# VIRGINIA RETIREMENT SYSTEM
# STATE EMPLOYEE RETIREMENT PLAN

## GASB No. 68 Schedules

## With Independent Auditor’s Report Thereon

## For the Fiscal Year Ended June 30, 2017

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Commonwealth of Virginia

*Auditor of Public Accounts*

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July 12, 2018

Board of Trustees
Virginia Retirement System
1200 E. Main Street
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## INDEPENDENT AUDITOR'S REPORT

**Report on the Schedules**

We have audited the accompanying schedule of employer allocations of the Virginia Retirement System State Employee Retirement Plan, as of and for the year ended June 30, 2017, and the related notes. Fort Monroe Authority (the Authority) and the Virginia Commonwealth University Health System Authority (the University Authority) are participating employers of the Virginia Retirement System State Employee Retirement Plan. We have also audited the total for all state employers of the columns titled net pension liability, total pension expense, total deferred outflows of resources, and total deferred inflows of resources (specified column totals) included in the accompanying schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer of the Virginia Retirement System State Employee Retirement Plan, as of and for the year ended June 30, 2017, and the related notes.

*Management's Responsibility for the Schedule*

The Virginia Retirement System's management is responsible for the preparation and fair presentation of these schedules in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the schedules that are free from material misstatement, whether due to fraud or error.

*Auditor's* Responsibility

Our responsibility is to express opinions on the schedule of employer allocations and the specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule of employer allocations and specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the schedule of employer allocations and the specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the schedule of employer allocations and the specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the schedule of employer allocations and the specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by the Virginia Retirement System management, as well as evaluating the overall presentation of the schedule of employer allocations and the specified column totals included in the schedule of net pension liability and total pension expense and the schedule of deferred outflows and deferred inflows of resources by employer.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

*Opinions*

In our opinion, the schedules referred to above present fairly, in all material respects, the employer allocations, the net pension liability, total deferred outflows of resources, total deferred inflows of resources, and total pension expense for the total of all participating state employers for the Virginia Retirement System State Employee Retirement Plan as of and for the year ended June 30, 2017, in accordance with accounting principles generally accepted in the United States of America.

*Other Matter*

We have audited, in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States, the financial statements of the Virginia Retirement System as of and for the year ended June 30, 2017, and our report thereon, dated December 15, 2017, expressed an unmodified opinion on those financial statements.

*Restriction on Use*

Our report is intended solely for the information and use of the Virginia Retirement System management, the Virginia Retirement System Board of Trustees, the Commonwealth Joint Legislative Audit and Review Commission, and the Authority's and the University Authority's management and their auditors and is not intended to be and should not be used by anyone other than these specified parties.

Staci A. Henshaw

AUDITOR OF PUBLIC ACCOUNTS

ZLB/clj

# Virginia Retirement System
# VRS State Employee Retirement Plan
# Schedule of Employer Allocations
# For the Fiscal Year Ended June 30, 2017

| Employer Code | Employer | | Employer Contributions | Employer Allocation Percentage |
|---|---|---|---|---|
| 30206 | MCV HOSPITALS AUTHORITY | $ | 3,924,152 | 0.74418% |
| 35885 | FORT MONROE AUTHORITY | | 165,541 | 0.03139% |
| | ALL OTHER STATE AGENCIES | | 523,222,966 | 99.22443% |
| | Total for all State Employers | $ | 527,312,659 | 100.00000% |

The accompanying notes are an integral part of the Schedule of Employer Allocations.

# Virginia Retirement System
# VRS State Employee Retirement Plan
# Schedule of Net Pension Liability and Total Pension Expense
# As of and For the Fiscal Year Ended June 30, 2017

(Dollars in Thousands)

| Employer Code | Employer | | Net Pension Liability June 30, 2017 | Total Pension Expense FY 2017 |
|---|---|---|---|---|
| 30206 | MCV HOSPITALS AUTHORITY | $ | 43,367 | $ (1,999) |
| 35885 | FORT MONROE AUTHORITY | | 1,830 | 116 |
| | ALL OTHER STATE AGENCIES | | 5,782,327 | 399,403 |
| | Total for all State Employers | $ | 5,827,524 | $ 397,520 |

The accompanying notes are an integral part of the Schedule of Net Pension Liability and Total Pension Expense.

# Virginia Retirement System
# VRS State Employee Retirement Plan
# Schedule of Deferred Outflows and Deferred Inflows of Resources by Employer
# As of June 30, 2017

(Dollars in Thousands)

| | | Deferred Outflows of Resources | | | | | Deferred Inflows of Resources | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Employer Code | Employer | Differences Between Expected and Actual Experience | Net Difference Between Projected and Actual Earnings on Pension Plan Investments | Change of Assumptions | Changes In Proportionate Share | Total Deferred Outflows of Resources | Differences Between Expected and Actual Experience | Net Difference Between Projected and Actual Earnings on Pension Plan Investments | Change of Assumptions | Changes In Proportionate Share | Total Deferred Inflows of Resources |
| 30206 | MCV HOSPITALS AUTHORITY | $ 92 | $ - | $ 421 | $ - | $ 513 | $ 1,312 | $ 1,853 | $ - | $ 5,612 | $ 8,777 |
| 35885 | FORT MONROE AUTHORITY | 4 | - | 18 | 27 | 49 | 56 | 78 | - | 132 | 266 |
| | ALL OTHER STATE AGENCIES | 12,268 | - | 56,165 | 138,801 | 207,234 | 175,082 | 247,010 | - | 133,084 | 555,176 |
| | Total for all State Employers | $ 12,364 | $ - | $ 56,604 | $ 138,828 | $ 207,796 | $ 176,450 | $ 248,941 | $ - | $ 138,828 | $ 564,219 |

The accompanying notes are an integral part of the Schedule of Deferred Outflows and Deferred Inflows of Resources by Employer.

## ***Note 1. Summary of Significant Accounting Policies***

### *Description of the Entity*

The Virginia Retirement System (the System) is an independent agency of the Commonwealth of Virginia. The System administers four separate pension trust funds – the Virginia Retirement System (VRS), the State Police Officers' Retirement System (SPORS), the Virginia Law Officers' Retirement System (VaLORS), and the Judicial Retirement System (JRS). The VRS State Employee Retirement Plan is part of the VRS Trust Fund.

### *Administration and Management*

The Board of Trustees (the Board) is responsible for the general administration and operation of the defined benefit pension plans and the other employee benefit plans. The Board has full power to invest and reinvest the trust funds of the System through the adoption of investment policies and guidelines that fulfill the Board's investment objective to maximize long-term investment returns while targeting an acceptable level of risk.

The Board consists of nine members. Five members are appointed by the Governor and four members are appointed by the Joint Rules Committee of the General Assembly subject to confirmation by the General Assembly. The Board appoints a Director to serve as the Chief Administrative Officer of the System and a Chief Investment Officer to direct, manage, and administer the investment of the System's funds.

The System issues a Comprehensive Annual Financial Report (CAFR) containing the financial statements and required supplementary information for all of the System's pension and other employee benefit trust funds. The CAFR is publically available through the About VRS link on the VRS website at *www.varetire.org*, or a copy may be obtained by submitting a request to the VRS Chief Financial Officer, PO Box 2500, Richmond, VA 23218-2500. The pension and other employee benefit trust funds administered by the VRS are classified as fiduciary funds and are included in the basic financial statements of the Commonwealth of Virginia.

### *Pensions*

For purposes of measuring the net pension liability, deferred outflows of resources and deferred inflows of resources related to pensions, and pension expense, information about the fiduciary net position of the Virginia Retirement System (VRS) State Employee Plan and the additions to/deductions from the VRS State Employee Retirement Plan's net fiduciary position have been determined on the same basis as they were reported by VRS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

## ***Note 2. General Information about the Pension Plan***

### ***Plan Description***

All full-time, salaried permanent employees of state agencies are automatically covered by the VRS State Employee Retirement Plan upon employment. This plan is administered by the Virginia Retirement System (the System) along with plans for other employer groups in the Commonwealth of Virginia. The State Employee Retirement Plan is a single employer plan treated as a cost-sharing employer plan for financial reporting purposes. Members earn one month of service credit for each month they are employed and for which they and their employer pay contributions to VRS. Members are eligible to purchase prior service, based on specific criteria a defined in the *Code of Virginia*, as amended. Eligible prior service that may be purchased includes prior public service, active military service, certain periods of leave, and previously refunded service.

The System administers three different benefit structures for covered employees in the VRS State Employee Retirement Plan – Plan 1, Plan 2, and, Hybrid. Each of these benefit structures has different eligibility criteria. The specific information for each plan, and the eligibility for covered groups within each plan are set out in the table below:

| RETIREMENT PLAN PROVISIONS BY PLAN STRUCTURE | | |
|---|---|---|
| **PLAN 1** | **PLAN 2** | **HYBRID RETIREMENT PLAN** |
| **About Plan 1**<br>Plan 1 is a defined benefit plan. The retirement benefit is based on a member's age, creditable service and average final compensation at retirement using a formula. | **About Plan 2**<br>Plan 2 is a defined benefit plan. The retirement benefit is based on a member's age, creditable service and average final compensation at retirement using a formula. | **About the Hybrid Retirement Plan**<br>The Hybrid Retirement Plan combines the features of a defined benefit plan and a defined contribution plan.<br>• The defined benefit is based on a member's age, creditable service and average final compensation at retirement using a formula.<br>• The benefit from the defined contribution component of the plan depends on the member and employer contributions made to the plan and the |

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| | | investment performance of those contributions.<br>• In addition to the monthly benefit payment payable from the defined benefit plan at retirement, a member may start receiving distributions from the balance in the defined contribution account, reflecting the contributions, investment gains or losses, and any required fees. |
| **Eligible Members**<br>Employees are in Plan 1 if their membership date is before July 1, 2010, and they were vested as of January 1, 2013 and they have not taken a refund.<br><br>**Hybrid Opt-In Election**<br>VRS Plan 1 members were allowed to make an irrevocable decision to opt into the Hybrid Retirement Plan during a special election window held January 1 through April 30, 2014.<br><br>The Hybrid Retirement Plan's effective date for eligible Plan 1 members who opted in was July 1, 2014.<br><br>If eligible deferred members returned to work during the election window, they were also eligible to opt into the Hybrid Retirement Plan. | **Eligible Members**<br>Employees are in Plan 2 if their membership date is on or after July 1, 2010, or their membership date is before July 1, 2010, and they were not vested as of January 1, 2013.<br><br>**Hybrid Opt-In Election**<br>Eligible Plan 2 members were allowed to make an irrevocable decision to opt into the Hybrid Retirement Plan during a special election window held January 1 through April 30, 2014.<br><br>The Hybrid Retirement Plan's effective date for eligible Plan 2 members who opted in was July 1, 2014.<br><br>If eligible deferred members returned to work during the election window, they were also eligible to opt into the Hybrid Retirement Plan. | **Eligible Members**<br>Employees are in the Hybrid Retirement Plan if their membership date is on or after January 1, 2014. This includes:<br>• State employees<br>• Members in Plan 1 or Plan 2 who elected to opt into the plan during the election window held January 1-April 30, 2014; the plan's effective date for opt-in members was July 1, 2014 |
| **Retirement Contributions**<br>Employees contribute 5% of their compensation each | **Retirement Contributions**<br>Employees contribute 5% of their compensation each month to | **Retirement Contributions**<br>A member's retirement benefit is funded through mandatory |

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| month to their member contribution account through a pre-tax salary reduction. Member contributions are tax-deferred until they are withdrawn as part of a retirement benefit or as a refund. The employer makes a separate actuarially determined contribution to VRS for all covered employees. VRS invests both member and employer contributions to provide funding for the future benefit payment. | their member contribution account through a pre-tax salary reduction. Some school divisions elected to phase in the required 5% member contribution. | and voluntary contributions made by the member and the employer to both the defined benefit and the defined contribution components of the plan. Mandatory contributions are based on a percentage of the employee's creditable compensation and are required from both the member and the employer. Additionally, members may choose to make voluntary contributions to the defined contribution component of the plan, and the employer is required to match those voluntary contributions according to specified percentages. |
| **Creditable Service**<br>Creditable service includes active service. Members earn creditable service for each month they are employed in a covered position. It also may include credit for prior service the member has purchased or additional creditable service the member was granted. A member's total creditable service is one of the factors used to determine their eligibility for retirement and to calculate their retirement benefit. It also may count toward eligibility for the health insurance credit in retirement, if the employer offers the health insurance credit. | **Creditable Service**<br>Same as Plan 1. | **Creditable Service**<br>**<u>Defined Benefit Component:</u>**<br>Under the defined benefit component of the plan, creditable service includes active service. Members earn creditable service for each month they are employed in a covered position. It also may include credit for prior service the member has purchased or additional creditable service the member was granted. A member's total creditable service is one of the factors used to determine their eligibility for retirement and to calculate their retirement benefit. It also may count toward eligibility for the health insurance credit in retirement, if the employer offers the health insurance credit. |

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| | | <u>**Defined Contributions Component:**</u><br>Under the defined contribution component, creditable service is used to determine vesting for the employer contribution portion of the plan. |
| **Vesting**<br>Vesting is the minimum length of service a member needs to qualify for a future retirement benefit. Members become vested when they have at least five years (60 months) of creditable service. Vesting means members are eligible to qualify for retirement if they meet the age and service requirements for their plan. Members also must be vested to receive a full refund of their member contribution account balance if they leave employment and request a refund.<br><br>Members are always 100% vested in the contributions that they make. | **Vesting**<br>Same as Plan 1. | **Vesting**<br><u>**Defined Benefit Component:**</u><br>Defined benefit vesting is the minimum length of service a member needs to qualify for a future retirement benefit. Members are vested under the defined benefit component of the Hybrid Retirement Plan when they reach five years (60 months) of creditable service. Plan 1 or Plan 2 members with at least five years (60 months) of creditable service who opted into the Hybrid Retirement Plan remain vested in the defined benefit component.<br><br><u>**Defined Contributions Component:**</u><br>Defined contribution vesting refers to the minimum length of service a member needs to be eligible to withdraw the employer contributions from the defined contribution component of the plan.<br><br>Members are always 100% vested in the contributions that they make.<br><br>Upon retirement or leaving covered employment, a member is eligible to withdraw a percentage of employer contributions to the defined |

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| | | contribution component of the plan, based on service.<br>• After two years, a member is 50% vested and may withdraw 50% of employer contributions.<br>• After three years, a member is 75% vested and may withdraw 75% of employer contributions.<br>• After four or more years, a member is 100% vested and may withdraw 100% of employer contributions.<br><br>Distribution is not required by law until age 70½. |
| **Calculating the Benefit**<br>The Basic Benefit is calculated based on a formula using the member's average final compensation, a retirement multiplier and total service credit at retirement. It is one of the benefit payout options available to a member at retirement.<br><br>An early retirement reduction factor is applied to the Basic Benefit if the member retires with a reduced retirement benefit or selects a benefit payout option other than the Basic Benefit. | **Calculating the Benefit**<br>See definition under Plan 1. | **Calculating the Benefit**<br>**Defined Benefit Component:**<br>See definition under Plan 1<br><br>**Defined Contribution Component:**<br>The benefit is based on contributions made by the member and any matching contributions made by the employer, plus net investment earnings on those contributions. |
| **Average Final Compensation**<br>A member's average final compensation is the average of the 36 consecutive months of | **Average Final Compensation**<br>A member's average final compensation is the average of their 60 consecutive months of | **Average Final Compensation**<br>Same as Plan 2. It is used in the retirement formula for the defined benefit component of the plan. |

| | | |
|---|---|---|
| highest compensation as a covered employee. | highest compensation as a covered employee. | |
| **Service Retirement Multiplier**<br>The retirement multiplier is a factor used in the formula to determine a final retirement benefit. The retirement multiplier for members is 1.70%. | **Service Retirement Multiplier**<br>Same as Plan 1 for service earned, purchased or granted prior to January 1, 2013. The retirement multiplier is 1.65% for creditable service earned, purchased or granted on or after January 1, 2013. | **Service Retirement Multiplier**<br>**<u>Defined Benefit Component:</u>**<br>The retirement multiplier for the defined benefit component is 1.00%.<br><br>For members who opted into the Hybrid Retirement Plan from Plan 1 or Plan 2, the applicable multipliers for those plans will be used to calculate the retirement benefit for service credited in those plans.<br><br>**<u>Defined Contribution Component:</u>**<br>Not applicable. |
| **Normal Retirement Age**<br>Age 65. | **Normal Retirement Age**<br>Normal Social Security retirement age. | **Normal Retirement Age**<br>**<u>Defined Benefit Component:</u>**<br>Same as Plan 2.<br><br>**<u>Defined Contribution Component:</u>**<br>Members are eligible to receive distributions upon leaving employment, subject to restrictions. |
| **Earliest Unreduced Retirement Eligibility**<br>Age 65 with at least five years (60 months) of creditable service or at age 50 with at least 30 years of creditable service. | **Earliest Unreduced Retirement Eligibility**<br>Normal Social Security retirement age with at least five years (60 months) of creditable service or when their age and service equal 90. | **Earliest Unreduced Retirement Eligibility**<br>**<u>Defined Benefit Component:</u>**<br>Normal Social Security retirement age and have at least five years (60 months) of creditable service or when their age and service equal 90.<br><br>**<u>Defined Contribution Component:</u>** Members are |

| | | |
|---|---|---|
| | | eligible to receive distributions upon leaving employment, subject to restrictions. |
| **Earliest Reduced Retirement Eligibility**<br>**VRS:** Age 55 with at least five years (60 months) of creditable service or age 50 with at least 10 years of creditable service. | **Earliest Reduced Retirement Eligibility**<br>**VRS:** Age 60 with at least five years (60 months) of creditable service. | **Earliest Reduced Retirement Eligibility**<br>**Defined Benefit Component:**<br>**VRS:** Age 60 with at least five years (60 months) of creditable service.<br><br>**Defined Contribution Component:**<br>Members are eligible to receive distributions upon leaving employment, subject to restrictions. |
| **Cost-of-Living Adjustment (COLA) in Retirement**<br>The Cost-of-Living Adjustment (COLA) matches the first 3% increase in the Consumer Price Index for all Urban Consumers (CPI-U) and half of any additional increase (up to 4%) up to a maximum COLA of 5%.<br><br>**Eligibility:**<br>For members who retire with an unreduced benefit or with a reduced benefit with at least 20 years of creditable service, the COLA will go into effect on July 1 after one full calendar year from the retirement date.<br><br>For members who retire with a reduced benefit and who have less than 20 years of creditable service, the COLA will go into effect on July 1 after one calendar year following the | **Cost-of-Living Adjustment (COLA) in Retirement**<br>The Cost-of-Living Adjustment (COLA) matches the first 2% increase in the CPI-U and half of any additional increase (up to 2%), for a maximum COLA of 3%.<br><br>**Eligibility:**<br>Same as Plan 1 | **Cost-of-Living Adjustment (COLA) in Retirement**<br>**Defined Benefit Component:**<br>Same as Plan 2.<br><br>**Defined Contribution Component:**<br>Not applicable.<br><br>**Eligibility:**<br>Same as Plan 1 and Plan 2. |

| | | |
|---|---|---|
| unreduced retirement eligibility date.<br><br>**<u>Exceptions to COLA Effective Dates:</u>**<br>The COLA is effective July 1 following one full calendar year (January 1 to December 31) under any of the following circumstances:<br>• The member is within five years of qualifying for an unreduced retirement benefit as of January 1, 2013.<br>• The member retires on disability.<br>• The member Is involuntarily separated from employment for causes other than job performance or misconduct and is eligible to retire under the Workforce Transition Act or the Transitional Benefits Program.<br>• The member dies in service and the member's survivor or beneficiary is eligible for a monthly death-in-service benefit. The COLA will go into effect on July 1 following one full calendar year (January 1 to December 31) from the date the monthly benefit begins. | **<u>Exceptions to COLA Effective Dates:</u>**<br>Same as Plan 1 | **<u>Exceptions to COLA Effective Dates:</u>**<br>Same as Plan 1 and Plan 2. |
| **Disability Coverage**<br>Members who are eligible to be considered for disability retirement and retire on disability, the retirement | **Disability Coverage**<br>Members who are eligible to be considered for disability retirement and retire on disability, the retirement multiplier is 1.65% | **Disability Coverage**<br>State employees (including Plan 1 and Plan 2 opt-ins) participating in the Hybrid Retirement Plan are covered |

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|---|---|---|
| multiplier is 1.7% on all service, regardless of when it was earned, purchased or granted.<br><br>Most state employees are covered under the Virginia Sickness and Disability Program (VSDP), and are not eligible for disability retirement.<br><br>VSDP members are subject to a one-year waiting period before becoming eligible for non-work-related disability benefits. | on all service, regardless of when it was earned, purchased or granted.<br><br>Most state employees are covered under the Virginia Sickness and Disability Program (VSDP), and are not eligible for disability retirement.<br><br>VSDP members are subject to a one-year waiting period before becoming eligible for non-work related disability benefits. | under the Virginia Sickness and Disability Program (VSDP), and are not eligible for disability retirement.<br><br>Hybrid members (including Plan 1 and Plan 2 opt-ins) covered under VSDP are subject to a one-year waiting period before becoming eligible for non-work-related disability benefits. |
| **Purchase of Prior Service**<br>Members may be eligible to purchase service from previous public employment, active duty military service, an eligible period of leave or VRS refunded service as creditable service in their plan. Prior creditable service counts toward vesting, eligibility for retirement and the health insurance credit. Only active members are eligible to purchase prior service. Members also may be eligible to purchase periods of leave without pay. | **Purchase of Prior Service**<br>Same as Plan 1. | **Purchase of Prior Service**<br>**<u>Defined Benefit Component:</u>**<br>Same as Plan 1, with the following exceptions:<br>• Hybrid Retirement Plan members are ineligible for ported service.<br><br>**<u>Defined Contribution Component:</u>**<br>Not applicable. |

***Contributions***

The contribution requirement for active employees is governed by §51.1-145 of the *Code of Virginia*, as amended, but may be impacted as a result of funding provided to state agencies by the Virginia General Assembly. Employees are required to contribute 5.00% of their compensation toward their retirement. Prior to July 1, 2012, all or part of the 5.00% member contribution may have been assumed by the employer. Beginning July 1, 2012, all state employees were required to pay the 5% member contribution. The actuarial employer retirement contribution rate for the VRS State Employee Retirement Plan was 13.49%. This was based on the actuarial valuation as of June 30, 2015 adjusted for the $162,406,000 that was received from the Commonwealth in June 2016 as an accelerated payback of the deferred contribution in the 2010-12 biennium. The actuarially determined rate, when combined with employee contributions, was expected to finance the costs of benefits earned by employees during the year, with an additional amount to finance any unfunded accrued liability.

***Actuarial Assumptions and Methods***

The total pension liability for the VRS State Employee Retirement Plan was based on an actuarial valuation as of June 30, 2016, using the Entry Age Normal actuarial cost method and the following assumptions, applied to all periods included in the measurement and rolled forward to the measurement date of June 30, 2017.

| | |
|---|---|
| Inflation | 2.50 percent |
| Salary increases, including Inflation | 3.50 percent – 5.35 percent |
| Investment rate of return | 7.00 Percent, net of pension plan investment expenses, including inflation* |

* Administrative expenses as a percent of the market value of assets for the last experience study were found to be approximately 0.06% of the market assets for all of the VRS plans. This would provide an assumed investment return rate for GASB purposes of slightly more than the assumed 7.00%. However, since the difference was minimal, and a more conservative 7.00% investment return assumption provided a projected plan net position that exceeded the projected benefit payments, the long-term expected rate of return on investments was assumed to be 7.00% to simplify preparation of pension liabilities.

Mortality rates:

Pre-Retirement:

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

Post-Retirement:

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

Post-Disablement:

RP-2014 Disability Life Mortality Table projected with scale BB to 2020; males 115% of rates; females 130% of rates.

The actuarial assumptions used in the June 30, 2016 valuation were based on the results of an actuarial experience study for the four-year period from July 1, 2012 through June 30, 2016. Changes to the actuarial assumptions as a result of the experience study are as follows:

| | |
|---|---|
| Mortality Rates (Pre-retirement, post-retirement healthy, and disabled | Update to a more current mortality table – RP-2014 projected to 2020 |
| Retirement Rates | Lowered rates at older ages and changed final retirement from 70 to 75 |
| Withdrawal Rates | Adjusted rates to better fit experience at each year age and service through 9 years of service |
| Disability Rates | Adjusted rates to better match experience |
| Salary Scale | No change |
| Line of Duty Disability | Increase rate from 14% to 25% |

***Note 3. Net Pension Liability***

The net pension liability (NPL) is calculated separately for each system and represents that particular system's total pension liability determined in accordance with GASB Statement No. 67, less that system's fiduciary net position. As of June 30, 2017, NPL amounts for the VRS State Employee Retirement Plan are as follows (amounts expressed in thousands):

| | |
|---|---|
| Total Pension Liability | $ 23,617,412 |
| Plan Fiduciary Net Position | 17,789,888 |
| Employers' Net Pension Liability (Asset) | $ 5,827,524 |
| | |
| Plan Fiduciary Net Position as a Percentage of the Total Pension Liability | 75.33% |

The total pension liability is calculated by the System's actuary, and each plan's fiduciary net position is reported in the System's financial statements. The net pension liability is disclosed in accordance with the requirements of GASB Statement No. 67 in the System's notes to the financial statements and required supplementary information.

***Discount Rate***

The discount rate used to measure the total pension liability was 7.00%. The projection of cash flows used to determine the discount rate assumed that member contributions will be made per the VRS Statutes and the employer contributions will be made in accordance with the VRS funding policy at rates equal to the difference between actuarially determined contribution rates adopted by the VRS Board of Trustees and the member rate. Through the fiscal year ending June 30, 2019, the rate contributed by the state agencies for the VRS State Employee Retirement Plan will be subject to the portion of the VRS Board-certified rates that are funded by the Virginia General Assembly. From July 1, 2019 on, state agencies are assumed to contribute 100% of the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current active and inactive employees. Therefore the long-term expected rate of return was applied to all periods of projected benefit payments to determine the total pension liability.

***Long-Term Expected Rate of Return***

The long-term expected rate of return on pension System investments was determined using a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of pension System investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target asset allocation and best estimate of arithmetic real rates of return for each major asset class are summarized in the following table:

| Asset Class (Strategy) | Target Allocation | Arithmetic Long-Term Expected Rate of Return | Weighted Average Long-Term Expected Rate of Return |
|---|---|---|---|
| Public Equity | 40.00% | 4.54% | 1.82% |
| Fixed Income | 15.00% | 0.69% | 0.10% |
| Credit Strategies | 15.00% | 3.96% | 0.59% |
| Real Assets | 15.00% | 5.76% | 0.86% |
| Private Equity | 15.00% | 9.53% | 1.43% |
| Total | 100.00% | | 4.80% |
| | Inflation | | 2.50% |
| | * Expected arithmetic nominal return | | 7.30% |

* The above allocation provides a one-year return of 7.30%. However, one-year returns do not take into account the volatility present in each of the asset classes. In setting the long-term expected return for the system, stochastic projections are employed to model future returns under various economic conditions. The results provide a range of returns over various time periods that ultimately provide a median return of 6.83%, including expected inflation of 2.50%.

***Sensitivity Analysis***

The following table presents the collective net pension liability of the participating employers in the VRS State Employee Retirement Plan using the discount rate of 7.00%, as well as what collective net pension liability of the participating employers in the VRS State Employee Retirement Plan net pension liability would be if it were calculated using a discount rate that is one percentage point lower (6.00%) or one percentage point higher (8.00%) than the current rate (amounts expressed in thousands):

| | |
|---|---|
| Net Pension Liability - 1.00% Decrease (6.00%) | $8,608,043 |
| Net Pension Liability - Current Discount Rate (7.00%) | $5,827,524 |
| Net Pension Liability - 1.00% Increase (8.00%) | $3,492,489 |

***Note 4. Deferred Outflows / (Inflows) of Resources***

The following schedule reflects the amortization of the net balance of remaining deferred outflows / (inflows) of resources at June 30, 2017. The average remaining service lives of all employees provided with pensions through the VRS State Employee Retirement Plan at June 30, 2017 was 3.78 years. Deferred outflows of resources related to pensions resulting from the state agency's contributions subsequent to the measurement date will be recognized as a reduction of the Net Pension Liability in the financial statements for the year ended June 30, 2019. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows (amounts expressed in thousands):

| | |
|---|---|
| Measurement Period Ending June 30, 2018 | ($224,198) |
| Measurement Period Ending June 30, 2019 | $ 32,452 |
| Measurement Period Ending June 30, 2020 | $ 2,727 |
| Measurement Period Ending June 30, 2021 | ($167,404) |

***Note 5. Employer Contributions***

Employers' proportionate shares were calculated on the basis of historical employer contributions. Although GASB Statement No. 68 encourages the use of the employer's projected long-term contribution effort to the retirement plan, allocating on the basis of historical employer contributions is considered acceptable. Employer contributions recognized by the VRS State Employee Retirement Plan that are not representative of future contribution effort are excluded in the determination of employers' proportionate shares. Examples of employer contributions not representative of future contribution effort are contributions toward the purchase of employee service, contributions for adjustments for prior periods, supplemental employer contributions from certain employers, and special payments.

The employer contributions used in the determination of employers' proportionate shares of collective pension amounts reported in the Schedule of Employer Allocations was based on the total employer contributions using the plan's contribution rate and the employer's covered payroll for FY 2017, less the amount transferred to ICMA-RC as the employer cost of the defined contribution component for employees covered by the Hybrid retirement plan benefit structure. The computed total employer contribution amount was $542,418,434. Of this amount, $11,535,453 was transferred to ICMA-RC and $530,882,981 was retained by the defined benefit plan, including $3,570,322 paid by VRS as its contribution to the pension plan. The employer contributions of $535,424,000 reported in the VRS State Employee's Retirement Plan's Statement of Changes in Net Position (per the System's separately issued financial statements) reflects this net retained amount plus approximately $4,541,019 in other employer contributions that were not representative of future contribution efforts.

***Note 6. Additional Financial and Actuarial Information***

Information contained in the VRS State Employee Retirement Plan Notes to the Schedule of Employer Allocations and Schedule of Pension Amounts by Employer (Schedules) was extracted from the audited financial statements of the Virginia Retirement System for the fiscal year ended June 30, 2017. Additional financial information supporting the preparation of the VRS State Employee Retirement Plan Schedules (including the unmodified audit opinion on the financial statements and required supplementary information) is presented in the separately issued VRS 2017 Comprehensive Annual Financial Report (CAFR). A copy of the 2017 VRS CAFR is publicly available through the About VRS link on the VRS website at *www.varetire.org*, or a copy may be obtained by submitting a request to the VRS Chief Financial Officer, PO Box 2500, Richmond, VA 23218-2500.