$ 536,022	\$ 505,834
Market Value	540,009	512,749
Actuarial Accrued Liability	\$ 645,662	\$ 631,522
Funded Ratio:		
Actuarial Value of Assets	83.02%	80.10%
Market Value of Assets	83.64%	81.19%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>109,640</u>	<u>125,688</u>
Total UAAL	\$ 109,640	\$ 125,688
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	For Informational Purposes	2019 & 2020
Employer Contribution Rate:		
Normal Cost (net of employee contributions)	22.14 %	23.00 %
Administrative Expense	0.49 %	0.91 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>7.47 %</u>	<u>9.30 %</u>
Annual Recommended Contribution	30.10 %	33.21 %
Employer Contribution Rate Defined Contribution	<u>1.31 %</u>	<u>1.18 %</u>
Total Employer Contribution Rate Retirement	31.41 %	34.39 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	16-25	17-26



Section I – Summary of Principal Results

**VIRGINIA LAW OFFICERS
(\$ IN THOUSANDS)**

VALUATION DATE	June 30, 2018	June 30, 2017
Members:		
Active	8,718	8,718
Long Term Disability	557	583
Retirees and Beneficiaries	5,225	4,813
Inactive, Vested	1,103	1,020
Inactive, Non-Vested	5,125	4,744
Inactive, active elsewhere in VRS	2,948	2,760
Total	23,676	22,638
Annual Covered Payroll	\$ 346,106	\$ 339,150
Annual Retirement Benefits	\$ 103,588	\$ 95,607
Total Assets:		
Actuarial Value	\$ 1,413,876	\$ 1,328,178
Market Value	1,423,980	1,345,887
Actuarial Accrued Liability	\$ 2,057,504	\$ 1,977,781
Funded Ratio:		
Actuarial Value of Assets	68.72%	67.15%
Market Value of Assets	69.21%	68.05%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	643,628	649,603
Total UAAL	\$ 643,628	\$ 649,603
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	For Informational Purposes	2019 & 2020
Employer Contribution Rate:		
Normal Cost (net of employee contributions)	9.63 %	10.07 %
Administrative Expense	0.25 %	0.46 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	10.93 %	11.08 %
Annual Recommended Contribution	20.81 %	21.61 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	16-25	17-26



Section I – Summary of Principal Results

POLITICAL SUBDIVISIONS (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2018	June 30, 2017
Number of Political Subdivisions in VRS	588	589
Members:		
Active	108,691	107,315
Long Term Disability	25	5
Retirees and Beneficiaries*	70,195	66,553
Inactive, Vested*	17,190	16,487
Inactive, Non-Vested*	35,035	31,930
Inactive, active elsewhere in VRS	<u>32,040</u>	<u>31,172</u>
Total	263,176	253,462
Annual Covered Payroll	\$ 4,973,503	\$ 4,808,354
Annual Retirement Benefits	\$1,003,716	\$ 927,567
Total Assets:**		
Actuarial Value	\$ 20,137,904	\$ 18,981,614
Market Value	20,302,821	19,250,247
Actuarial Accrued Liability**	\$ 22,543,485	\$ 21,533,733
Funded Ratio:		
Actuarial Value of Assets	89.33%	88.15%
Market Value of Assets	90.06%	89.40%
Unfunded Actuarial Accrued Liability (UAAL)**	2,405,581	2,552,119
	For Informational Purposes	For Informational Purposes
Average Employer Contribution Rate Defined Benefit Plan (net of employee contributions)	6.76 %	7.12 %
Average Employer Contribution Rate Defined Contribution Plan	<u>0.53 %</u>	<u>0.48 %</u>
Average Employer Contribution Rate Retirement Plans	7.29 %	7.60 %
Amortization Period (Years)	16-25	17-26

* Includes count for each plan from which members are receiving pension benefits or entitled to deferred vested benefits. Therefore, members with benefits from more than one political subdivision are counted more than once. This does not include counts for Political Subdivisions with no active members.

** Includes Political Subdivisions with no active members.



Section I – Summary of Principal Results

2. Comments on the valuation results as of June 30, 2018 are given in Section IV and further discussion of the contribution level for each plan is set out in Section V.
3. Schedule B shows the development of the actuarial value of assets. Schedule E and Schedule F of this report outline the full set of actuarial assumptions and methods used in the current valuation.
4. The valuation takes into account the effect of amendments to VRS through the valuation date. The main provisions of VRS, as summarized in Schedule G, were taken into account in the current valuation.
5. In accordance with the supplemental contribution provision of the 2011 Appropriation Act, Item 469(1)(6), the portion of the unfunded accrued liability with respect to deferred contributions for the 2010-2012 biennium will be paid back to the plans over a 10-year period. Amendments to the 2016-2017 Virginia budget accelerated the payback of the full outstanding balance of the deferred contributions to all plans except Teachers. Below we provide an estimate of the deferred contributions as provided by VRS.

DIVISION	Deferred Contributions (\$ in thousands)	
	Outstanding Balance as of 6/30/2018	Outstanding Balance as of 6/30/2017
State Employees	\$ 0	\$ -
Teachers	172,451	222,583
State Police	0	0
Virginia Law Officers	0	0
Judicial	0	0
Total	\$ 172,451	\$ 222,583



Section II – Membership Data

1. Data regarding the membership of VRS for use as a basis of the valuation was furnished by VRS. The following table shows the number of active members and their annual compensation as of June 30, 2018 on the basis of which the valuation was prepared.

TABLE 1
THE NUMBER AND ANNUAL COMPENSATION OF
ACTIVE MEMBERS AS OF JUNE 30, 2018
(\$ IN THOUSANDS)

DIVISION	NUMBER	COMPENSATION*
State Employees	74,582	\$4,161,922
Teachers	151,585	8,086,933
State Police	1,885	126,523
Judicial	416	67,424
Virginia Law Officers	8,718	346,106
Political Subdivisions	<u>108,691</u>	<u>4,973,503</u>
Total	345,877	\$17,762,411

* Actual annual compensation provided by VRS.

2. The following table shows a five-year history of active member valuation data, including the political subdivisions.

TABLE 2
SCHEDULE OF TOTAL ACTIVE MEMBER VALUATION DATA

VALUATION DATE	NUMBER	ANNUAL PAYROLL (\$ IN THOUSANDS)	ANNUAL AVERAGE PAY	% CHANGE IN AVERAGE PAY
6/30/2018	345,877	\$ 17,762,411	\$ 51,355	2.10 %
6/30/2017	343,559	17,280,580	50,299	1.95 %
6/30/2016	341,719	16,859,077	49,336	2.27 %
6/30/2015	340,048	16,404,201	48,241	1.37 %
6/30/2014	340,319	16,195,744	47,590	2.56 %



Section II – Membership Data

3. The following table shows the number and annual retirement benefits payable to retired members and survivors on the roll of VRS as of the valuation date.

TABLE 3

**THE NUMBER AND ANNUAL RETIREMENT BENEFITS
OF RETIRED MEMBERS AND SURVIVORS OF DECEASED MEMBERS
ON THE ROLL AS OF JUNE 30, 2018
(\$ IN THOUSANDS)**

TYPE OF RETIREMENT	DIVISION						TOTAL
	STATE EMPLOYEES	TEACHERS	STATE POLICE	JUDICIAL	VIRGINIA LAW OFFICERS	POLITICAL SUBDIVISIONS*	
Service:							
Number	56,332	87,319	1,139	404	4,667	57,338	207,199
Annual Benefits	\$1,162,335	\$2,058,605	\$46,951	\$34,976	\$97,183	\$831,953	\$4,232,003
Disability:							
Number	3,623	4,418	185	0	261	8,256	16,743
Annual Benefits	\$59,610	\$96,928	\$6,382	\$0	\$3,970	\$128,052	\$294,942
Survivors:							
Number	5,141	3,246	225	140	297	4,601	13,650
Annual Benefits	\$69,556	\$47,099	\$4,239	\$6,586	\$2,435	\$43,711	\$173,626
Total:							
Number	65,096	94,983	1,549	544	5,225	70,195	237,592
Annual Benefits	\$1,291,501	\$2,202,632	\$57,572	\$41,562	\$103,588	\$1,003,716	\$4,700,571

- * Includes count for each plan from which members are receiving pension benefits or entitled to deferred vested benefits. Therefore, members with benefits from more than one political subdivision are counted more than once. This does not include counts for Political Subdivisions with no active members.

4. The five tables of Schedule H, which can be found at the end of this document, show the distribution by age and service of the number and average annual compensation of active members for each division included in the valuation.



Section III – Assets

- Schedule C shows the additions and deductions to the assets of VRS for the year preceding the valuation date and a reconciliation of the fund balances at market value. As of June 30, 2018, the market value of assets used to determine the actuarial value of assets for each division is shown below:

TABLE 4
COMPARISON OF MARKET VALUE OF ASSETS
(\$ IN THOUSANDS)

DIVISION	JUNE 30, 2018 MARKET VALUE	JUNE 30, 2017 MARKET VALUE
State Employees	\$18,532,189	\$17,789,888
Teachers	34,919,563	33,119,545
State Police	836,702	796,073
Judicial	540,009	512,749
Virginia Law Officers	1,423,980	1,345,887
Political Subdivisions	<u>20,302,821</u>	<u>19,250,247</u>
Total Market Value of Assets	\$76,555,264	\$72,814,389

* Includes Political Subdivisions with no active members.

- Schedule B shows the development of the actuarial value of assets as of June 30, 2018. The following table shows the actuarial value of assets allocated among all divisions.

TABLE 5
COMPARISON OF ACTUARIAL VALUE OF ASSETS
(\$ IN THOUSANDS)

DIVISION	JUNE 30, 2018 ACTUARIAL VALUE	JUNE 30, 2017 ACTUARIAL VALUE
State Employees	\$18,392,939	\$17,547,764
Teachers	34,673,952	32,684,868
State Police	830,978	785,677
Judicial	536,022	505,834
Virginia Law Officers	1,413,876	1,328,178
Political Subdivisions	<u>20,137,904</u>	<u>18,981,614</u>
Total Actuarial Value of Assets	\$75,985,671	\$71,833,935

* Includes Political Subdivisions with no active members.



Section IV – Comments on Valuation

State Employees

1. The total valuation balance sheet on account of benefits as of June 30, 2018 shows that the State Employees plan has total prospective benefit liabilities of \$26,787,846,755, of which \$13,755,346,671 is for the prospective benefits payable on account of present retired members and survivors of deceased members, \$1,156,422,483 is for the prospective benefits payable on account of present inactive members, and \$11,876,077,601 is for the prospective benefits payable on account of present active members. Against these benefit liabilities the State Employees plan has a total present actuarial value of assets of \$18,392,939,000 as of June 30, 2018. The difference of \$8,394,907,755 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$1,382,781,713 is the present value of future contributions expected to be made by members (at the rate of 5% of salary for Plan 1 and Plan 2 members and 4% for Hybrid members) and the balance of \$7,012,126,042 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the State Employees plan on account of retirement benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 4.50% of salary are required. This is net of the 4.64% blended employee contribution rate. In addition, there is a required contribution rate of 0.28% of pay for administrative expenses.
3. Prospective employer normal contributions at the above rate have a present value of \$1,289,907,661. When this amount is subtracted from \$7,012,126,042, which is the present value of the total future contributions to be made by the employers, there remains \$5,722,218,381 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by employers on account of retirement benefits be set at 7.86% of salary. This rate is sufficient to liquidate the unfunded accrued liability of \$5,722,218,381 on the assumption that the aggregate payroll for State employees will increase by 3% each year. See Schedule D for the amortization schedule for the unfunded accrued liability.
5. In addition, the employer makes a contribution to the defined contribution component of the Hybrid Plan. As of the valuation date the average employer defined contribution rate is 2.01% of pay for members in the Hybrid Plan. The employer defined contribution rate as a percent of the plan's total payroll is 0.72%.



Section IV – Comments on Valuation

Teachers

1. The total valuation balance sheet on account of benefits as of June 30, 2018 shows that the Teachers plan has total prospective benefit liabilities of \$54,049,387,591, of which \$25,490,956,073 is for the prospective benefits payable on account of present retired members and survivors of deceased members, \$1,235,610,705 is for the prospective benefits payable on account of present inactive members, and \$27,322,820,813 is for the prospective benefits payable on account of present active members. Against these benefit liabilities the Teachers plan has a total present actuarial value of assets of \$34,673,952,000 as of June 30, 2018. The difference of \$19,375,435,591 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$3,456,615,698 is the present value of future contributions expected to be made by members (at the rate of 5% of salary for Plan 1 and Plan 2 members and 4% for Hybrid members) and the balance of \$15,918,819,893 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the Teachers plan on account of retirement benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 5.85% of salary are required. This is net of the 4.71% blended employee contribution rate. In addition, there is a required contribution rate of 0.25% of pay for administrative expenses.
3. Prospective employer normal contributions at the above rate have a present value of \$4,076,595,562. When this amount is subtracted from \$15,918,819,893, which is the present value of the total future contributions to be made by the employers, there remains \$11,842,224,331 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the employers on account of retirement benefits be set at 8.62% of salary. This rate is sufficient to liquidate the unfunded accrued liability of \$11,842,224,331 on the assumption that the aggregate payroll for Teachers will increase by 3% each year. See Schedule D for the amortization schedule for the unfunded accrued liability.
5. In addition, the employer makes a contribution to the defined contribution component of the Hybrid Plan. As of the valuation date the average employer defined contribution rate is 1.78% of pay for members in the Hybrid Plan. The employer defined contribution rate as a percent of the plan's total payroll is 0.51%.



Section IV – Comments on Valuation

State Police (SPORS)

1. The total valuation balance sheet on account of benefits as of June 30, 2018 shows that the SPORS plan has total prospective benefit liabilities of \$1,295,526,889, of which \$622,256,438 is for the prospective benefits payable on account of present retired members and survivors of deceased members, \$24,323,523 is for the prospective benefits payable on account of present inactive members, and \$648,946,928 is for the prospective benefits payable on account of present active members. Against these benefit liabilities SPORS has a total present actuarial value of assets of \$830,978,000 as of June 30, 2018. The difference of \$464,548,889 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$57,504,067 is the present value of future contributions expected to be made by members (at the rate of 5% of salary) and the balance of \$407,044,822 represents the present value of future contributions payable by the employers.
2. The employers' contributions to SPORS on account of retirement benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 11.15% of salary are required. This is net of the 5% employee contribution rate. In addition, there is a required contribution rate of 0.41% of pay for administrative expenses.
3. Prospective employer normal contributions at the above rate have a present value of \$125,129,641. When this amount is subtracted from \$407,044,822, which is the present value of the total future contributions to be made by the employers, there remains \$281,915,181 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the employers on account of retirement benefits be set at 12.31% of salary. This rate is sufficient to liquidate the unfunded accrued liability of \$281,915,181 on the assumption that the aggregate payroll for SPORS employees will increase by 3% each year. See Schedule D for the amortization schedule for the unfunded accrued liability.



Section IV – Comments on Valuation

Judicial

1. The total valuation balance sheet on account of benefits as of June 30, 2018 shows that the Judicial plan has total prospective benefit liabilities of \$757,244,735, of which \$411,644,571 is for the prospective benefits payable on account of present retired members and survivors of deceased members, \$1,964,624 is for the prospective benefits payable on account of present inactive members, and \$343,635,540 is for the prospective benefits payable on account of present active members. Against these benefit liabilities the Judicial plan has a total present actuarial value of assets of \$536,022,000 as of June 30, 2018. The difference of \$221,222,735 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$21,554,112 is the present value of future contributions expected to be made by members (at the rate of 5% of salary for Plan 1 and Plan 2 members and 4% for Hybrid members) and the balance of \$199,668,623 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the Judicial plan on account of retirement benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 22.14% of salary are required. This is net of the 4.56% employee contribution rate. In addition, there is a required contribution rate of 0.49% of pay for administrative expenses.
3. Prospective employer normal contributions at the above rate have a present value of \$90,029,013. When this amount is subtracted from \$199,668,623, which is the present value of the total future contributions to be made by the employers, there remains \$109,639,610 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by employers on account of retirement benefits be set at 7.47% of salary. This rate is sufficient to liquidate the unfunded accrued liability of \$109,639,610 on the assumption that the aggregate payroll for Judicial employees will increase by 3% each year. See Schedule D for the amortization schedule for the unfunded accrued liability.
5. In addition, the employer makes a contribution to the defined contribution component of the Hybrid Plan. As of the valuation date the average employer defined contribution rate is 2.96% of pay for members in the Hybrid Plan. The employer defined contribution rate as a percent of the plan's total payroll is 1.31%.



Section IV – Comments on Valuation

Virginia Law Officers (VaLORS)

1. The total valuation balance sheet on account of benefits as of June 30, 2018 shows that VaLORS has total prospective benefit liabilities of \$2,319,551,762, of which \$1,143,348,974 is for the prospective benefits payable on account of present retired members and survivors of deceased members, \$174,382,787 is for the prospective benefits payable on account of present inactive members, and \$1,001,820,001 is for the prospective benefits payable on account of present active members. Against these benefit liabilities VaLORS has a total present actuarial value of assets of \$1,413,876,000 as of June 30, 2018. The difference of \$905,675,762 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$93,675,185 is the present value of future contributions expected to be made by members (at the rate of 5% of salary) and the balance of \$812,000,577 represents the present value of future contributions payable by the employers.
2. The employers' contributions to VaLORS on account of retirement benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 9.63% of salary are required. This is net of the 5% employee contribution rate. In addition, there is a required contribution rate of 0.25% of pay for administrative expenses.
3. Prospective employer normal contributions at the above rate have a present value of \$168,372,080. When this amount is subtracted from \$812,000,577, which is the present value of the total future contributions to be made by the employers, there remains \$643,628,497 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by employers on account of retirement benefits be set at 10.93% of salary. This rate is sufficient to liquidate the unfunded accrued liability of \$643,628,497 on the assumption that the aggregate payroll for VaLORS employees will increase by 3% each year. See Schedule D for the amortization schedule for the unfunded accrued liability.



Section V – Contribution Rates

1. The actuarially determined employer contribution rates as a percent of payroll for each division based on the June 30, 2018 actuarial valuation are shown in the following table:

TABLE 6

Division	Employer Contribution Rate Defined Benefit Plan	Employer Contribution Rate Defined Contribution Plan	Employer Contribution Rate Retirement Plans
State Employees	12.64%	0.72%	13.36%
Teachers	14.72	0.51	15.23
State Police	23.87	N/A	23.87
Judicial	30.10	1.31	31.41
Virginia Law Officers	20.81	N/A	20.81

The rates shown are net of member contributions.



Section V – Contribution Rates

2. The table below shows the development of the normal contribution rate, the unfunded accrued liability (UAL) rate, the actuarially recommended defined benefit plan contribution rate, the employer defined contribution plan rate and the total employer retirement plans contribution rate for each division as of June 30, 2018.

TABLE 7
EMPLOYER CONTRIBUTION RATE
EXPRESSED AS PERCENT OF ACTIVE MEMBER PAYROLL

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers
<u>Employer Contribution Rate for Defined Benefit Plan</u>					
Normal Cost					
Service Retirement Benefits	6.16%	8.23%	12.48%	25.71%	8.10%
Disability Benefits	0.97%	0.59%	1.34%	0.00%	2.83%
Survivor Benefits	0.33%	0.18%	0.62%	0.99%	0.27%
Separation Benefits	<u>1.68%</u>	<u>1.56%</u>	<u>1.71%</u>	<u>0.00%</u>	<u>3.43%</u>
Total	9.14%	10.56%	16.15%	26.70%	14.63%
Member Current Contributions	<u>4.64%</u>	<u>4.71%</u>	<u>5.00%</u>	<u>4.56%</u>	<u>5.00%</u>
Employer Normal Cost	4.50%	5.85%	11.15%	22.14%	9.63%
Administrative Expense	0.28%	0.25%	0.41%	0.49%	0.25%
Amortization of UAAL (<i>net of deferred contributions</i>) *	7.86%	7.88%	12.31%	7.47%	10.93%
Amortization of Deferred Contributions *	0.00%	0.74%	0.00%	0.00%	0.00%
Actuarially Recommended Employer Defined Benefit Plan Contribution Rate to pay Normal Cost and amortize UAAL	12.64%	14.72%	23.87%	30.10%	20.81%
<u>Defined Contribution Hybrid Plan</u>	0.72%	0.51%	N/A	1.31%	N/A
Employer Contribution Rate for Retirement Plans	13.36%	15.23%	23.87%	31.41%	20.81%

- * The amortization period of the unfunded less the deferred contribution begins at 30 years on June 30, 2013 and will decrease by one each year until reaching 0 years. Each subsequent year a new base will be added to the unfunded accrued liability and will be amortized over a closed 20 year period. The deferred contribution, as defined under the 2011 Appropriation Act, Item 469(1)(6), has been paid off except for Teachers which is to be amortized using a level-dollar, closed, 10 year period. See Schedule D for the Amortization Schedules showing each base comprising the unfunded accrued liability.



Section VI – Derivation of Experience Gains and Losses

CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITIES (UAAL) DURING FISCAL YEAR 2018 (\$ 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, 2017	\$ 5,763,770	\$ 12,321,149	\$ 254,951	\$ 125,688	\$ 649,603	\$ 2,552,119	\$21,667,280
2. Normal Cost for previous year	351,369	827,579	16,997	17,970	42,223	509,123	1,765,261
3. Actual contributions during the year	(737,447)	(1,661,366)	(41,545)	(30,959)	(90,181)	(718,117)	(3,279,615)
4. Interest at previous year's rate of 0.07							
a. on UAAL	403,464	862,480	17,847	8,798	45,472	178,648	1,516,709
b. on normal cost	24,596	57,931	1,190	1,258	2,956	35,639	123,570
c. on contributions	(25,811)	(58,148)	(1,454)	(1,084)	(3,156)	(25,134)	(114,787)
d. total: (a)+(b)+(c)	\$ 402,249	\$ 862,263	\$ 17,583	\$ 8,972	\$ 45,272	\$ 189,153	\$ 1,525,492
5. Expected UAAL as of June 30, 2018 A1+A2+A3+A4	5,779,941	12,349,625	247,986	121,671	646,917	2,532,278	21,678,418
6. Actual UAAL as of June 30, 2018	5,722,218	11,842,224	281,915	109,640	643,628	2,405,581	21,005,206
7. Total Gain/(Loss): A5-A6	\$ 57,723	\$ 507,401	\$ (33,929)	\$ 12,031	\$ 3,289	\$ 126,697	\$ 673,212
B. Calculation of Asset Gain/(Loss)							
1. Actuarial Value of Assets (AVA) as of June 30, 2017	\$17,547,764	\$ 32,684,868	\$ 785,677	\$ 505,834	\$ 1,328,178	\$18,981,614	\$71,833,935
2. Contributions during the year	\$ 737,447	\$ 1,661,366	\$ 41,545	\$ 30,959	\$ 90,181	\$ 718,117	\$ 3,279,615
3. Benefit payments during the year	(1,327,039)	(2,282,505)	(59,064)	(41,165)	(110,380)	(1,051,345)	(4,871,498)
4. Interest at previous year's rate of 0.07							
a. on AVA at beginning of year	\$ 1,228,343	\$ 2,287,941	\$ 54,997	\$ 35,408	\$ 92,972	\$ 1,328,713	\$ 5,028,374
b. on contributions	25,811	58,148	1,454	1,084	3,156	25,134	114,787
c. on benefit payments	(46,446)	(79,888)	(2,067)	(1,441)	(3,863)	(36,797)	(170,502)
d. total: (a)+(b)+(c)	\$ 1,207,708	\$ 2,266,201	\$ 54,384	\$ 35,051	\$ 92,265	\$ 1,317,050	\$ 4,972,659
5. Expected AVA as of June 30, 2018 B1+B2+B3+B4	18,165,880	34,329,930	822,542	530,679	1,400,244	19,965,436	75,214,711
6. Actual AVA as of June 30, 2018	18,392,939	34,673,952	830,978	536,022	1,413,876	20,137,904	75,985,671
7. Gain/(Loss) on assets: B6-B5	\$ 227,059	\$ 344,022	\$ 8,436	\$ 5,343	\$ 13,632	\$ 172,468	\$ 770,960
C. Calculation of Liability Gain/(Loss)							
1. Gain/(Loss) due to reflecting modified cash refund payment form	(150,190)	(177,499)	(4,172)	(1,344)	(7,136)	(45,160)	(385,501)
2. Gain/(Loss) due to plan amendments	0	0	0	0	0	(3,690)	(3,690)
3. Gain/(Loss) due to change in methods	0	0	0	0	0	0	0
4. Liability Experience Gain/(Loss): A7-B7-C1-C2-C3	\$ (19,146)	\$ 340,878	\$ (38,193)	\$ 8,032	\$ (3,207)	\$ 3,079	\$ 291,443



Section VI – Derivation of Experience Gains and Losses

GAINS & LOSSES DURING FISCAL YEAR 2018 (\$ IN MILLIONS)

Type of Activity	State Employees	Teachers	State Police	Judges	Virginia Law Officers	Political Subdivisions
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	(\$11.0)	\$71.3	\$0.8	\$5.8	(\$14.5)	(\$48.6)
Disability Before Retirement. If disability claims are less than assumed, there is a gain. If more claims, a loss.	\$3.9	\$4.4	(\$0.6)	\$0.0	\$0.7	\$2.0
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(\$1.1)	\$0.2	(\$0.2)	(\$0.3)	(\$0.2)	\$1.0
Withdrawal from Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(\$38.0)	(\$107.5)	(\$0.6)	\$0.0	\$3.4	(\$22.0)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(\$41.7)	\$265.3	(\$36.0)	\$2.2	(\$2.6)	\$8.4
New Members. Additional unfunded accrued liability will produce a loss.	(\$3.5)	(\$24.0)	\$0.0	(\$0.2)	(\$0.5)	(\$13.2)
Death after Retirement. If retirees live longer than assumed, there is a loss. If not as long, a gain.	\$33.3	\$34.3	(\$4.6)	(\$1.4)	\$4.6	\$9.5
Data and Other Adjustments.	(\$3.6)	\$15.8	\$1.8	\$0.1	\$2.6	\$16.1
Benefit Payments. If benefit payments are greater than expected, there is a loss. If the benefits payments are less, a gain.	(\$4.5)	(\$7.2)	(\$0.9)	\$0.4	(\$0.5)	\$6.5
Cost of Living Allowance (COLA). If COLA is greater than expected, there is a loss. If COLA is less, a gain.	\$47.0	\$88.3	\$2.2	\$1.4	\$3.8	\$43.4
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	\$227.1	\$344.0	\$8.4	\$5.3	\$13.6	\$172.5
Gain or (Loss) During Year	\$207.9	\$684.9	(\$29.7)	\$13.3	\$10.4	\$175.6
Non-Recurring Items. Adjustments for plan amendments, assumption changes, etc.	(150.2)	(177.5)	(4.2)	(1.3)	(7.1)	(\$48.9)
Expected Contributions vs. Actual Contributions. If the difference in the actual contribution to the plan is more or less than what was expected based on the previous valuation then there will be a gain or loss associated with this difference.	46.4	47.3	10.5	6.4	8.7	\$71.5
Total Gain or (Loss) During Year	\$104.2	\$554.7	(\$23.3)	\$18.4	\$12.0	\$198.2



Schedule A – Valuation Balance Sheet

STATE EMPLOYEES
As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets	\$	18,392,939,000
Present value of future members' contributions		1,382,781,713
Present value of future employer contributions		
Normal contributions	\$	1,289,907,661
Unfunded accrued liability contributions		<u>5,722,218,381</u>
Total prospective employer contributions		<u>7,012,126,042</u>
Total Present and Prospective Assets	\$	<u><u>26,787,846,755</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits	\$	13,755,346,671
Present value of prospective benefits payable on account of inactive members		1,156,422,483
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$	10,589,603,151
Disability retirement benefits		581,156,672
Survivor benefits		303,494,950
Separation benefits		<u>401,822,828</u>
Total		<u>11,876,077,601</u>
Total Actuarial Liabilities	\$	<u><u>26,787,846,755</u></u>



Schedule A – Valuation Balance Sheet

TEACHERS
As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 34,673,952,000
Present value of future members' contributions		3,456,615,698
Present value of future employer contributions		
Normal contributions	\$ 4,076,595,562	
Unfunded accrued liability contributions	<u>11,842,224,331</u>	
Total prospective employer contributions		<u>15,918,819,893</u>
Total Present and Prospective Assets		<u>\$ 54,049,387,591</u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 25,490,956,073
Present value of prospective benefits payable on account of inactive members		1,235,610,705
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$ 25,060,576,155	
Disability retirement benefits	810,415,867	
Survivor benefits	373,538,560	
Separation benefits	<u>1,078,290,231</u>	
Total		<u>27,322,820,813</u>
Total Actuarial Liabilities		<u>\$ 54,049,387,591</u>



Schedule A – Valuation Balance Sheet

STATE POLICE
As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS			
Actuarial Value of Assets		\$	830,978,000
Present value of future members' contributions			57,504,067
Present value of future employer contributions			
Normal contributions	\$	125,129,641	
Unfunded accrued liability contributions		<u>281,915,181</u>	
Total prospective employer contributions			<u>407,044,822</u>
Total Present and Prospective Assets		\$	<u><u>1,295,526,889</u></u>
ACTUARIAL LIABILITIES			
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$	622,256,438
Present value of prospective benefits payable on account of inactive members			24,323,523
Present value of prospective benefits payable on account of present active members:			
Service retirement benefits	\$	573,924,022	
Disability retirement benefits		29,916,577	
Survivor benefits		16,352,395	
Separation benefits		<u>28,753,934</u>	
Total			<u>648,946,928</u>
Total Actuarial Liabilities		\$	<u><u>1,295,526,889</u></u>



Schedule A – Valuation Balance Sheet

JUDICIAL
As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS			
Actuarial Value of Assets		\$	536,022,000
Present value of future members' contributions			21,554,112
Present value of future employer contributions			
Normal contributions	\$	90,029,013	
Unfunded accrued liability contributions		<u>109,639,610</u>	
Total prospective employer contributions			<u>199,668,623</u>
Total Present and Prospective Assets		\$	<u><u>757,244,735</u></u>
ACTUARIAL LIABILITIES			
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$	411,644,571
Present value of prospective benefits payable on account of inactive members			1,964,624
Present value of prospective benefits payable on account of present active members:			
Service retirement benefits	\$	334,353,354	
Disability retirement benefits		-	
Survivor benefits		9,282,186	
Separation benefits		<u>-</u>	
Total			<u>343,635,540</u>
Total Actuarial Liabilities		\$	<u><u>757,244,735</u></u>



Schedule A – Valuation Balance Sheet

VIRGINIA LAW OFFICERS

As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 1,413,876,000
Present value of future members' contributions		93,675,185
Present value of future employer contributions		
Normal contributions	\$ 168,372,080	
Unfunded accrued liability contributions	<u>643,628,497</u>	
Total prospective employer contributions		<u>812,000,577</u>
Total Present and Prospective Assets		<u><u>\$ 2,319,551,762</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 1,143,348,974
Present value of prospective benefits payable on account of inactive members		174,382,787
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$ 793,278,892	
Disability retirement benefits	89,112,249	
Survivor benefits	13,743,549	
Separation benefits	<u>105,685,311</u>	
Total		<u>1,001,820,001</u>
Total Actuarial Liabilities		<u><u>\$ 2,319,551,762</u></u>



Schedule A – Valuation Balance Sheet

POLITICAL SUBDIVISIONS

As of June 30, 2018

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 20,137,904,000
Present value of future members' contributions		1,611,158,287
Present value of future employer contributions		
Normal contributions	\$ 2,348,550,568	
Unfunded accrued liability contributions	<u>2,405,581,123</u>	
Total prospective employer contributions		<u>4,754,131,691</u>
Total Present and Prospective Assets		<u><u>\$ 26,503,193,978</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 11,115,281,462
Present value of prospective benefits payable on account of inactive members		1,378,774,029
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$11,961,962,807	
Disability retirement benefits	879,836,282	
Survivor benefits	291,169,947	
Separation benefits	<u>876,169,451</u>	
Total		<u>14,009,138,487</u>
Total Actuarial Liabilities		<u><u>\$ 26,503,193,978</u></u>



Schedule A – Solvency Test

SOLVENCY TEST

Virginia Retirement System (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) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$13,221,525	\$54,132,392	\$25,820,901	\$93,174,818	\$73,204,795	100.00%	100.00%	22.66%
6/30/2017	12,887,047	51,247,606	25,716,631	89,851,284	69,214,246	100.00	100.00	19.75
6/30/2016	12,518,183	48,717,940	25,882,869	87,118,992	65,203,736	100.00	100.00	15.33
6/30/2015	12,176,530	46,783,519	25,751,093	84,711,142	62,083,601	100.00	100.00	12.13
6/30/2014	11,819,771	44,469,489	25,794,124	82,083,384	57,144,567	100.00	100.00	3.32

State Employees Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$3,416,685	\$14,911,769	\$5,786,703	\$24,115,157	\$18,392,939	100.00%	100.00%	1.11%
6/30/2017	3,374,835	14,148,870	5,787,829	23,311,534	17,547,764	100.00	100.00	0.42
6/30/2016	3,324,003	13,408,506	6,145,734	22,878,243	16,672,776	100.00	99.55	0.00
6/30/2015	3,267,188	12,960,842	6,063,528	22,291,558	15,881,597	100.00	97.33	0.00
6/30/2014	3,202,604	12,433,349	6,186,983	21,822,936	14,826,208	100.00	93.50	0.00



Schedule A – Solvency Test

Teachers Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$6,282,723	\$26,726,567	\$13,506,886	\$46,516,176	\$34,673,952	100.00%	100.00%	12.32%
6/30/2017	6,082,982	25,474,535	13,448,500	45,006,017	32,684,868	100.00	100.00	8.38
6/30/2016	5,871,258	24,559,074	13,151,297	43,581,629	30,768,277	100.00	100.00	2.57
6/30/2015	5,679,555	23,776,912	13,107,711	42,564,178	29,441,485	100.00	99.94	0.00
6/30/2014	5,494,752	22,720,375	13,082,542	41,297,669	27,026,576	100.00	94.80	0.00

Political Subdivisions Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$3,522,117	\$12,494,055	\$6,527,313	\$22,543,485	\$20,137,904	100.00%	100.00%	63.15%
6/30/2017	3,429,230	11,624,201	6,480,302	21,533,733	18,981,614	100.00	100.00	60.62
6/30/2016	3,322,922	10,750,359	6,585,839	20,659,120	17,762,683	100.00	100.00	56.02
6/30/2015	3,229,787	10,045,765	6,579,854	19,855,406	16,760,519	100.00	100.00	52.96
6/30/2014	3,122,415	9,315,765	6,524,599	18,962,779	15,291,783	100.00	100.00	43.74



Schedule A – Solvency Test

State Police Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$103,710	\$646,580	\$362,603	\$1,112,893	\$830,978	100.00%	100.00%	22.25%
6/30/2017	99,643	622,206	318,779	1,040,628	785,677	100.00	100.00	20.02
6/30/2016	100,291	585,837	395,852	1,081,980	744,656	100.00	100.00	14.79
6/30/2015	95,394	586,984	368,323	1,050,701	710,864	100.00	100.00	7.73
6/30/2014	92,637	562,413	374,105	1,029,155	662,244	100.00	100.00	1.92

Judicial Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$41,009	\$413,609	\$191,044	\$645,662	\$536,022	100.00%	100.00%	42.61%
6/30/2017	39,104	407,862	184,556	631,522	505,834	100.00	100.00	31.90
6/30/2016	37,648	395,698	174,452	607,798	476,321	100.00	100.00	24.63
6/30/2015	36,784	390,690	172,914	600,388	442,250	100.00	100.00	8.55
6/30/2014	38,522	370,265	199,382	608,169	406,053	100.00	99.30	0.00



Schedule A – Solvency Test

Virginia Law Officers Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$240,390	\$1,317,732	\$499,382	\$2,057,504	\$1,413,876	100.00%	89.05%	0.00%
6/30/2017	240,517	1,219,673	517,591	1,977,781	1,328,178	100.00	89.18	0.00
6/30/2016	237,416	1,160,507	586,334	1,984,257	1,235,490	100.00	86.00	0.00
6/30/2015	232,824	1,088,742	585,155	1,906,721	1,155,767	100.00	84.77	0.00
6/30/2014	230,522	977,848	611,675	1,820,045	1,058,010	100.00	84.60	0.00

All Retirement Systems Combined
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2018	\$13,606,634	\$56,510,313	\$26,873,930	\$96,990,877	\$75,985,671	100.00%	100.00%	21.84%
6/30/2017	13,266,311	53,497,347	26,737,557	93,501,215	71,833,935	100.00	100.00	18.96
6/30/2016	12,893,538	50,859,982	27,039,507	90,793,027	67,660,203	100.00	100.00	14.45
6/30/2015	12,541,532	48,849,935	26,877,485	88,268,952	64,392,482	100.00	100.00	11.17
6/30/2014	12,181,452	46,380,015	26,979,286	85,540,753	59,270,874	100.00	100.00	2.63



Schedule B – Development of Actuarial Value of Assets

STATE EMPLOYEES
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	17,547,764
(2)	Market Value End of Year	\$	18,532,189
(3)	Market Value Beginning of Year (Adjusted)	\$	17,819,540
(4)	Cash Flow		
a.	Contributions	\$	750,078
b.	Benefit Payments		(1,327,039)
c.	Administrative Expenses		(11,481)
d.	Miscellaneous revenue and expenses		(1,150)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(589,592)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	1,302,241
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	1,226,732
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	75,509
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	15,102
b.	First Prior Year		167,405
c.	Second Prior Year		(171,992)
d.	Third Prior Year		(79,389)
e.	Fourth Prior Year		247,257
f.	Total Recognized Investment Gain	\$	178,383
(7)	Adjustment to Beginning of Year Market Value		29,652
(8)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f + (7)]	\$	18,392,939



Schedule B – Development of Actuarial Value of Assets

TEACHERS
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	32,684,868
(2)	Market Value End of Year	\$	34,919,563
(3)	Market Value Beginning of Year	\$	33,119,545
(4)	Cash Flow		
a.	Contributions	\$	1,684,478
b.	Benefit Payments		(2,282,505)
c.	Administrative Expenses		(20,945)
d.	Miscellaneous revenue and expenses		(2,167)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(621,139)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	2,421,157
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	2,296,628
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	124,529
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	24,906
b.	First Prior Year		308,870
c.	Second Prior Year		(316,628)
d.	Third Prior Year		(147,364)
e.	Fourth Prior Year		443,811
f.	Total Recognized Investment Gain	\$	313,595
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	34,673,952



Schedule B – Development of Actuarial Value of Assets

STATE POLICE
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	785,677
(2)	Market Value End of Year	\$	836,702
(3)	Market Value Beginning of Year	\$	796,073
(4)	Cash Flow		
a.	Contributions	\$	42,117
b.	Benefit Payments		(59,064)
c.	Administrative Expenses		(509)
d.	Miscellaneous revenue and expenses		(63)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(17,519)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	58,148
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	55,112
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	3,036
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	607
b.	First Prior Year		7,377
c.	Second Prior Year		(7,633)
d.	Third Prior Year		(3,555)
e.	Fourth Prior Year		10,912
f.	Total Recognized Investment Gain	\$	7,708
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	830,978



Schedule B – Development of Actuarial Value of Assets

JUDICIAL
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	505,834
(2)	Market Value End of Year	\$	540,009
(3)	Market Value Beginning of Year	\$	512,749
(4)	Cash Flow		
a.	Contributions	\$	31,327
b.	Benefit Payments		(41,165)
c.	Administrative Expenses		(326)
d.	Miscellaneous revenue and expenses		(42)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(10,206)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	37,466
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	35,535
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	1,931
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	386
b.	First Prior Year		4,737
c.	Second Prior Year		(4,786)
d.	Third Prior Year		(2,198)
e.	Fourth Prior Year		6,720
f.	Total Recognized Investment Gain	\$	4,859
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	536,022



Schedule B – Development of Actuarial Value of Assets

VIRGINIA LAW OFFICERS
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	1,328,178
(2)	Market Value End of Year	\$	1,423,980
(3)	Market Value Beginning of Year	\$	1,345,887
(4)	Cash Flow		
a.	Contributions	\$	91,289
b.	Benefit Payments		(110,380)
c.	Administrative Expenses		(861)
d.	Miscellaneous revenue and expenses		(247)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(20,199)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	98,292
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	93,505
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	4,787
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	957
b.	First Prior Year		12,329
c.	Second Prior Year		(12,494)
d.	Third Prior Year		(5,716)
e.	Fourth Prior Year		17,316
f.	Total Recognized Investment Gain	\$	12,392
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	1,413,876



Schedule B – Development of Actuarial Value of Assets

POLITICAL SUBDIVISIONS
For the Year Ending June 30, 2018
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	18,981,619
(2)	Market Value End of Year	\$	20,302,821
(3)	Market Value Beginning of Year	\$	19,220,595
(4)	Cash Flow		
a.	Contributions	\$	731,625
b.	Benefit Payments		(1,051,345)
c.	Administrative Expenses		(12,236)
d.	Miscellaneous revenue and expenses		(1,272)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(333,228)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	1,415,454
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	1,333,779
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	81,675
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	16,334
b.	First Prior Year		180,914
c.	Second Prior Year		(180,602)
d.	Third Prior Year		(81,957)
e.	Fourth Prior Year		250,697
f.	Total Recognized Investment Gain	\$	185,386
(7)	Adjustment to Beginning of Year Market Value		(29,652)
(8)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f + (7)]	\$	20,137,904



Schedule C – Summary of Changes in Net Assets

STATE EMPLOYEES
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	201,920
Members (paid by employer)		-
Employers		<u>548,158</u>
Total	\$	750,078
Miscellaneous Revenue		(1,150)
Net Investment Income		<u>1,302,241</u>
TOTAL	\$	2,051,169

Deductions for the Year

Benefit Payments	\$	1,296,803
Refunds		30,236
Transfers		-
Administrative Expenses		<u>11,481</u>
TOTAL	\$	<u>1,338,520</u>

Excess of Additions Over Deductions \$ 712,649

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	17,789,888
Adjustment to Beginning of Year Market Value		29,652
Excess of Additions over Deductions		<u>712,649</u>
Market Value of Assets as of 6/30/2018*	\$	<u>18,532,189</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

TEACHERS
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	391,490
Members (paid by employer)		-
Employers		<u>1,292,988</u>
Total	\$	1,684,478
Miscellaneous Revenue		(2,167)
Net Investment Income		<u>2,421,157</u>
TOTAL	\$	4,103,468

Deductions for the Year

Benefit Payments	\$	2,241,927
Refunds		40,578
Transfers		-
Administrative Expenses		<u>20,945</u>
TOTAL	\$	<u>2,303,450</u>

<u>Excess of Additions Over Deductions</u>	\$	<u>1,800,018</u>
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Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	33,119,545
Excess of Additions over Deductions		<u>1,800,018</u>
Market Value of Assets as of 6/30/2018*	\$	<u>34,919,563</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

STATE POLICE
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	6,311
Members (paid by employer)		-
Employers		<u>35,806</u>
Total	\$	42,117
Miscellaneous Revenue		(63)
Net Investment Income		<u>58,148</u>
TOTAL	\$	100,202

Deductions for the Year

Benefit Payments	\$	58,197
Refunds		867
Transfers		-
Administrative Expenses		<u>509</u>
TOTAL	\$	<u>59,573</u>

Excess of Additions Over Deductions \$ 40,629

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	796,073
Excess of Additions over Deductions		<u>40,629</u>
Market Value of Assets as of 6/30/2018*	\$	<u>836,702</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

JUDICIAL
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	3,231
Members (paid by employer)		-
Employers		<u>28,096</u>
Total	\$	31,327
Miscellaneous Revenue		(42)
Net Investment Income		<u>37,466</u>
TOTAL	\$	68,751

Deductions for the Year

Benefit Payments	\$	41,165
Refunds		-
Transfers		-
Administrative Expenses		<u>326</u>
TOTAL	\$	<u>41,491</u>

Excess of Additions Over Deductions \$ 27,260

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	512,749
Excess of Additions over Deductions		<u>27,260</u>
Market Value of Assets as of 6/30/2018*	\$	<u>540,009</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

VIRGINIA LAW OFFICERS
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	17,496
Members (paid by employer)		-
Employers		<u>73,793</u>
Total	\$	91,289
Miscellaneous Revenue		(247)
Net Investment Income		<u>98,292</u>
TOTAL	\$	<u>189,334</u>

Deductions for the Year

Benefit Payments	\$	104,776
Refunds		5,604
Transfers		-
Administrative Expenses		<u>861</u>
TOTAL	\$	<u>111,241</u>

Excess of Additions Over Deductions \$ 78,093

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	1,345,887
Excess of Additions over Deductions		<u>78,093</u>
Market Value of Assets as of 6/30/2018*	\$	<u>1,423,980</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

POLITICAL SUBDIVISIONS
For the Year Ending June 30, 2018
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	241,339
Members (paid by employer)		-
Employers		<u>490,286</u>
Total	\$	731,625
Miscellaneous Revenue		(1,272)
Net Investment Income		<u>1,415,454</u>
TOTAL	\$	2,145,807

Deductions for the Year

Benefit Payments	\$	1,010,021
Refunds		41,324
Transfers		-
Administrative Expenses		<u>12,236</u>
TOTAL	\$	<u>1,063,581</u>

<u>Excess of Additions Over Deductions</u>	\$	<u>1,082,226</u>
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Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2017	\$	19,250,247
Adjustment to Beginning of Year Market Value		(29,652)
Excess of Additions over Deductions		<u>1,082,226</u>
Market Value of Assets as of 6/30/2018*	\$	20,302,821

*The Market Value of Assets shown above includes Political Subdivisions with no active members and is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule D – Amortization of Unfunded Accrued Liability

STATE EMPLOYEES
As of June 30, 2018

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2017</u>	<u>BOY 2017/2018 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Years Remaining June 30, 2018</u>
2013 Original Unfunded	\$7,117,727,223	\$7,393,680,709	\$439,674,871	\$7,440,786,247	\$452,865,117	25 years
2014 Experience (Gain) / Loss	(\$414,716,278)	(\$405,144,388)	(\$31,768,349)	(\$399,512,362)	(\$32,721,399)	16 years
2015 Experience (Gain) / Loss	(\$637,505,432)	(\$629,460,287)	(\$47,412,212)	(\$622,791,440)	(\$48,834,579)	17 years
2016 Experience (Gain) / Loss	(\$87,589,562)	(\$87,150,792)	(\$6,324,431)	(\$86,484,206)	(\$6,514,164)	18 years
2017 Assumption Change	\$62,300,692	\$62,300,692	\$4,367,418	\$61,988,603	\$4,498,440	19 years
2017 Experience (Gain) / Loss	(\$570,456,389)	(\$570,456,389)	(\$39,990,270)	(\$567,598,747)	(\$41,189,978)	19 years
2018 Experience (Gain) / Loss	(\$104,169,714)			(\$104,169,714)	(\$7,302,530)	20 years
Total		\$5,763,769,545	\$318,547,027	\$5,722,218,381	\$320,800,907	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2018	\$5,722,218,381
June 30, 2019	\$5,779,516,697
June 30, 2020	\$5,830,528,185
June 30, 2021	\$5,874,503,837
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

TEACHERS
As of June 30, 2018

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2017</u>	<u>BOY 2017/2018 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Years Remaining June 30, 2018</u>
2013 Original Unfunded	\$14,493,629,234	\$15,055,545,616	\$895,297,665	\$15,151,465,308	\$922,156,595	25 years
2014 Experience (Gain) / Loss	(\$958,176,017)	(\$936,060,762)	(\$73,398,782)	(\$923,048,319)	(\$75,600,745)	16 years
2015 Experience (Gain) / Loss	(\$1,043,509,874)	(\$1,030,341,063)	(\$77,607,357)	(\$1,019,425,065)	(\$79,935,578)	17 years
2016 Experience (Gain) / Loss	(\$411,540,187)	(\$409,478,620)	(\$29,715,385)	(\$406,346,661)	(\$30,606,846)	18 years
2017 Assumption Change	\$104,287,885	\$104,287,885	\$7,310,814	\$103,765,466	\$7,530,139	19 years
2017 Experience (Gain) / Loss	(\$685,386,348)	(\$685,386,348)	(\$48,047,117)	(\$681,952,977)	(\$49,488,530)	19 years
2018 Experience (Gain) / Loss	(\$554,684,143)			(\$554,684,143)	(\$38,884,600)	20 years
2011 10 Yr Payback of Contribution Deficit	\$741,432,106	\$222,582,577	\$61,413,678	\$172,450,722	\$61,413,678	3 years
Total		\$12,321,149,285	\$735,253,516	\$11,842,224,331	\$716,584,113	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2018	\$11,842,224,331
June 30, 2019	\$11,904,435,033
June 30, 2020	\$11,949,969,516
June 30, 2021	\$11,977,029,512
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

STATE POLICE
As of June 30, 2018

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2017</u>	<u>BOY 2017/2018 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Years Remaining June 30, 2018</u>
2013 Original Unfunded	\$385,000,723	\$399,927,158	\$23,782,190	\$402,475,116	\$24,495,656	25 years
2014 Experience (Gain) / Loss	(\$25,215,304)	(\$24,633,321)	(\$1,931,558)	(\$24,290,886)	(\$1,989,505)	16 years
2015 Experience (Gain) / Loss	(\$30,844,770)	(\$30,455,518)	(\$2,293,971)	(\$30,132,855)	(\$2,362,790)	17 years
2016 Experience (Gain) / Loss	(\$3,942,276)	(\$3,922,528)	(\$284,653)	(\$3,892,526)	(\$293,193)	18 years
2017 Assumption Change	(\$63,376,957)	(\$63,376,957)	(\$4,442,867)	(\$63,059,476)	(\$4,576,152)	19 years
2017 Experience (Gain) / Loss	(\$22,588,135)	(\$22,588,135)	(\$1,583,479)	(\$22,474,982)	(\$1,630,983)	19 years
2018 Experience (Gain) / Loss	\$23,290,790			\$23,290,790	\$1,632,737	20 years
Total		\$254,950,699	\$13,245,662	\$281,915,181	\$15,275,770	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2018	\$281,915,181
June 30, 2019	\$285,304,170
June 30, 2020	\$288,440,036
June 30, 2021	\$291,290,351
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

JUDICIAL
As of June 30, 2018

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2017</u>	<u>BOY 2017/2018 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Years Remaining June 30, 2018</u>
2013 Original Unfunded	\$209,625,821	\$217,752,992	\$12,948,966	\$219,140,308	\$13,337,435	25 years
2014 Experience (Gain) / Loss	(\$21,000,605)	(\$20,515,900)	(\$1,608,701)	(\$20,230,703)	(\$1,656,962)	16 years
2015 Experience (Gain) / Loss	(\$44,957,373)	(\$44,390,023)	(\$3,343,546)	(\$43,919,730)	(\$3,443,852)	17 years
2016 Experience (Gain) / Loss	(\$19,134,811)	(\$19,038,957)	(\$1,381,635)	(\$18,893,335)	(\$1,423,084)	18 years
2017 Assumption Change	\$19,588,792	\$19,588,792	\$1,373,218	\$19,490,664	\$1,414,415	19 years
2017 Experience (Gain) / Loss	(\$27,709,090)	(\$27,709,090)	(\$1,942,469)	(\$27,570,284)	(\$2,000,743)	19 years
2018 Experience (Gain) / Loss	(\$18,377,310)			(\$18,377,310)	(\$1,288,291)	20 years
Total		\$125,687,814	\$6,045,833	\$109,639,610	\$4,938,918	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2018	\$109,639,610
June 30, 2019	\$112,029,740
June 30, 2020	\$114,428,641
June 30, 2021	\$116,832,170
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

VIRGINIA LAW OFFICERS
As of June 30, 2018

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2017</u>	<u>BOY 2017/2018 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Years Remaining June 30, 2018</u>
2013 Original Unfunded	\$759,539,883	\$788,987,158	\$46,918,151	\$794,013,837	\$48,325,695	25 years
2014 Experience (Gain) / Loss	(\$27,744,710)	(\$27,104,347)	(\$2,125,317)	(\$26,727,562)	(\$2,189,077)	16 years
2015 Experience (Gain) / Loss	(\$16,540,081)	(\$16,331,349)	(\$1,230,110)	(\$16,158,326)	(\$1,267,013)	17 years
2016 Experience (Gain) / Loss	\$9,695,693	\$9,647,123	\$700,080	\$9,573,336	\$721,083	18 years
2017 Assumption Change	(\$59,590,715)	(\$59,590,715)	(\$4,177,442)	(\$59,292,202)	(\$4,302,766)	19 years
2017 Experience (Gain) / Loss	(\$46,004,687)	(\$46,004,687)	(\$3,225,032)	(\$45,774,231)	(\$3,321,782)	19 years
2018 Experience (Gain) / Loss	(\$12,006,355)			(\$12,006,355)	(\$841,672)	20 years
Total		\$649,603,183	\$36,860,330	\$643,628,497	\$37,124,468	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2018	\$643,628,497
June 30, 2019	\$648,959,311
June 30, 2020	\$653,471,587
June 30, 2021	\$657,072,276
June 30, 2043	\$0



Schedule E – Outline of Actuarial Assumptions and Methods

Assumptions and Methods which apply to all VRS Plans

The basis for the assumptions is the Virginia Retirement System Experience Study for the Four-Year Period July 1, 2012 to June 30, 2016 issued February 21, 2018 and presented and adopted by the Board at its April 2017 meeting. These assumptions comply with Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* and ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*.

Investment Return Rate:	7.00% per annum, compounded annually, net of investment expenses.
Inflation Assumption:	2.50% per year.
Actuarial Cost Method:	Entry age normal cost method. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability. See Schedule F for a detailed explanation.
Funding Period:	<p>The legacy unfunded actuarial accrued liability less the deferred contribution as of June 30, 2013 is amortized over a closed 30 year period from June 30, 2013. The amortization period of the unfunded less the deferred contribution, will decrease by one each year until reaching 0 years. The deferred contribution, as defined under the 2011 Appropriations Act, Item 469(1)(6), has been paid off except for Teachers which is to be amortized using a level-dollar, closed 10 year period beginning June 30, 2011. The actuarial gains and losses and other changes in the unfunded due to benefit and actuarial assumption and method changes for each valuation subsequent to the June 30, 2013 valuation will be amortized over a closed 20 year period. See the Amortization Schedules for more detail.</p> <p>The amortization payment includes an adjustment of 1.019233 to account for the passage of time from the valuation date to the date the contribution is made.</p>
Payroll Growth Rate:	3.00% per annum.
Asset Valuation Method:	The method of valuing assets is intended to recognize a “smoothed” market value of assets. Under this method, the difference between actual return on market value from investment experience and the expected return on market value is recognized over a five-year period. The resulting actuarial value of assets cannot be less than 80% or more than 120% of the market value of assets.
Cost-of-living Increase:	2.50% per year compounded annually for Plan 1 members receiving benefits or vested as of January 1, 2013 and 2.25%



Schedule E – Outline of Actuarial Assumptions and Methods

compounded annually for all other members. The temporary supplement for SPORS and VaLORS members is assumed to be adjusted biennially based on increases of 2.50% per annum compounded annually.

**Percent Electing a
Deferred Termination Benefit:**

Terminating members are assumed to elect a return of contributions or a deferred annuity, whichever is most valuable benefit at the time of termination. Termination benefits are assumed to commence at normal retirement age.

Assumed Payment Form:

Modified cash refund annuity; in which the total benefit received by a member and his or her estate cannot be less than the total contributions made by the member while he or she was an active participant. . For members in pay status, the modified cash refund was estimated to be in effect for two years after retirement for Judicial members and three years for all others.

Marriage Assumption:

100% of active employees are assumed to be married, with males two years older than females.

Service Related Disability:

The service related disability benefits do not include an adjustment for Social Security or Worker's Compensation benefits.

Hazardous Duty Service:

The valuations of SPORS and VaLORS assume that all VRS service is hazardous duty service for purposes of determining eligibility for the temporary supplement.

Administrative Expenses:

The employer contribution rates include a rate for anticipated non-investment expenses based on actual prior year experience.



Schedule E – State Employees’ Actuarial Assumptions and Methods

STATE EMPLOYEES

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males setback 1 year, 85% of rates; females setback 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year; females setback 1 year with 1.5% increase compounded from ages 70 to 85

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males 115% of rates; females 130% of rates

State Employees Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00031	0.00044	0.00803	0.00016	0.00016	0.00285
25	0.00043	0.00045	0.00957	0.00017	0.00017	0.00304
30	0.00037	0.00046	0.00894	0.00020	0.00020	0.00383
35	0.00042	0.00053	0.01035	0.00027	0.00027	0.00503
40	0.00050	0.00066	0.01242	0.00036	0.00036	0.00696
45	0.00073	0.00107	0.01925	0.00058	0.00058	0.01155
50	0.00127	0.00431	0.02304	0.00098	0.00098	0.01520
55	0.00211	0.00599	0.02639	0.00151	0.00333	0.01827
60	0.00345	0.00789	0.02933	0.00214	0.00454	0.02081
65	0.00587	0.01102	0.03389	0.00315	0.00684	0.02522
70	0.00970	0.01677	0.04238	0.00527	0.01104	0.03410
75		0.02704	0.05702		0.01930	0.04963
80		0.04548	0.08047		0.03437	0.07380
85		0.07920	0.11900		0.06378	0.10933
90		0.14247	0.18618		0.11280	0.16137

25% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – State Employees’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 1.

State Employees Retirement Rates, Plan 1 Male							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	>=31
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.033	0.033	0.125	0.125
51	0.000	0.000	0.000	0.033	0.030	0.080	0.090
52	0.000	0.000	0.000	0.033	0.030	0.080	0.090
53	0.000	0.000	0.000	0.033	0.030	0.050	0.090
54	0.000	0.000	0.000	0.033	0.030	0.050	0.090
55	0.000	0.045	0.045	0.045	0.035	0.050	0.090
56	0.000	0.045	0.040	0.040	0.040	0.050	0.090
57	0.000	0.045	0.040	0.040	0.040	0.075	0.090
58	0.000	0.045	0.040	0.040	0.040	0.100	0.090
59	0.000	0.045	0.040	0.040	0.040	0.100	0.090
60	0.000	0.045	0.050	0.050	0.050	0.115	0.090
61	0.000	0.150	0.075	0.075	0.075	0.165	0.150
62	0.000	0.150	0.100	0.100	0.100	0.200	0.200
63	0.000	0.150	0.100	0.100	0.100	0.200	0.175
64	0.000	0.150	0.135	0.135	0.135	0.200	0.175
65	0.000	0.250	0.250	0.250	0.250	0.250	0.250
66	0.000	0.275	0.250	0.250	0.250	0.250	0.250
67	0.000	0.275	0.220	0.220	0.220	0.220	0.220
68	0.000	0.200	0.220	0.220	0.220	0.220	0.220
69	0.000	0.200	0.220	0.220	0.220	0.220	0.220
70	0.000	0.200	0.220	0.220	0.220	0.220	0.220
71	0.000	0.200	0.220	0.220	0.220	0.220	0.220
72	0.000	0.200	0.220	0.220	0.220	0.220	0.220
73	0.000	0.200	0.220	0.220	0.220	0.220	0.220
74	0.000	0.200	0.220	0.220	0.220	0.220	0.220
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

State Employees Retirement Rates, Plan 1 Female							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	>=31
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.030	0.030	0.075	0.075
51	0.000	0.000	0.000	0.035	0.030	0.075	0.060
52	0.000	0.000	0.000	0.035	0.030	0.075	0.060
53	0.000	0.000	0.000	0.035	0.035	0.100	0.090
54	0.000	0.000	0.000	0.050	0.035	0.100	0.090
55	0.000	0.050	0.050	0.050	0.040	0.100	0.090
56	0.000	0.050	0.050	0.050	0.050	0.100	0.090
57	0.000	0.050	0.050	0.050	0.050	0.100	0.090
58	0.000	0.050	0.050	0.050	0.050	0.100	0.090
59	0.000	0.050	0.050	0.050	0.050	0.100	0.090
60	0.000	0.050	0.050	0.050	0.050	0.120	0.125
61	0.000	0.075	0.080	0.080	0.080	0.165	0.175
62	0.000	0.100	0.120	0.120	0.120	0.225	0.250
63	0.000	0.175	0.120	0.120	0.120	0.225	0.175
64	0.000	0.175	0.150	0.150	0.150	0.225	0.175
65	0.000	0.275	0.275	0.275	0.275	0.275	0.300
66	0.000	0.300	0.300	0.300	0.300	0.300	0.300
67	0.000	0.300	0.250	0.250	0.250	0.250	0.250
68	0.000	0.250	0.250	0.250	0.250	0.250	0.250
69	0.000	0.250	0.250	0.250	0.250	0.250	0.250
70	0.000	0.250	0.250	0.250	0.250	0.250	0.250
71	0.000	0.250	0.250	0.250	0.250	0.250	0.250
72	0.000	0.250	0.250	0.250	0.250	0.250	0.250
73	0.000	0.250	0.250	0.250	0.250	0.250	0.250
74	0.000	0.250	0.250	0.250	0.250	0.250	0.250
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 2 and the Hybrid Plan.

State Employees Retirement Rates, Plan 2 and Hybrid Male																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	>=40
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.125
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.080
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.080	0.090
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090	0.090
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090	0.090	0.090
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075	0.090	0.090	0.090	0.090	0.090	0.090
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
60	0.000	0.045	0.045	0.045	0.045	0.045	0.045	0.115	0.115	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
61	0.000	0.150	0.075	0.075	0.075	0.075	0.165	0.165	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
62	0.000	0.150	0.100	0.100	0.100	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
63	0.000	0.150	0.100	0.100	0.200	0.200	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
64	0.000	0.150	0.135	0.200	0.200	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
65	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
66	0.000	0.275	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
67	0.000	0.275	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
68	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
69	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
70	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
71	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
72	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
73	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
74	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

State Employees Retirement Rates, Plan 2 and Hybrid Female																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	>=40
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075	0.060
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
60	0.000	0.050	0.050	0.050	0.050	0.050	0.050	0.120	0.120	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
61	0.000	0.075	0.080	0.080	0.080	0.080	0.165	0.165	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
62	0.000	0.100	0.120	0.120	0.120	0.225	0.225	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
63	0.000	0.175	0.120	0.120	0.225	0.225	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
64	0.000	0.175	0.150	0.225	0.225	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
65	0.000	0.275	0.275	0.275	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
66	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
67	0.000	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
68	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
69	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
70	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
71	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
72	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
73	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
74	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 25% of disability cases are assumed to be service related.

State Employees Disability Rates		
Age	Male	Female
20	0.00039	0.00033
25	0.00072	0.00100
30	0.00091	0.00211
35	0.00129	0.00281
40	0.00212	0.00354
45	0.00343	0.00474
50	0.00497	0.00629
55	0.00629	0.00742
60	0.00690	0.00735
65	0.00657	0.00653
70	0.00572	0.00841



Schedule E – State Employees’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

State Employees Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.25852	0.25852	0.25694	0.23691	0.19663	0.15321	0.11602	0.09132	0.08331	0.08331	0.08331
25	0.22297	0.22297	0.22056	0.20171	0.16921	0.13670	0.10954	0.09132	0.08251	0.07732	0.07214
30	0.17601	0.17601	0.17095	0.15425	0.13244	0.11401	0.10011	0.08993	0.08095	0.06790	0.05485
35	0.15120	0.14553	0.13631	0.12195	0.10694	0.09577	0.08902	0.08387	0.07574	0.05878	0.04183
40	0.14480	0.12618	0.11198	0.09890	0.08767	0.08029	0.07681	0.07442	0.06799	0.04938	0.03077
45	0.14223	0.11470	0.09617	0.08321	0.07345	0.06888	0.06600	0.06412	0.05934	0.04282	0.02630
50	0.13789	0.10668	0.08617	0.07370	0.06544	0.06362	0.05994	0.05630	0.05128	0.03879	0.02630
55	0.13242	0.10032	0.08050	0.07094	0.06491	0.06348	0.05950	0.05391	0.04470	0.03550	0.02630
60	0.13038	0.09617	0.07857	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.13038	0.09477	0.07859	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.13038	0.09477	0.07859	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

State Employees Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.31434	0.31434	0.30334	0.27392	0.23350	0.18606	0.14708	0.12545	0.12362	0.12362	0.12362
25	0.26747	0.26747	0.25594	0.23170	0.20061	0.16601	0.13663	0.11705	0.11136	0.11136	0.11136
30	0.21874	0.20726	0.19398	0.17630	0.15700	0.13853	0.12163	0.10538	0.09500	0.09045	0.09045
35	0.19257	0.17078	0.15532	0.14101	0.12758	0.11658	0.10633	0.09380	0.08241	0.07177	0.06019
40	0.17770	0.14790	0.12987	0.11685	0.10577	0.09775	0.09030	0.08135	0.07188	0.05904	0.03747
45	0.17029	0.13335	0.11247	0.09984	0.08920	0.08275	0.07531	0.06872	0.06277	0.05214	0.03025
50	0.16721	0.12286	0.09934	0.08763	0.07822	0.07316	0.06479	0.05936	0.05545	0.05088	0.03025
55	0.16695	0.11694	0.09149	0.08236	0.07660	0.07039	0.06175	0.05711	0.05138	0.05088	0.03025
60	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – State Employees’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following total salary increase rates are used. The total salary increase rate consists of an inflation rate of 2.50%, a productivity component of 1.00%, and a variable merit component that is dependent on years of service.

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	5.35%
2	5.35
3	4.75
4	4.45
5	4.45
6	4.45
7	4.35
8	4.25
9	4.00
10	4.00
11-19	3.65
20 or more	3.50

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member’s actual election contained in the valuation data.

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – Teachers’ Actuarial Assumptions and Methods

TEACHERS

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 White Collar Employee Rates to age 80, White Collar Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020

Post-Retirement:

RP-2014 White Collar Employee Rates to age 49, White Collar Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males 1% increase compounded from ages 70 to 90; females setback 3 years with 1.5% increase compounded from ages 65 to 75 and 2.0% increase compounded from ages 75 to 90

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; 115% of rates for males and females

Teachers Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00028	0.00028	0.00803	0.00014	0.00015	0.00252
25	0.00033	0.00033	0.00957	0.00014	0.00014	0.00269
30	0.00031	0.00031	0.00894	0.00018	0.00016	0.00339
35	0.00036	0.00036	0.01035	0.00024	0.00020	0.00445
40	0.00043	0.00043	0.01242	0.00033	0.00026	0.00616
45	0.00067	0.00067	0.01925	0.00054	0.00040	0.01022
50	0.00116	0.00272	0.02304	0.00091	0.00068	0.01345
55	0.00192	0.00384	0.02639	0.00137	0.00225	0.01616
60	0.00315	0.00501	0.02933	0.00194	0.00297	0.01841
65	0.00540	0.00705	0.03389	0.00290	0.00460	0.02231
70	0.00939	0.01144	0.04238	0.00505	0.00804	0.03017
75		0.02063	0.05702		0.01419	0.04390
80		0.03801	0.08047		0.02649	0.06529
85		0.07325	0.11900		0.05139	0.09672
90		0.14553	0.18618		0.10307	0.14275

5% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Teachers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 1.

Teachers Retirement Rates, Plan 1 Male							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	>=31
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.020	0.020	0.175	0.175
51	0.000	0.000	0.000	0.020	0.020	0.175	0.150
52	0.000	0.000	0.000	0.020	0.020	0.175	0.150
53	0.000	0.000	0.000	0.020	0.020	0.175	0.150
54	0.000	0.000	0.000	0.040	0.035	0.175	0.150
55	0.000	0.070	0.070	0.070	0.045	0.225	0.150
56	0.000	0.070	0.045	0.045	0.045	0.225	0.150
57	0.000	0.070	0.045	0.045	0.045	0.225	0.150
58	0.000	0.070	0.060	0.060	0.060	0.225	0.150
59	0.000	0.100	0.060	0.060	0.060	0.225	0.150
60	0.000	0.100	0.070	0.070	0.070	0.225	0.150
61	0.000	0.110	0.085	0.085	0.085	0.300	0.250
62	0.000	0.170	0.150	0.150	0.150	0.350	0.350
63	0.000	0.140	0.150	0.150	0.150	0.350	0.250
64	0.000	0.180	0.150	0.150	0.150	0.350	0.250
65	0.000	0.300	0.300	0.300	0.300	0.300	0.350
66	0.000	0.275	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.350	0.350	0.350	0.350	0.350
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

Teachers Retirement Rates, Plan 1 Female							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	>=31
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.024	0.024	0.150	0.150
51	0.000	0.000	0.000	0.035	0.020	0.150	0.100
52	0.000	0.000	0.000	0.035	0.025	0.150	0.100
53	0.000	0.000	0.000	0.035	0.025	0.150	0.100
54	0.000	0.000	0.000	0.040	0.030	0.150	0.100
55	0.000	0.060	0.060	0.060	0.050	0.225	0.160
56	0.000	0.060	0.050	0.050	0.050	0.225	0.160
57	0.000	0.060	0.050	0.050	0.050	0.225	0.160
58	0.000	0.070	0.050	0.050	0.050	0.225	0.160
59	0.000	0.080	0.060	0.060	0.060	0.225	0.200
60	0.000	0.090	0.080	0.080	0.080	0.225	0.200
61	0.000	0.150	0.100	0.100	0.100	0.300	0.250
62	0.000	0.150	0.150	0.150	0.150	0.350	0.300
63	0.000	0.150	0.150	0.150	0.150	0.350	0.300
64	0.000	0.250	0.150	0.150	0.150	0.350	0.300
65	0.000	0.300	0.300	0.300	0.300	0.300	0.350
66	0.000	0.300	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.300	0.300	0.300	0.300	0.300
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 2 and the Hybrid Plan.

Teachers Retirement Rates, Plan 2 and Hybrid Male																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	>=40
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150	0.150
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150	0.150	0.150
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
60	0.000	0.100	0.100	0.100	0.100	0.100	0.100	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
61	0.000	0.110	0.085	0.085	0.085	0.085	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
62	0.000	0.170	0.150	0.150	0.150	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
63	0.000	0.140	0.150	0.150	0.350	0.350	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
64	0.000	0.180	0.150	0.350	0.350	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
65	0.000	0.300	0.300	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
66	0.000	0.275	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

Teachers Retirement Rates, Plan 2 and Hybrid Female																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	>=40
<=49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100	0.100
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100	0.100	0.100
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160	0.160
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160	0.160	0.160
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
60	0.000	0.090	0.090	0.090	0.090	0.090	0.090	0.225	0.225	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
61	0.000	0.150	0.100	0.100	0.100	0.100	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
62	0.000	0.150	0.150	0.150	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
63	0.000	0.150	0.150	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
64	0.000	0.250	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
65	0.000	0.300	0.300	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
66	0.000	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
>=75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 5% of disability cases are assumed to be service related.

Teachers Disability Rates		
Age	Male	Female
20	0.000005	0.000003
25	0.000005	0.000023
30	0.000064	0.000081
35	0.000135	0.000196
40	0.000325	0.000481
45	0.000725	0.000792
50	0.001444	0.001609
55	0.002443	0.002521
60	0.003395	0.003321
65	0.003773	0.003509
70	0.003773	0.003509



Schedule E – Teachers’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

Teachers Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.21079	0.14843	0.11901	0.11020	0.09349	0.08050	0.08046	0.07228	0.05097	0.04292	0.04292
25	0.18729	0.14293	0.12175	0.11084	0.09453	0.08071	0.07568	0.06716	0.05060	0.04286	0.04286
30	0.16964	0.13940	0.12584	0.11218	0.09637	0.08159	0.07055	0.06162	0.05134	0.04355	0.04355
35	0.16964	0.13888	0.12459	0.10907	0.09347	0.07931	0.06709	0.05881	0.05210	0.04361	0.03314
40	0.16964	0.13888	0.12078	0.10272	0.08688	0.07483	0.06444	0.05760	0.05255	0.04302	0.02407
45	0.16964	0.13888	0.11573	0.10116	0.07864	0.06940	0.06230	0.05733	0.05243	0.04239	0.02407
50	0.16964	0.13888	0.11233	0.10116	0.07206	0.06391	0.06033	0.05733	0.05234	0.04238	0.02407
55	0.16964	0.13888	0.11217	0.10116	0.07038	0.05844	0.05813	0.05733	0.05234	0.04238	0.02407
60	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Teachers Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.18697	0.11393	0.09392	0.09392	0.08483	0.06269	0.04984	0.04984	0.04938	0.04663	0.04663
25	0.18037	0.12332	0.10860	0.10637	0.09381	0.07728	0.06567	0.06507	0.05448	0.04933	0.04933
30	0.17320	0.13889	0.12685	0.11780	0.10503	0.09536	0.08496	0.07332	0.06172	0.05303	0.04656
35	0.16500	0.14138	0.12602	0.11307	0.10178	0.09519	0.08653	0.07385	0.06386	0.05292	0.03931
40	0.15660	0.13208	0.11313	0.09891	0.08919	0.08395	0.07759	0.06810	0.06086	0.04911	0.02568
45	0.15055	0.12047	0.09933	0.08544	0.07686	0.07181	0.06623	0.05912	0.05390	0.04417	0.02287
50	0.14909	0.11617	0.09449	0.08038	0.07126	0.06481	0.05822	0.05346	0.04858	0.04357	0.02287
55	0.14909	0.11617	0.09449	0.08038	0.07093	0.06249	0.05450	0.05326	0.04771	0.04357	0.02287
60	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – Teachers’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: Teachers are assumed to receive their first salary increase on the valuation date. The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase
1	5.95%
2	5.85
3	5.85
4	5.45
5	5.45
6	5.45
7	5.35
8	5.35
9	5.35
10	4.85
11	4.85
12	4.85
13	4.75
14	4.75
15	4.65
16	4.65
17	4.55
18	4.45
19	4.45
20 or more	3.50

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – State Police Actuarial Assumptions and Methods

STATE POLICE

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males 90% of rates; females set forward 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males set forward 2 years; unisex using 100% male

SPORS Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00036	0.00044	0.00839	0.00016	0.00016	0.00839
25	0.00043	0.00045	0.00772	0.00018	0.00019	0.00772
30	0.00040	0.00046	0.00820	0.00023	0.00025	0.00820
35	0.00046	0.00053	0.00948	0.00030	0.00033	0.00948
40	0.00056	0.00066	0.01247	0.00043	0.00052	0.01247
45	0.00086	0.00107	0.01810	0.00072	0.00089	0.01810
50	0.00149	0.00431	0.02124	0.00118	0.00317	0.02124
55	0.00246	0.00599	0.02397	0.00174	0.00423	0.02397
60	0.00405	0.00789	0.02682	0.00247	0.00625	0.02682
65	0.00693	0.01102	0.03182	0.00383	0.00989	0.03182
70	0.01139	0.01694	0.04125	0.00653	0.01601	0.04125
75		0.02871	0.05658		0.02631	0.05658
80		0.05074	0.08141		0.04493	0.08141
85		0.09286	0.12299		0.07928	0.12299
90		0.17558	0.19143		0.14077	0.19143

85% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – State Police Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire.

SPORS Retirement Rates			
Age	Years of service		
	0-4	5-24	>=25
<=49	0.000	0.000	0.000
50	0.000	0.100	0.100
51	0.000	0.030	0.100
52	0.000	0.030	0.100
53	0.000	0.030	0.100
54	0.000	0.030	0.100
55	0.000	0.060	0.100
56	0.000	0.060	0.100
57	0.000	0.060	0.100
58	0.000	0.100	0.100
59	0.000	0.100	0.100
60	0.000	0.100	0.100
61	0.000	0.100	0.100
62	0.000	0.200	0.200
63	0.000	0.200	0.200
64	0.000	0.200	0.200
>=65	0.000	1.000	1.000



Schedule E – State Police Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 85% of disability cases are assumed to be service related.

SPORS Disability Rates	
Age	Unisex
<=44	0.00194
45	0.00233
50	0.00481
55	0.00770
60	0.00897
65	0.01108
70	0.01368

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

SPORS Termination Rates	
Service	Unisex
0	0.09750
1	0.04750
2	0.04750
3	0.04750
4	0.04750
5	0.04750
6	0.04750
7	0.03000
8	0.03000
9	0.03000
>=10	0.01750



Schedule E – State Police Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	4.75%
2	4.75
3	4.75
4	4.75
5	4.65
6	4.40
7	4.40
8	4.40
9	4.40
10 - 19	4.00
20 or more	3.50

It is assumed members covered under VSDP receive a 3.50% annual increase in pay while disabled and this adjusted pay is used to determine deferred benefits payable from the System.

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member's actual election contained in the valuation data.



Schedule E – Judicial Actuarial Assumptions and Methods

JUDICIAL

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males setback 1 year, 85% of rates; females setback 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year; females setback 1 year with 1.5% compounding increase from ages 70 to 85

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males 115% of rates; females 130% of rates

Judicial Employees Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00031	0.00044	0.00803	0.00016	0.00016	0.00285
25	0.00043	0.00045	0.00957	0.00017	0.00017	0.00304
30	0.00037	0.00046	0.00894	0.00020	0.00020	0.00383
35	0.00042	0.00053	0.01035	0.00027	0.00027	0.00503
40	0.00050	0.00066	0.01242	0.00036	0.00036	0.00696
45	0.00073	0.00107	0.01925	0.00058	0.00058	0.01155
50	0.00127	0.00431	0.02304	0.00098	0.00098	0.01520
55	0.00211	0.00599	0.02639	0.00151	0.00333	0.01827
60	0.00345	0.00789	0.02933	0.00214	0.00454	0.02081
65	0.00587	0.01102	0.03389	0.00315	0.00684	0.02522
70	0.00970	0.01677	0.04238	0.00527	0.01104	0.03410
75		0.02704	0.05702		0.01930	0.04963
80		0.04548	0.08047		0.03437	0.07380
85		0.07920	0.11900		0.06378	0.10933
90		0.14247	0.18618		0.11280	0.16137

5% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Judicial Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire with an unreduced retirement benefit.

Judicial Retirement Rates	
Age	Unisex
<=59	0.000
60	0.150
61	0.150
62	0.150
63	0.150
64	0.150
65	0.150
66	0.150
67	0.150
68	0.150
69	0.150
70	0.500
71	0.500
72	0.500
>=73	1.000

DISABILITY RATES: There are no assumed rates of disability prior to service retirement (for causes other than death or retirement).

TERMINATION RATES: There are no assumed rates of withdrawal prior to service retirement (for causes other than death or retirement).

SALARY INCREASE RATES: Salary increase rates are 4.5%.

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

VIRGINIA LAW OFFICERS

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males 90% of rates; females set forward 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males set forward 2 years; unisex using 100% male

VaLORS Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00036	0.00044	0.00839	0.00016	0.00016	0.00839
25	0.00043	0.00045	0.00772	0.00018	0.00019	0.00772
30	0.00040	0.00046	0.00820	0.00023	0.00025	0.00820
35	0.00046	0.00053	0.00948	0.00030	0.00033	0.00948
40	0.00056	0.00066	0.01247	0.00043	0.00052	0.01247
45	0.00086	0.00107	0.01810	0.00072	0.00089	0.01810
50	0.00149	0.00431	0.02124	0.00118	0.00317	0.02124
55	0.00246	0.00599	0.02397	0.00174	0.00423	0.02397
60	0.00405	0.00789	0.02682	0.00247	0.00625	0.02682
65	0.00693	0.01102	0.03182	0.00383	0.00989	0.03182
70	0.01139	0.01694	0.04125	0.00653	0.01601	0.04125
75		0.02871	0.05658		0.02631	0.05658
80		0.05074	0.08141		0.04493	0.08141
85		0.09286	0.12299		0.07928	0.12299
90		0.17558	0.19143		0.14077	0.19143

35% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire.

VaLORS Retirement Rates, Male					
Age	Years of service				
	0-4	5	6-24	25	>=26
<=49	0.000	0.000	0.000	0.000	0.000
50	0.000	0.110	0.110	0.350	0.350
51	0.000	0.100	0.080	0.300	0.250
52	0.000	0.100	0.080	0.300	0.250
53	0.000	0.100	0.080	0.300	0.250
54	0.000	0.100	0.080	0.240	0.250
55	0.000	0.100	0.080	0.180	0.250
56	0.000	0.100	0.090	0.180	0.200
57	0.000	0.100	0.100	0.180	0.200
58	0.000	0.100	0.100	0.180	0.200
59	0.000	0.100	0.120	0.180	0.200
60	0.000	0.180	0.180	0.180	0.200
61	0.000	0.180	0.200	0.200	0.200
62	0.000	0.180	0.400	0.400	0.400
63	0.000	0.400	0.250	0.250	0.250
64	0.000	0.150	0.250	0.250	0.250
>=65	0.000	1.000	1.000	1.000	1.000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

VaLORS Retirement Rates, Female					
Age	Years of service				
	0-4	5	6-24	25	>=26
<=49	0.000	0.000	0.000	0.000	0.000
50	0.000	0.100	0.100	0.375	0.375
51	0.000	0.100	0.080	0.250	0.200
52	0.000	0.100	0.080	0.250	0.200
53	0.000	0.100	0.080	0.250	0.225
54	0.000	0.100	0.080	0.250	0.250
55	0.000	0.100	0.080	0.250	0.275
56	0.000	0.100	0.080	0.250	0.300
57	0.000	0.100	0.080	0.250	0.225
58	0.000	0.100	0.080	0.400	0.225
59	0.000	0.100	0.130	0.300	0.225
60	0.000	0.200	0.200	0.200	0.225
61	0.000	0.200	0.225	0.225	0.225
62	0.000	0.200	0.300	0.300	0.300
63	0.000	0.200	0.250	0.250	0.250
64	0.000	0.200	0.250	0.250	0.250
>=65	0.000	1.000	1.000	1.000	1.000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 35% of disability cases are assumed to be service related.

VaLORS Disability Rates		
Age	Male	Female
20	0.00143	0.00543
25	0.00322	0.00581
30	0.00584	0.00659
35	0.00720	0.00769
40	0.00793	0.01001
45	0.00913	0.01381
50	0.01165	0.01821
55	0.01501	0.02277
60	0.01782	0.02901
65	0.01916	0.03865
70	0.01920	0.05499



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

VaLORS Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	>=10
20	0.31876	0.28460	0.25466	0.22550	0.19680	0.16134	0.13524	0.12367	0.12367	0.12367	0.12367
25	0.30264	0.26915	0.23838	0.20793	0.17797	0.14758	0.12544	0.11510	0.11510	0.11510	0.11510
30	0.28066	0.24612	0.21425	0.18325	0.15307	0.12980	0.11286	0.10375	0.10098	0.10098	0.10098
35	0.25749	0.21974	0.18823	0.16020	0.13400	0.11603	0.10242	0.09350	0.08615	0.07590	0.06050
40	0.23639	0.19311	0.16185	0.13861	0.11962	0.10471	0.09313	0.08358	0.07325	0.05907	0.04275
45	0.22182	0.17034	0.13792	0.12032	0.11173	0.09580	0.08484	0.07391	0.06240	0.05163	0.04275
50	0.21689	0.15441	0.11855	0.10683	0.10683	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
55	0.21689	0.14708	0.10525	0.09930	0.09930	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
60	0.21689	0.14673	0.09871	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.21689	0.14673	0.09796	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.21689	0.14673	0.09796	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

VaLORS Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	>=10
20	0.34816	0.33235	0.29905	0.25161	0.20346	0.15381	0.13567	0.10072	0.09919	0.09919	0.09919
25	0.33633	0.30645	0.27155	0.23161	0.19212	0.15381	0.13567	0.10072	0.09919	0.09919	0.09919
30	0.32698	0.27494	0.23556	0.20432	0.17667	0.15381	0.13567	0.10072	0.09919	0.09066	0.09066
35	0.32025	0.25204	0.20727	0.17948	0.15980	0.14868	0.13534	0.10072	0.09909	0.08073	0.06058
40	0.31390	0.23286	0.18182	0.15417	0.14036	0.13413	0.12530	0.10072	0.09311	0.07057	0.03901
45	0.30589	0.21487	0.15693	0.12720	0.11803	0.10976	0.10134	0.09113	0.07804	0.06036	0.03687
50	0.29483	0.19601	0.13051	0.09760	0.09281	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
55	0.28000	0.17544	0.10155	0.06516	0.06490	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
60	0.26118	0.15309	0.06978	0.02989	0.03440	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.23879	0.12934	0.03574	0.00004	0.00182	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.20897	0.10078	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	4.75%
2	4.75
3	4.75
4	4.75
5	4.65
6	4.40
7	4.40
8	4.40
9	4.40
10 - 19	4.00
20 or more	3.50

It is assumed members covered under VSDP receive a 3.50% annual increase in pay while disabled and this adjusted pay is used to determine deferred benefits payable from the System.

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member’s actual election contained in the valuation data.



Schedule E – Summary of Actuarial Assumption and Method Changes

2009 Valuation

1. Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2008 are stated below.

SYSTEM	ASSUMPTION CHANGE
State	Increase rates of withdrawals Increase rates of disability retirement up to age 52, females Decrease rates of disability retirement after age 52, all members Decrease rates of service retirement
Teachers	Increase rates of withdrawals Increase rates of disability retirement Decrease rates of service retirement
SPORS	Decrease rates of withdrawals, males Decrease rates of service retirement
VaLORS	Increase rates of withdrawals Decrease rates of disability retirement Change rates of service retirement
Judicial	Increase rates of salary increases

2. For the June 30, 2009 valuation the Board suspended application of the 80%/120% market value of assets corridor on the actuarial value of assets.

2010 Valuation

The investment return rate was decreased from 7.50% per annum to 7.00% per annum.

2011 Valuation

The amortization period of the unfunded less the deferred contribution begins at 30 years on June 30, 2011 and will decrease by one each year until reaching the minimum period of 20 years. The deferred contribution, as defined under 2011 Appropriations Act, Item 469(1)(6), is amortized using a level-dollar, closed, 10 year period beginning June 30, 2011.

2013 Valuation

1. The amortization period of the unfunded as of June 30, 2013 less the deferred contribution under 2011 Appropriations Act, Item 469(1)(6) is amortized using a level-dollar, closed, 30 year period beginning June 30, 2013 decreasing by one each year until reaching 0 years.



Schedule E – Summary of Actuarial Assumption and Method Changes

- Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2012 are summarized below.

STATE SYSTEM	ASSUMPTION CHANGE
State	Update mortality table Decrease rates of service retirement Decrease rates of withdrawals for less than 10 years of service Decrease rates of male disability retirement Reduce rates of salary increase by 0.25% per year
Teachers	Update mortality table Adjustments to rates of service retirement Decrease rates of withdrawals for three through nine years of service Decrease rates of disability Reduce rates of salary increase by 0.25% per year
SPORS	Update mortality table Increase rate of service retirement at age 54
VaLORS	Update mortality table Adjustments to rates of service retirement Decrease rates of withdrawals for females under 10 years of service Increase rates of disability Decrease service related disability rate from 60% to 50%
Judicial	Update mortality table

2015 Valuation

- An administrative expense charge was added to the employer contribution rates to cover administrative expenses.
- The retirement rates for the Judicial plan were extended to age 73 to reflect the change in the mandatory retirement age to 73.



Schedule E – Summary of Actuarial Assumption and Method Changes

2017 Valuation

Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2016 are summarized below. In addition to these, the spouse age difference was changed from spouses being the same age as participants to males being two years older than females.

System	Assumption	Description
State	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Lowered rates at older ages and changed final retirement age from 70 to 75
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Scale	No change
	6. Line of Duty Disability	Increase rate from 14% to 25%
Teachers	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Lowered rates at older ages and changed final retirement age from 70 to 75
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Scale	No change
SPORS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020 and reduced margin for future improvement in accordance with experience
	2. Retirement Rates	Increased age 50 rates, and lowered rates at older ages
	3. Withdrawal Rates	Adjusted rates to better match experience
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Increases	No change
	6. Line of Duty Disability	Increase rate from 60% to 85%
VaLORS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020 and reduced margin for future improvement in accordance with experience
	2. Retirement Rates	Increased age 50 rates, and lowered rates at older ages
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Increases	No change
	6. Line of Duty Disability	Decrease rate from 50% to 35%
JRS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Decreased rates at first retirement eligibility
	3. Withdrawal Rates	No change
	4. Disability Rates	Removed disability rates
	5. Salary Increases	No change

In addition to these assumption changes listed above, the method to determine the normal cost rate has changed. Beginning with this valuation, the payroll used to develop the rate will be reduced for those expected to leave during the year. The normal cost rate is also adjusted to reflect that the hybrid payroll as a percent of the total payroll will increase from the rate setting valuation date to when employers make the contribution.



Schedule E – Summary of Actuarial Assumption and Method Changes

2018 Valuation

The assumed payment form was updated to a modified cash refund annuity. This is a form of payment in which the total benefit received by a member and his or her estate cannot be less than the total contributions made by the member while he or she was an active participant.



Schedule F – Actuarial Cost Method

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability, termination from service or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.00%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.
2. The employer contributions required to support the benefits of VRS are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf. The normal cost rate has been developed to cover the cost of new hires during the fiscal year and has also been adjusted to reflect the expected allocation of Plan 1, Plan 2, and hybrid membership as of the fiscal year in which the contributions are being made.
4. The unfunded accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the VRS. The accrued liability contribution amortizes the balance of the unfunded accrued liability over a period of years from the valuation date and includes a timing adjustment to reflect the period between the rate setting date and the time employers will actually make contributions.



Schedule G – Summary of Main Plan Provisions

Benefit Provisions which apply to all VRS Plans

Plan Year:	Twelve-month period ending June 30th.
Administration:	All plans are administered by the Board of Trustees of the Virginia Retirement System.
Plan 1:	Members hired prior to July 1, 2010 and who were vested as of January 1, 2013.
Plan 2:	Members hired on or after July 1, 2010, or members hired prior to July 1, 2010 and who were not vested as of January 1, 2013. Members hired after January 1, 2014 in the State Police and Virginia Law Officers Plans are in Plan 2.
Hybrid:	Members hired on or after January 1, 2014 or by member election. There is no Hybrid Plan in the State Police and Virginia Law Officers Plans.
Eligibility:	All full-time, salaried, permanent employees of the Commonwealth of Virginia or of any participating Virginia city, county, town or political subdivision or of any local Virginia school boards are eligible to become members of VRS. This summary covers the provisions relating to state employees.
Employee Contributions:	
Defined Benefit -	Active members in Plan 1 and Plan 2 contribute 5% of their creditable compensation per year. Active members in the Hybrid Plan contribute 4% of their creditable compensation per year. The employer may "pick-up" the member's assessments under the provisions of Internal Revenue Code Section 414(h).
Defined Contribution -	Active members in the Hybrid Plan are required to contribute 1% of their creditable compensation per year to the defined contribution component of the Hybrid Plan. Active members can make voluntary additional contributions of up to 4% of their creditable compensation. The employer matches the required 1% and will match 100% of the first 1% of voluntary contributions plus 50% of additional voluntary contributions up to the 4% maximum.



Schedule G – Summary of Main Plan Provisions

Creditable Compensation:	Annual salary minus any overtime pay, payments of a temporary nature, or payments for extra duties.
Optional Forms of Payment:	<p>There are optional forms of payment available on an actuarially equivalent basis, as follows:</p> <p>100% Survivor Option:</p> <p>Payable for the member's life. Upon the member's death, 100% of the benefit continues to the contingent annuitant.</p> <p>50% Survivor Option:</p> <p>Upon the member's death, 50% of the benefit continues to the contingent annuitant.</p> <p>Leveling Option:</p> <p>A temporarily increased retirement allowance payable to a date specified by the member and a reduced retirement allowance (on an actuarially equivalent basis) payable after the specified date for the member's remaining lifetime.</p> <p>Partial Lump Sum Option:</p> <p>The member may elect to receive a lump sum payment equal to the sum of 12, 24, or 36 payments of the standard monthly life annuity. The member's monthly benefit will be actuarially reduced to reflect the lump sum payment. The member may then elect to receive the reduced monthly annuity under any of the other optional forms of payment.</p> <p>Actuarial equivalence is based on tables adopted by the Board of Trustees.</p>



Schedule G – State Employees’ Plan Provisions

STATE EMPLOYEES **Plan Specific Benefit Provisions**

Effective Date: March 1, 1952

Type of Plan: VRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered an agent multiple-employer PERS with separate cost-sharing pools for state employees and teachers.

Service: Employees receive credit of one month of service for each month a contribution is made on their behalf to VRS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Average Final Compensation:

Plan 1: The average of the member’s highest 36 consecutive months of salary.

Plan 2 and Hybrid: The average of the member’s highest 60 consecutive months of salary.

Normal Retirement:

Plan 1: Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Employees’ Plan Provisions

Plan 2:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service up to January 1, 2013 plus 1.65% of AFC times years of service from January 1, 2013.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Hybrid:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.00% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Employees’ Plan Provisions

Early Retirement:

Plan 1:

Eligibility:

A member may retire early after reaching age 50 with at least ten years of service credit, or age 55 with credit for at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has credit for thirty years of service at retirement and is at least age 50. For members at least age 55, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is applied for each month that the retirement age precedes 65, or if more favorable, for each month the service at retirement is less than 30. For members younger than 55 at retirement, the reduction factor determined as though the member were 55 is further reduced by multiplying it by a second factor, to reflect a 0.6% reduction for each month retirement precedes age 55.

Payment Form:

Same as for Normal Retirement above.

Plan 2 & Hybrid:

Eligibility:

A member may retire early after reaching age 60 with five years of service, or upon the sum of their age and their service being 90 (Rule of 90).

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor similar to Plan 1. No reduction is applied if the sum of the member’s age and service is equal to 90.

Payment Form:

Same as for Normal Retirement above.



Schedule G – State Employees' Plan Provisions

Disability Retirement - Non-VSDP: Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee:

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)



Schedule G – State Employees’ Plan Provisions

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 65 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 65. If the member dies while disabled before age 65, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Plan 1:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 50 with at least 30 years of service. Reduced benefits may commence at or after age 55 with more than 5 years of service or age 50 with at least 10 years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – State Employees’ Plan Provisions

Plan 2 & Hybrid:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits commence unreduced at Social Security Normal Retirement Age. Reduced benefits may commence on or after age 60 with five years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.



Schedule G – State Employees’ Plan Provisions

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

Plan 1:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.

Plan 2 and Hybrid:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.

Plans 1, 2 & Hybrid:

The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – Teachers’ Plan Provisions

TEACHERS **Plan Specific Benefit Provisions**

Effective Date: March 1, 1952

Type of Plan: VRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered an agent multiple-employer PERS with separate cost-sharing pools for state employees and teachers.

Service: Employees receive credit of one month of service for each month a contribution is made on their behalf to VRS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Average Final Compensation:

Plan 1: The average of the member’s highest 36 consecutive months of salary.

Plan 2 and Hybrid: The average of the member’s highest 60 consecutive months of salary.

Normal Retirement:

Plan 1: Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – Teachers’ Plan Provisions

Plan 2:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service up to January 1, 2013 plus 1.65% of AFC times years of service from January 1, 2013.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Hybrid:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.00% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – Teachers’ Plan Provisions

Early Retirement:

Plan 1:

Eligibility:

A member may retire early after reaching age 50 with at least ten years of service credit, or age 55 with credit for at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has credit for thirty years of service at retirement and is at least age 50. For members at least age 55, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is applied for each month that the retirement age precedes 65, or if more favorable, for each month the service at retirement is less than 30. For members younger than 55 at retirement, the reduction factor determined as though the member were 55 is further reduced by multiplying it by a second factor, to reflect a 0.6% reduction for each month retirement precedes age 55.

Payment Form:

Same as for Normal Retirement above.

Plan 2 and Hybrid:

Eligibility:

A member may retire early after reaching age 60 with five years of service or upon the sum of their age and their service being 90 (Rule of 90).

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor similar to Plan 1. No reduction is applied if the sum of the member’s age and service is equal to 90.

Payment Form:

Same as for Normal Retirement above.



Schedule G – Teachers’ Plan Provisions

Disability Retirement (Plan 1 and Plan 2):

Eligibility:

A member is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- **Workers Compensation Guarantee:**

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- **Special Retirement Allowance Guarantee:**

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)



Schedule G – Teachers’ Plan Provisions

Disability Retirement – VLDP (Hybrid Plan):

Provisions applying to Hybrid members: In lieu of the above benefits, these members will be covered by the Virginia Local Disability Program (VLDP). Under VLDP, these members will receive a deferred benefit payable at normal retirement from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and the date of normal retirement. If the member dies while disabled before normal retirement, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Plan 1:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 50 with at least 30 years of service. Reduced benefits may commence at or after age 55 with more than 5 years of service or age 50 with at least 10 years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – Teachers’ Plan Provisions

Plan 2 and Hybrid:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits commence unreduced at Social Security Normal Retirement Age. Reduced benefits may commence on or after age 60 with five years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.



Schedule G – Teachers’ Plan Provisions

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

Plan 1:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.

Plan 2 and Hybrid:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.

Plans 1, 2 & Hybrid:

The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – State Police Plan Provisions

STATE POLICE
Plan Specific Benefit Provisions

Effective Date:	July 1, 1950
Type of Plan:	SPORS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.
Service:	Employees receive credit of one month of service for each month a contribution is made on their behalf to SPORS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.
Average Final Compensation:	
Plan 1:	The average of the member's highest 36 consecutive months of salary.
Plan 2:	The average of the member's highest 60 consecutive months of salary.
Normal Retirement:	Eligibility: A member may retire upon Normal Retirement on or after age 60 with credit for five years of service. Annual Benefit: 1.85% of average final compensation (AFC) times years of service for retirements on or after July 1, 2007 (1.70% of AFC times years of service for retirements prior to July 1, 2007). Payment Form: Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Police Plan Provisions

Temporary supplement:

A member hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall receive an additional annual retirement allowance of \$13,584 payable from the date of retirement to their Social Security normal retirement age. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period.

Early Retirement:

Eligibility:

A member may retire early after reaching age 50 with at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and reduced by 1/2% for the first 60 months and 4/10% for any additional months of early retirement. This reduction is applied for each month that the retirement age precedes 60, or if more favorable, for each month the service at retirement is less than 25. No reduction applies if the member has credit for 25 years of service at retirement.

Payment Form:

Same as for Normal Retirement above.

Temporary Supplement:

A member hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall receive an additional annual retirement allowance of \$13,584 payable from the date of retirement to their Social Security normal retirement age. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period.



Schedule G – State Police Plan Provisions

Disability Retirement

- Non-VSDP:

Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Monthly Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- **Workers Compensation Guarantee:**

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- **Special Retirement Allowance Guarantee:**

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a



Schedule G – State Police Plan Provisions

lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 60 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 60. If the member dies while disabled before age 60, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 60 or at age 50 with at least 25 years of service. Reduced benefits may commence at or after age 50 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – State Police Plan Provisions

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 50, the member is assumed to be 50 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.



Schedule G – State Police Plan Provisions

Cost-of-Living Increase:

Plan 1:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.
Plan 2:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%. This COLA will be deferred until the date at which the member is eligible for unreduced retirement.
Plans 1 & 2:	The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – Judicial Plan Provisions

JUDICIAL **Plan Specific Benefit Provisions**

Effective Date:

July 1, 1970

Type of Plan:

JRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.

Service:

Appointed or elected
prior to 7/1/2010:

Employees receive credit of one month of service multiplied by a weighting factor of 3.5 (2.5 for judges entering JRS on or after January 1, 1995) for each month a contribution is made on their behalf to JRS. This weighted service is used for all purposes under this plan, including determining a member's vested status, determining whether a member is eligible for retirement, computing early retirement reductions, and computing the amount of the benefit. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Appointed or elected
on and after 7/1/2010:

Employees receive credit of one month of service multiplied by a tiered weighting factor for each month a contribution is made on their behalf to JRS. First term judges under age 45 at the time of appointment/election use a weighing factor of 1.5, judges age 45 – 54 use a weighing factor of 2.0, and judges age 55 and above use a weighing factor of 2.5. This weighted service is used for all purposes under this plan, including determining a member's vested status, determining whether a member is eligible for retirement, computing early retirement reductions, and computing the amount of the benefit. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.



Schedule G – Judicial Plan Provisions

Average Final Compensation:

Plan 1:	The average of the member's highest 36 consecutive months of salary.
Plan 2 and Hybrid:	The average of the member's highest 60 consecutive months of salary.

Normal Retirement:

Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service. The mandatory retirement age for judges is age 73.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service, not to exceed 78% of AFC. For members appointed or elected on or after January 1, 2013, the benefit multiplier is 1.65% and for members appointed or elected on or after January 1, 2014, the benefit multiplier is 1.00%

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Early Retirement:

Eligibility:

A member may retire early after reaching age 55 with credit for five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has reached age 60 and has credit for 30 or more years of creditable service. For other members, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is measured



Schedule G – Judicial Plan Provisions

from the later of age 60 and the point at which the member would have earned 30 years of service, or if more favorable, from age 65.

Payment Form:

Same as for Normal Retirement above.

Disability Retirement:

Eligibility:

A member is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit (1.65% if appointed or elected on or after January 1, 2013 and 1.00% if appointed or elected on or after January 1, 2014). Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.



Schedule G – Judicial Plan Provisions

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 60 with at least 30 years of service. Reduced benefits may commence at or after age 55 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – Judicial Plan Provisions

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 8(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits, and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.



Schedule G – Judicial Plan Provisions

Cost-of-Living Increase:

Plan 1:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.
Plan 2 and Hybrid:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.
Plans 1, 2 & Hybrid:	The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – Virginia Law Officers’ Plan Provisions

VIRGINIA LAW OFFICERS Plan Specific Benefit Provisions

Effective Date: October 1, 1999

Type of Plan: VaLORS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.

Service: Employees receive credit of one month of service for each month a contribution is made on their behalf to VaLORS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Average Final Compensation:

Plan 1: The average of the member’s highest 36 consecutive months of salary.

Plan 2: The average of the member’s highest 60 consecutive months of salary.

Normal Retirement: Eligibility:

A member may retire upon Normal Retirement on or after age 60 with credit for five years of service.

Annual Benefit:

For all employees hired on or after July 1, 2001, the benefit is calculated as 2.00% of average final compensation (AFC) times years of service.

Employees hired before July 1, 2001, must make a one-time election to receive benefits under (i) or (ii) below:

(i) 1.70% of average final compensation (AFC) times years of service plus the temporary supplement described in 5(d).

(ii) 2.00% of average final compensation (AFC) times years of service and no temporary supplement.



Schedule G – Virginia Law Officers' Plan Provisions

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Temporary supplement:

Temporary Supplement: A member who is hired before July 1, 2001, and who was either (i) hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or (ii) a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall be eligible to receive an additional annual retirement allowance of \$13,584 payable from the date of retirement to age 65. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period. The eligible employee must have made a one-time election to receive benefits under b(i) to receive this supplement.

Early Retirement:

Eligibility:

A member may retire early after reaching age 50 with credit for five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and reduced by 0.5% per month for the first 60 months and 0.4% per month for any additional months of early retirement. This reduction is applied for each month that the retirement age precedes 60, or if more favorable, for each month the service at retirement is less than 25. No reduction applies if the member has credit for 25 years of service at retirement.

Payment Form:

Same as for Normal Retirement above.



Schedule G – Virginia Law Officers’ Plan Provisions

Temporary Supplement:

Temporary Supplement: A member who is hired before July 1, 2001, and who was either (i) hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or (ii) a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall be eligible to receive an additional annual retirement allowance or \$13,584 payable from the date of retirement to age 65. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period. The eligible employee must have made a one-time election to receive benefits under 5(b)(i) to receive this supplement.

Disability Retirement - Non-VSDP:

Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Monthly Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee:

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.



Schedule G – Virginia Law Officers’ Plan Provisions

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 60 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 60. If the member dies while disabled before age 60, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 60 or at age 50 with at least 25 years of service.



Schedule G – Virginia Law Officers’ Plan Provisions

Reduced benefits may commence at or after age 50 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 50, the member is assumed to be 50 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit.



Schedule G – Virginia Law Officers' Plan Provisions

If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

- | | |
|--------------|--|
| Plan 1: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%. |
| Plan 2: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%. |
| Plans 1 & 2: | The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service. |



Schedule G – Summary of Plan Changes

Summary of Plan Changes

1996 Valuation

1. Any member with at least 25 years of service may purchase prior service credit for a) active duty military service in the armed forces of the United States, b) certified creditable service in the retirement system of another state, or c) both at the rate of 5% of current compensation or average final compensation, if greater, times years of service purchased.
2. VRS may enter into an agreement with any political subdivision of the Commonwealth of Virginia which has a defined benefit plan that is not supplemental to VRS to permit portability of service credit on a cost-neutral basis.
3. Early retirement is allowed at age 50 with 10 years of service. The early retirement benefit is determined as if the member is age 55 (but using actual service and AFC) reduced by 0.6% for each month the member is younger than age 55. This benefit can be no smaller than the value of the member's contributions and interest paid in monthly installments over the member's lifetime.
4. The service multiplier for judges entering the Retirement System after January 1, 1995 is 2.5.
5. Effective 7/1/98, a health credit of \$1.50 per month per year of service (up to 30 years) is automatically provided to teachers in VRS who retire with at least 15 years of service. An additional credit of \$1.00 per month per year of service (up to 30 years) can be provided.

1998 Valuation

1. Effective January 1, 1999, the retirement benefit became 1.7% of average final pay times years of service. The 3% benefit adjustment was eliminated for future retirees. A 1.6% ad hoc benefit increase was provided for all retirees and beneficiaries receiving benefits as of December 31, 1999.
2. On January 1, 1999, the Virginia Sickness and Disability Program became effective. All future new members will be covered by this program, and will only receive a deferred retirement benefit from VRS. Members joining before 1999 were allowed to make a one-time irrevocable election to join this program. (Applies to State Employees and State Police.)
3. Effective July 1, 1999, state employees, teachers and employees of participating local units that had not elected out of this benefit may retire with an unreduced benefit if they are at least 50 years old and they have earned at least 30 years of service.

1999 Valuation

1. 100% Joint and Survivor Option is payable in the case of death of a member who dies while in active service.
2. 100% Joint and Survivor Option is payable for disability retirement.



Schedule G – Summary of Plan Changes

2000 Valuation

1. On October 1, 1999, the Virginia Law Officers' Retirement System (VaLORS) became effective.
2. The Board of Trustees adopted the use of a "pooled" contribution rate for State Employees and Teachers.

2001 Valuation

1. The State Police System had their temporary supplement starting at retirement extended from age 65 to their Social Security Retirement Age.
2. VaLORS changed their benefit multiplier from 1.70% to 2.00% of pay with no temporary supplement for all new hires and rehires after July 1, 2001 as well as for current participants who have made an election to change formulas.
3. The Partial Lump Sum Option was added as an additional optional form of payment. This option provides the retiring member with a lump sum payment equal to the sum of 12, 24, or 36 payments of the standard monthly life annuity. The member's monthly annuity is actuarially reduced to reflect the lump sum payment.

2003 Valuation

No actuarially material changes were made to the plan provisions. Listed below are the two minor changes of note.

1. School superintendents with five years of service may now purchase an additional ten years of out-of-state service. The superintendent must not be eligible for an out-of-state benefit.
2. The leveling option was restored as an optional form of payment. Benefits may be leveled to age 62 or older, and the benefit cannot reduce more than 50%. Any COLAs are calculated on the basic benefit amount.

2007 Valuation

The State Police changed their benefit multiplier from 1.70% to 1.85% of pay.



Schedule G – Summary of Plan Changes

2011 Valuation

In 2010, VRS adopted a second retirement plan. All employees hired on or after July 1, 2010 are automatically enrolled in this plan. The differences between Plan 1 and Plan 2 are listed below:

1. The Average Final Compensation is now based on the highest 60 consecutive months of service.
2. The Cost of Living Adjustment was adjusted to be the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 10%, with the maximum cost-of-living increases of 6%.
3. The Normal Retirement Age is Social Security Normal Retirement Age plus five years of service. A member is eligible for unreduced early retirement when the sum of his or her age plus years of service is 90 (Rule of 90). Eligibility for reduced early retirement is at age 60 with five years of service.
4. Judges service weight has been changed. For first term judges less than age 45 the service weight is 1.5; for judges age 45 – 54 the service weight is 2.0; finally, for judges age 55 and above the service weight is 2.5.

The State Employees Plan and the Teachers Plan adopted changes 1, 2, and 3 listed above. The State Police Plan and the Virginia Law Officers Plan adopted changes 1 and 2 listed above. The Judicial Plan adopted changes 1, 2, and 4

2012 Valuation

In, 2012 HB 1130 / SB 498 was enacted and will go into effect on January 1, 2013. A summary of this bill is listed below:

1. Active non-vested members in Plan 1 will have their Average Final Compensation based on the highest 60 consecutive months of service instead of the highest 36 consecutive months of service. This provision applies to all plans.
2. Active non-vested members in Plan 1 and all Plan 2 members will accrue benefits at 1.65% as of the effective date. This provision applies only to the State and Teacher Plans as well as members in political subdivision plans not covered by hazardous duty benefits members.
3. Active members in the Judicial plan hired after January 1, 2013 will accrue benefits at 1.65%.
4. Active non-vested members in Plan 1 will now have to satisfy the Rule of 90 (sum of age and service at least 90) or reach their Social Security Normal Retirement Age to be eligible for Unreduced Retirement. These same members must attain age 60 with five years of service to be eligible for Early Retirement. This provision applies only to the State and Teachers Plans as well as members in political subdivision plans not covered by hazardous duty benefits members.



Schedule G – Summary of Plan Changes

5. Active non-vested members in Plan 1 and all Plan 2 members will only be able to receive a maximum COLA of 3%. This provision applies to all plans.
6. All active employees not within five years of eligibility for unreduced retirement as of January 1, 2013 and retiring with less than 20 years of service will have their COLA deferred to one year after their unreduced retirement date after beginning to receive benefits. All active employees within five years of eligibility for unreduced retirement as of January 1, 2013 are grandfathered into the old provisions with no deferral of the COLA.

2014 Valuation

The 2014 valuation includes Hybrid Plan members for the first time. The Hybrid Plan covers eligible employees hired on or after January 1, 2014 in the State, Teachers and Judicial plans. The Hybrid Plan does not apply to members in the State Police and VaLORS plans. The Hybrid Plan consists of defined benefit plan and defined contribution plan components.

Defined benefit plan component

The benefits under the defined benefit plan are similar to Plan 2 benefits except that the benefit accrual rate is 1.00% under the Hybrid Plan.

Defined contribution plan component

Active members in the Hybrid Plan are required to contribute 1% of their creditable compensation per year to the defined contribution component of the Hybrid Plan. Active members can make voluntary additional contributions of up 4% of their creditable compensation. The maximum employee contribution is 5% of pay.

Employers are also required to contribute 1% of pay to the defined contribution component for members in the Hybrid Plan. In addition, employers match the employee's first 1% of voluntary contributions and 0.5% match for each additional 1% of voluntary employee contributions. The maximum employer contribution is 3.5% of pay of members in the defined contribution component of the Hybrid Plan.

2015 Valuation

The mandatory retirement age for Judges was increased from age 70 to age 73.



Schedule H – Schedules of Active Member Data

**STATE EMPLOYEES
As of June 30, 2018**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	54	0	0	0	0	0	0	54	\$ 1,338,710
20 to 24	1,742	5	0	0	0	0	0	1,747	\$ 59,348,423
25 to 29	4,624	535	11	0	0	0	0	5,170	\$ 211,630,331
30 to 34	4,311	1,866	588	9	0	0	0	6,774	\$ 327,293,938
35 to 39	3,633	2,044	1,744	367	7	0	0	7,795	\$ 414,725,559
40 to 44	2,870	1,821	1,775	1,030	294	12	0	7,802	\$ 439,408,777
45 to 49	2,716	1,834	1,948	1,392	959	406	23	9,278	\$ 539,066,137
50 to 54	2,417	1,700	1,953	1,509	1,112	1,184	696	10,571	\$ 612,089,080
55 to 59	1,938	1,542	1,923	1,577	1,146	1,406	1,991	11,523	\$ 674,001,140
60	279	284	339	285	214	240	481	2,122	\$ 127,069,578
61	230	264	330	287	216	232	535	2,094	\$ 128,118,947
62	211	210	316	236	194	240	434	1,841	\$ 111,314,067
63	178	214	277	224	183	197	453	1,726	\$ 106,442,501
64	134	132	255	226	169	148	405	1,469	\$ 93,838,715
65	94	144	203	151	129	136	342	1,199	\$ 77,578,008
66	63	78	134	125	80	86	232	798	\$ 52,325,561
67	55	99	112	90	80	72	174	682	\$ 44,291,817
68	28	54	82	79	52	41	146	482	\$ 33,031,099
69	25	36	61	60	31	45	106	364	\$ 26,238,158
70 & Over	62	81	165	150	99	106	428	1,091	\$ 82,771,275
Total	25,664	12,943	12,216	7,797	4,965	4,551	6,446	74,582	\$ 4,161,921,821

Average Age: 48.04

Average Service: 12.10



Schedule H – Schedules of Active Member Data

TEACHERS
As of June 30, 2018

Attained Age	Completed Years of Service								Payroll*
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	21	0	0	0	0	0	0	21	\$ 570,601
20 to 24	3,782	2	0	0	0	0	0	3,784	\$ 151,276,290
25 to 29	12,035	3,410	9	0	0	0	0	15,454	\$ 698,112,120
30 to 34	6,385	7,786	2,798	11	0	0	0	16,980	\$ 830,501,356
35 to 39	4,770	3,918	7,577	2,299	9	0	0	18,573	\$ 978,895,803
40 to 44	4,514	3,088	4,286	5,389	1,407	5	0	18,689	\$ 1,027,726,896
45 to 49	4,414	3,493	4,316	4,264	4,365	1,282	7	22,141	\$ 1,252,709,306
50 to 54	3,316	2,925	4,167	3,593	2,455	2,957	919	20,332	\$ 1,142,205,228
55 to 59	2,258	2,079	3,593	3,692	2,284	1,893	2,376	18,175	\$ 1,003,243,372
60	296	303	605	588	454	366	482	3,094	\$ 176,091,514
61	234	272	486	625	440	345	505	2,907	\$ 164,355,740
62	203	209	410	510	374	351	396	2,453	\$ 138,666,082
63	158	165	330	475	346	287	390	2,151	\$ 126,173,369
64	137	158	299	414	304	263	288	1,863	\$ 110,280,236
65	100	109	238	277	246	188	279	1,437	\$ 85,200,281
66	84	79	196	208	132	137	206	1,042	\$ 61,136,779
67	58	67	108	138	101	81	135	688	\$ 39,764,855
68	41	43	78	91	60	51	106	470	\$ 27,313,618
69	25	32	71	73	51	58	75	385	\$ 21,946,606
70 & Over	93	88	153	189	111	105	207	946	\$ 50,762,632
Total	42,924	28,226	29,720	22,836	13,139	8,369	6,371	151,585	\$ 8,086,932,684

Average Age: 45.12

Average Service: 11.84

* Actual annual compensation provided by VRS.



Schedule H – Schedules of Active Member Data

**STATE POLICE
As of June 30, 2018**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	0	0	0	0	0	0	0	0	\$ -
20 to 24	67	0	0	0	0	0	0	67	\$ 3,226,655
25 to 29	180	100	0	0	0	0	0	280	\$ 14,455,385
30 to 34	66	120	64	0	0	0	0	250	\$ 13,828,988
35 to 39	30	57	137	65	0	0	0	289	\$ 17,955,509
40 to 44	12	21	58	122	44	0	0	257	\$ 17,361,157
45 to 49	9	23	36	76	118	19	0	281	\$ 20,185,356
50 to 54	1	15	25	22	43	96	43	245	\$ 19,981,043
55 to 59	3	12	8	11	12	25	64	135	\$ 11,659,178
60	0	0	0	3	2	1	15	21	\$ 1,910,471
61	0	0	0	1	2	1	16	20	\$ 2,024,461
62	0	0	1	1	2	0	9	13	\$ 1,191,443
63	0	0	1	1	0	0	8	10	\$ 932,835
64	0	0	0	0	0	0	2	2	\$ 223,731
65	0	0	0	1	0	0	4	5	\$ 463,898
66	0	0	0	0	0	0	3	3	\$ 352,687
67	0	0	0	0	0	0	5	5	\$ 560,826
68	0	0	0	0	0	0	1	1	\$ 111,449
69	0	0	0	0	0	0	1	1	\$ 97,813
70 & Over	0	0	0	0	0	0	0	0	\$ -
Total	368	348	330	303	223	142	171	1,885	\$ 126,522,885

Average Age: 41.49

Average Service: 14.51



Schedule H – Schedules of Active Member Data

JUDICIAL
As of June 30, 2018

Attained Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	0	0	0	0	0	0	0	0	\$ -
20 to 24	0	0	0	0	0	0	0	0	\$ -
25 to 29	0	0	0	0	0	0	0	0	\$ -
30 to 34	0	0	0	0	0	0	0	0	\$ -
35 to 39	6	0	0	0	0	0	0	6	\$ 924,102
40 to 44	13	2	0	0	0	0	0	15	\$ 2,361,564
45 to 49	21	12	7	0	0	0	0	40	\$ 6,430,706
50 to 54	23	26	9	7	0	0	0	65	\$ 10,414,964
55 to 59	30	17	16	13	6	1	0	83	\$ 13,485,744
60	6	1	7	2	2	1	0	19	\$ 3,090,740
61	3	7	8	2	2	1	0	23	\$ 3,777,325
62	3	7	6	7	1	0	0	24	\$ 3,929,271
63	4	6	4	3	0	1	0	18	\$ 2,943,370
64	6	2	4	4	4	0	0	20	\$ 3,257,337
65	3	1	3	5	2	2	1	17	\$ 2,789,319
66	1	7	2	5	4	3	1	23	\$ 3,764,730
67	2	6	5	2	2	2	0	19	\$ 3,093,740
68	0	1	2	3	0	1	0	7	\$ 1,167,511
69	0	2	1	3	4	1	0	11	\$ 1,784,393
70 & Over	1	2	5	5	8	3	2	26	\$ 4,209,678
Total	122	99	79	61	35	16	4	416	\$ 67,424,494

Average Age: 58.91

Average Service: 10.47



Schedule H – Schedules of Active Member Data

**VIRGINIA LAW OFFICERS
As of June 30, 2018**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	50	0	0	0	0	0	0	50	\$ 1,540,105
20 to 24	888	4	0	0	0	0	0	892	\$ 29,429,157
25 to 29	1,240	209	4	0	0	0	0	1,453	\$ 51,187,859
30 to 34	660	297	191	2	0	0	0	1,150	\$ 43,345,879
35 to 39	420	204	302	60	5	0	0	991	\$ 38,945,598
40 to 44	286	163	254	211	117	2	0	1,033	\$ 43,231,232
45 to 49	228	160	257	234	282	62	2	1,225	\$ 53,046,984
50 to 54	162	114	221	182	150	56	22	907	\$ 39,960,018
55 to 59	88	84	169	138	104	25	22	630	\$ 27,568,544
60	14	14	25	18	19	3	3	96	\$ 4,175,570
61	9	12	21	18	10	7	5	82	\$ 3,776,144
62	7	8	12	12	7	0	6	52	\$ 2,323,249
63	5	5	9	8	7	1	3	38	\$ 1,646,214
64	5	5	10	9	5	2	7	43	\$ 2,197,128
65	2	2	7	2	4	1	4	22	\$ 1,068,962
66	3	1	7	3	1	1	3	19	\$ 888,574
67	1	2	3	3	0	0	1	10	\$ 440,309
68	1	1	2	1	0	1	0	6	\$ 323,935
69	1	0	0	0	1	0	1	3	\$ 140,087
70 & Over	0	1	6	3	2	1	3	16	\$ 870,425
Total	4,070	1,286	1,500	904	714	162	82	8,718	\$ 346,105,973

Average Age: 39.75

Average Service: 8.50



Schedule I – Schedules of Retiree and Beneficiary Data

RETIREE AND BENEFICIARY DATA
As of June 30, 2018

Employer	Prior Year Total Retirees and Beneficiaries	Retirees and Beneficiaries		Current Year Total Retirees and Beneficiaries	Current Annual Allowances (000s)	Prior Annual Allowances (000s)	% Increase in Annual Allowances	Average Annual Allowances	Prior Year Average Annual Allowances	% Increase in Average Annual Allowances
		Added	Removed							
State	55,668	3,448	1,943	57,173	\$1,291,501	\$1,223,849	5.5%	\$ 22,589	\$ 21,985	2.7%
Teacher	86,997	5,030	1,997	90,030	2,202,632	2,090,205	5.4%	24,466	24,026	1.8%
Political	51,438	4,155	1,678	53,915	1,003,716	927,567	8.2%	18,617	18,033	3.2%
Total VRS	194,103	12,633	5,618	201,118	\$ 4,497,849	\$4,241,621	6.0%	\$ 22,364	\$ 21,852	2.3%
State Police	1,346	63	29	1,380	57,572	55,248	4.2%	41,719	41,046	1.6%
ValORS	4,413	422	74	4,761	103,588	95,607	8.3%	21,758	21,665	0.4%
Judicial	520	22	16	526	41,562	40,657	2.2%	79,015	78,187	1.1%
Totals	200,382	13,140	5,737	207,785	\$ 4,700,571	\$4,433,133	6.0%	\$ 22,622	\$ 22,123	2.3%

CHANGE IN ALLOWANCES FOR RETIREES AND BENEFICIARIES
As of June 30, 2018

	Prior Year Annual Allowances	COLA	Additions	Deletions	Current Year Annual Allowances
State	\$ 1,223,849	\$ 26,067	\$ 81,250	\$ 39,665	\$ 1,291,501
Teacher	2,090,205	44,520	113,465	45,558	2,202,632
Political	927,567	19,757	84,293	27,901	1,003,716
Total VRS	\$ 4,241,621	\$ 90,344	\$ 279,008	\$ 113,124	\$ 4,497,849
State Police	55,248	1,177	2,765	1,618	57,572
ValORS	95,607	2,036	9,529	3,584	103,588
Judges	40,657	866	1,576	1,537	41,562
Totals	\$ 4,433,133	\$ 94,423	\$ 292,878	\$ 119,863	\$ 4,700,571