

**October 26, 2017**

National Guard Pension Fund  
Principal Results of Actuarial Valuation  
as of December 31, 2016

**Board of Trustees Meeting  
David Driscoll and Mike Ribble**

# National Guard Pension Fund Principal Results of December 31, 2016 Valuation

Valuation results as of	12/31/2016	12/31/2015
Active Members		
Number	5,953	5,756
Retired Members Currently Receiving Benefits		
Number	4,541	4,484
Annual Pensions	\$ 8,531,535	\$ 8,398,865
Terminated Members Entitled to but Not Yet Receiving Benefits		
Number	5,538	5,512
Deferred Pensions	\$ 9,532,782	\$ 9,469,908
Assets		
Actuarial Value (AVA)	\$ 118,724,236	\$ 113,094,394
Market Value	\$ 113,183,427	\$ 107,064,124
Actuarial Accrued Liability (AAL)	\$ 173,102,363	\$ 168,689,943
Unfunded Accrued Liability (AAL-AVA)	\$ 54,378,127	\$ 55,595,549
Funded Ratio (AVA/AAL)*	68.6%	67.0%

Due to recent history of benefit increases, the funded status of the plan is lower than the other North Carolina Retirement Systems.

\* The funded ratio on a market value of assets basis is 65.4% at December 31, 2016.

# National Guard Pension Fund Principal Results of December 31, 2016 Valuation

Contributions for Fiscal Year Ending	6/30/2019	6/30/2018
Actuarially Determined Employer Contribution (ADEC)		
Normal Cost	\$ 437,389	\$ 381,477
Accrued Liability	<u>8,634,544</u>	<u>8,541,676</u>
Total	\$ 9,071,933	\$ 8,923,153
Impact of Legislative Changes	<u>NA</u>	<u>0</u>
Final ADEC	NA	\$ 8,923,153

As a result of the unfunded liabilities created by benefit increases, less than 5% of the ADEC is going toward the cost of service to be paid while service is accruing, meaning that more than 95% of the ADEC pays for pension debt.

# Certification



The assumptions, methods, and plan provisions used in the results presented in this presentation were provided in October 2017 in the “Report on the Actuarial Valuation of the North Carolina National Guard Pension Fund prepared as of December 31, 2016.”

The results were prepared under the direction of Michael Ribble and David Driscoll who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about them.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

Michael A. Ribble, FSA, EA, MAAA  
Principal, Consulting Actuary

David Driscoll, FSA, EA, MAAA, FCA  
Principal, Consulting Actuary

# North Carolina National Guard Pension Fund

Report on the Actuarial Valuation  
Prepared as of December 31, 2016

October 2017

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Board of Trustees  
Teachers' and State Employees'  
Retirement System of North Carolina  
3200 Atlantic Avenue  
Raleigh, NC 27604

Members of the Board:

We submit herewith our report on the actuarial valuation of the National Guard Pension Fund of North Carolina (referred to as "the Fund") prepared as of December 31, 2016. The report has been prepared in accordance with Chapter 127A of the North Carolina General Statutes.

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

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

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

The assumptions used for the December 31, 2016 actuarial valuation are based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016, and a discount rate of 7.20% as adopted by the Board of Trustees on April 20, 2017. The economic assumptions with respect to investment yield, salary increase and inflation have been based upon a review of the existing portfolio structure as well as recent and anticipated experience.

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

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Conduent performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information.

I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and I am available to answer questions about it.

Respectfully submitted,



Michael A. Ribble, FSA, EA, MAAA  
Principal, Consulting Actuary



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## Section 1: Summary of Principal Results

1. This report, prepared as of December 31, 2016, presents the results of the actuarial valuation of the Fund. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below.

**Table 1: Summary of Principal Results**

Valuation results as of	12/31/2016	12/31/2015
Active Members		
Number	5,953	5,756
Retired Members Currently Receiving Benefits		
Number	4,541	4,484
Annual Pensions	\$ 8,531,535	\$ 8,398,865
Terminated Members Entitled to but Not Yet Receiving Benefits		
Number	5,538	5,512
Deferred Pensions	\$ 9,532,782	\$ 9,469,908
Assets		
Actuarial Value (AVA)	\$ 118,724,236	\$ 113,094,394
Market Value	\$ 113,183,427	\$ 107,064,124
Actuarial Accrued Liability (AAL)	\$ 173,102,363	\$ 168,689,943
Unfunded Accrued Liability (AAL-AVA)	\$ 54,378,127	\$ 55,595,549
Funded Ratio (AVA/AAL)*	68.6%	67.0%
<b>Contributions for Fiscal Year Ending</b>	<b>6/30/2019</b>	<b>6/30/2018</b>
Actuarially Determined Employer Contribution (ADEC)		
Normal Cost	\$ 437,389	\$ 381,477
Accrued Liability	<u>8,634,544</u>	<u>8,541,676</u>
Total	\$ 9,071,933	\$ 8,923,153
Impact of Legislative Changes	<u>NA</u>	<u>0</u>
Final ADEC	NA	\$ 8,923,153

\* The Funded Ratio on a Market Value of Assets basis is 65.4% at December 31, 2016.

## Section 1: Summary of Principal Results

2. The following table shows a reconciliation of the change in the actuarially determined employer contribution computed to be \$8,923,153 based on the December 31, 2015 valuation and \$9,071,933 based on the December 31, 2016 valuation.

**Table 2: Reconciliation of Change in Actuarially Determined Employer Contribution (ADEC)**

Fiscal year ending June 30, 2018 Preliminary ADEC (based on December 31, 2015 valuation)	\$ 8,923,153
Impact of Legislative Changes	<u>0</u>
Fiscal year ending June 30, 2018 Final ADEC	\$ 8,923,153
Change Due to Demographic (Gain)/Loss	(312,943)
Change Due to Investment (Gain)/Loss	300,935
Change Due to Contributions Greater than ADEC	0
Impact of Assumption Changes	160,788
Impact of Plan Changes	<u>0</u>
Fiscal year ending June 30, 2019 Preliminary ADEC (based on December 31, 2016 valuation)	\$ 9,071,933

## Section 1: Summary of Principal Results

3. Tables summarizing the membership of the Fund as of the valuation date are shown in Section 2.
4. The valuation balance sheet showing the assets and liabilities of the Fund as of the current and previous valuation dates is provided in Section 3.
5. An allocation of investments by category is shown in Section 4.
6. Comments on the experience and actuarial gains/losses during the valuation year are provided in Section 5.
7. Comments on the actuarially determined employer contribution are provided in Section 6.
8. Accounting information to be disclosed in the financial statements of the Plan is provided in Section 7.
9. Appendix A of this report presents the development of the actuarial value of assets.
10. Appendix B of this report presents the development of the amortization of the unfunded accrued liability.
11. Appendix C of this report outlines the full set of actuarial assumptions and methods employed.
12. Appendix D gives a summary of the benefit provisions of the system.
13. Appendix E provides the projection of cash flows used to determine the discount rate under GASB Statement No. 67.
14. Appendix F provides detailed tabulations of the membership of the system as of the valuation date.

## Section 2: Membership Data

Data regarding the membership of the Fund for use as a basis for the valuation were furnished by the Retirement Systems Division. The following table summarizes the membership of the Fund as of December 31, 2016 upon which the valuation was based. Detailed tabulations of the data are given in Appendix F.

**Table 3: Membership of the Fund as of December 31, 2016**

	Member Count	Average Age	Average Service	Annual Pensions
Active Members	5,953	37.65	15.18	N/A
Retired Members				
Currently Receiving Benefits	4,541	70.94	N/A	\$ 8,531,535
Terminated Members Entitled to Benefits but Not Yet Receiving Benefits	5,538	57.22	N/A	\$ 9,532,782

## Section 3: Valuation Balance Sheet

The following valuation balance sheet shows the assets and liabilities of the Retirement Fund as of the current valuation date of December 31, 2016. Appendix A summarizes the development of the actuarial value of assets.

**Table 4: Valuation Balance Sheet Showing the Present and Prospective Assets and Liabilities of the North Carolina National Guard Pension Fund Prepared as of December 31, 2016**

<b>Assets</b>	
Present Assets	\$ 118,724,236
Present Value of Prospective Contributions Payable by State	
Normal Contribution	\$ 1,602,646
Accrued Liability Contribution	<u>\$ 54,378,127</u>
Total Prospective Contributions by State	<u>\$ 55,980,773</u>
Total Assets	<u><u>\$ 174,705,009</u></u>
<b>Liabilities</b>	
Present Value of Pensions Payable to Retired Members Currently Receiving Benefits	\$ 75,652,516
Present Value of Deferred Pensions Payable to Terminated Members Entitled to Benefits but Not Yet Receiving Benefits	\$ 73,113,019
Present Value of Prospective Pensions to Active Members Included in the Valuation	\$ 25,939,474
Reserve for Increases in Retirement Allowances	<u>\$ 0</u>
Total Liabilities	<u><u>\$ 174,705,009</u></u>

The valuation balance sheet shows that the total present value of the prospective benefit payments as of December 31, 2016 amounts to \$174,705,009. Of this amount, \$75,652,516 represents the present value of future pension payments to retired members currently receiving benefits, \$25,939,474 represents the present value of prospective pensions which will become payable to present active members and \$73,113,019 represents the present value of future pension payments to terminated members entitled to benefits but not yet receiving benefits. Against these liabilities, the Fund has assets of \$118,724,236 leaving a balance of \$55,980,773 to be provided by future contributions of the State. Of this amount, \$1,602,646 represents the present value of prospective normal contributions, and the balance of \$54,378,127 represents the present value of accrued liability contributions.

## Section 4: Asset Allocation

The following table shows an allocation of investments by category as of December 31, 2016.

**Table 5: Allocation of Investments by Category for the National Guard Pension Fund as of December 31, 2016**

Cash and Receivables	2.2%
Fixed Income (LTIF)	26.5%
Public Equity	42.7%
Other*	<u>28.6%</u>
Total	100.0%

\* Real Estate, Alternatives, Inflation and Credit.

## Section 5: Comments on Experience and Gains/Losses

The following table shows a detailed reconciliation of the change in unfunded accrued liability since the prior valuation.

**Table 6: Reconciliation of Change in Unfunded Accrued Liability  
Since the Prior Valuation**  
(in millions)

Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2015	\$	55.6
Normal Cost during 2016		0.3
Reduction due to Actual Contributions during 2016		(8.3)
Interest on UAAL, Normal Cost, and Contributions		3.8
Asset (Gain)/Loss		2.2
Actuarial Accrued Liability (Gain)/Loss		(0.2)
Impact of Assumption Changes		1.0
Impact of Legislative Changes		<u>0.0</u>
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2016	\$	54.4

**Commentary:** The change in assumptions reflects the change in interest rate from 7.25% to 7.20% and increased the unfunded actuarial accrued liability (UAAL) by \$1.0 million.



## Section 6: Actuarially Determined Employer Contribution

The normal contribution covers the cost of benefits based on current service. The valuation indicates that the annual normal contribution payable by the State is equal to \$52.14 multiplied by the number of active members. Based on 5,953 active members included in the valuation, the normal contribution is \$310,389.

The unfunded actuarial accrued liability is amortized within a 12-year period through an annual unfunded accrued liability contribution. Assuming that the unfunded accrued liability is amortized based on the amortization schedule shown in Appendix B, with the payments covering both the principal amount and the accruing interest thereon at the rate of 7.20% per annum, the annual unfunded actuarial accrued liability contribution would be \$8,634,544.

Based on the present membership and the amortization schedule described above, the following table shows the total annual contributions payable by the State for the fiscal year ending June 30, 2019.

**Table 7: Actuarially Determined Employer Contribution**

Contribution	Annual Amount
Normal Cost*	\$ 437,389
Accrued Liability	<u>8,634,544</u>
Total	\$ 9,071,933

\* Includes assumed administrative expenses equal to prior year's actual administrative expenses of \$127,000.

## Section 7: Accounting Information

The section contains the accounting information for Governmental Accounting Standards Board (GASB) Statement No. 67 for fiscal year ending June 30, 2017 based on a valuation date of December 31, 2016.

Please note that GASB Statement No. 67 (Financial Reporting for Pension Plans) is applicable for fiscal years ending 2014 and later.

The June 30, 2017 total pension liability presented in this section was determined by an actuarial valuation as of December 31, 2016, based on the assumptions, methods and plan provisions described in this report. The actuarial cost method used to develop the total pension liability is the Entry Age Normal Cost method, as required by GASB Statement No. 67.

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

**Table 8: Number of Active and Retired Members  
as of December 31, 2016**

Group	Number
Retired members and survivors of deceased members currently receiving benefits	4,541
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	5,538
Active participants	<u>5,953</u>
Total	16,032

## Section 7: Accounting Information

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

**Table 9: Schedule of Changes in Net Pension Liability (Asset)**

Calculation as of	June 30, 2017
<b>Total Pension Liability</b>	
Service Cost	\$ 305,000
Interest	11,975,000
Changes of Benefit Terms	0
Difference between Expected and Actual Experience	1,204,000
Change of Assumptions	955,000
Benefit Payments, including Refund of Member Contributions	(8,677,000)
Net Change in Total Pension Liability	\$ 5,762,000
Total Pension Liability - Beginning of Year	\$ 169,210,000
Total Pension Liability - End of Year	\$ 174,972,000
<b>Plan Fiduciary Net Position</b>	
Employer Contributions	\$ 8,517,000
Member Contributions	0
Net Investment Income	11,626,000
Benefit Payments, including Refund of Member Contributions	(8,677,000)
Administrative Expenses	(168,000)
Other	0
Net Change in Fiduciary Net Position	\$ 11,298,000
Plan Fiduciary Net Position - Beginning of Year	\$ 109,829,000
Plan Fiduciary Net Position - End of Year	\$ 121,127,000

**Table 10: Net Pension Liability (Asset)**

Calculation as of	June 30, 2017	June 30, 2016
Total Pension Liability	\$ 174,972,000	\$ 169,210,000
Plan Fiduciary Net Position	121,127,000	109,829,000
Net Pension Liability (Asset)	\$ 53,845,000	\$ 59,381,000
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	69.23%	64.91%

## Section 7: Accounting Information

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

**Table 11: Sensitivity of the Net Pension Liability (Asset)  
at June 30, 2017 to Changes in the Discount Rate**

	1% Decrease	Current	1% Increase
Discount Rate	6.20%	7.20%	8.20%
Net Pension Liability (Asset)	75,110,000	53,845,000	36,354,000

The discount rate used to measure the total pension liability was 7.20%. The projection of cash flows used to determine the discount rate assumed that System contributions will continue to follow the current funding policy. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Please see Appendix E for additional detail.

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

**Table 12: Additional Information for GASB Statement No. 67**

Valuation Date	12/31/2016
Actuarial Cost Method	Entry Age
Amortization Method	Level dollar closed
Amortization Period	12 years
Asset Valuation Method	Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period (not greater than 120% of market value and not less than 80% of market value)
Actuarial Assumptions	
Investment Rate of Return*	7.20%
Projected Salary Increases	N/A
* Includes Inflation of	3.00%
Cost-of-living Adjustments	N/A

## Appendix A: Development of Actuarial Value of Assets

Asset Data as of	12/31/2016
Beginning of Year Market Value of Assets	\$ 107,064,124
Contributions	8,291,496
Benefit Payments	<u>(8,648,758)</u>
Net Cash Flow	(357,262)
Expected Investment Return	7,749,198
Expected End of Year Market Value of Assets	114,456,060
End of Year Market Value of Assets	113,183,427
Excess of Market Value over Expected Market Value of Assets	(1,272,633)
80% of 2016 Asset Gain/(Loss)	(1,018,106)
60% of 2015 Asset Gain/(Loss)	(4,522,703)
40% of 2014 Asset Gain/(Loss)	N/A
20% of 2013 Asset Gain/(Loss)	<u>N/A</u>
Total Deferred Asset Gain/(Loss)	(5,540,809)
Preliminary End of Year Actuarial Value of Assets	118,724,236
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	118,724,236
Estimated Net Investment Return on Actuarial Value	5.30%
Estimated Net Investment Return on Market Value	6.06%

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

Lower than expected market returns in 2015 and 2016 resulted in an actuarial value of asset return for calendar year 2016 of 5.30% and a recognized actuarial asset loss of \$2.2 million during 2016.

## Appendix B: Amortization Schedule for Unfunded Actuarial Accrued Liability

Date Established	Original Balance	12/31/2016 Outstanding Balance	Annual Payment
December 31, 2009	\$ 40,483,684	\$ 28,923,222	\$ 5,531,722
December 31, 2010	(2,911,753)	(2,324,375)	(397,787)
December 31, 2011	(2,233,723)	(1,957,719)	(305,100)
December 31, 2012	(515,855)	(489,709)	(70,446)
December 31, 2013	4,219,347	4,292,223	576,102
December 31, 2014	7,361,464	7,955,036	1,004,946
December 31, 2015	16,021,040	17,182,565	2,186,406
December 31, 2016	796,884	796,884	108,701
Total		\$ 54,378,127	\$ 8,634,544

## Appendix C: Actuarial Assumptions and Methods

Assumptions are based on the experience investigation prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016 for use beginning with the December 31, 2015 annual actuarial valuation. The interest rate of 7.20% was adopted by the Board of Trustees on April 20, 2017.

**Interest Rate:** 7.20% per annum, compounded annually.

**Active Members:** The valuation excludes all active members with less than 7 years of service.

**Separations From Active Service:** Representative values of the assumed annual rates of separation from active service are as follows:

### Annual Rates of Withdrawal\*

<u>Age</u>	<u>Service</u>			
	<u>&lt;=6</u>	<u>7-9</u>	<u>10-14</u>	<u>15-19</u>
<=24	0.000	0.150	0.080	0.050
25-29	0.000	0.150	0.080	0.050
30-34	0.000	0.150	0.080	0.050
35-39	0.000	0.150	0.080	0.050
40-44	0.000	0.150	0.080	0.050
45-49	0.000	0.150	0.080	0.050
>=50	0.000	0.150	0.080	0.050

\* Applied only to members with less than 20 years of service.

### Annual Rates of

<u>Age</u>	<u>Male</u>	<u>Female</u>	
	<u>Mortality*</u>	<u>Mortality*</u>	<u>Disability*</u>
25	.0005	.0002	.0001
30	.0005	.0002	.0004
35	.0005	.0003	.0010
40	.0006	.0004	.0029
45	.0010	.0007	.0049
50	.0017	.0011	.0084
55	.0028	.0017	.0144
60	.0047	.0024	.0240

\* Base mortality rates as of 2014.

## Appendix C: Actuarial Assumptions and Methods

### Annual Rates of Retirement

<u>Age</u>	<u>Service</u>	
	<u>&lt;=19</u>	<u>&gt;=20</u>
<=54	0.000	0.150
55-59	0.000	0.200
60-64	0.000	0.750
>=65	0.000	1.000

**Deaths After Retirement:** Representative values of the assumed post-retirement mortality rates in 2014 prior to any mortality improvements are as follows:

### Annual Rates of Death After Retirement

<u>Age</u>	<u>Male Retirees (Healthy at Retirement)</u>	<u>Female Retirees (Healthy at Retirement)</u>	<u>Male Retirees (Disabled at Retirement)</u>	<u>Female Retirees (Disabled at Retirement)</u>
55	.0057	.0036	.0234	.0145
60	.0078	.0052	.0266	.0170
65	.0110	.0080	.0317	.0209
70	.0168	.0129	.0403	.0282
75	.0268	.0209	.0543	.0410
80	.0447	.0348	.0766	.0610

**Deaths After Retirement (Healthy at Retirement):** Mortality rates are based on the RP-2014 Total Data Set for Healthy Annuitants Mortality Table.

**Death After Retirement (Disabled at Retirement):** Mortality rates are based on the RP-2014 Total Data Set for Disabled Annuitants Mortality Table.

**Deaths Prior to Retirement:** Mortality Rates are based on the RP-2014 Total Data Set Employee Mortality Table.

**Mortality Projection:** All mortality rates are projected from 2014 using generational improvement with Scale MP-2015.

**Timing of Assumptions:** All deaths, disabilities and retirements are assumed to occur on July 1 of each year.



## Appendix C: Actuarial Assumptions and Methods

**Administrative Expenses:** Prior year's actual administrative expenses.

**Actuarial Cost Method:** Entry age normal cost method. Entry age is established on an individual basis.

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

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

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

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

**Changes Since Prior Valuation:** The interest rate was changed from 7.25% to 7.20%.

## Appendix D: Summary of Main Plan Provisions

### Membership

All members of the North Carolina National Guard with seven years of service are eligible to be members of the Fund.

### Benefits

#### Service Retirement Pension

##### Condition for Pension

A member who retires after he has attained age 60 and has credit for 20 years of military service, including at least 15 years of North Carolina national guard duty, both reserve and active, and who has received an honorable discharge, is entitled to a monthly pension.

##### Amount of Pension

The amount of the pension is equal to \$105 per month for 20 years of creditable service with an additional \$10.50 per month for each additional year of such service, provided that the total pension shall not exceed \$210 per month.

#### Deferred Early Retirement Pension

##### Condition for Pension

A member whose service is terminated after he has credit for 20 years of military service, including at least 15 years of North Carolina national guard duty, both reserve and active, and who has received an honorable discharge, is eligible to receive a deferred retirement pension commencing at age 60.

##### Amount of Pension

The amount is the same as that for a service retirement.

##### Normal Form

Life Annuity.

##### Optional Form

None.

### Contributions

The State makes annual contributions sufficient to meet the cost of the benefits under the Fund.

### Changes Since Prior Valuation

None.

## Appendix E: GASB 67 Fiduciary Net Position Projection

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

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2017	\$ 113,183	\$ 0	\$ 7,874	\$ 11,428	\$ 131	\$ 8,000	\$ 117,498
2018	117,498	0	8,954	11,608	116	8,362	123,090
2019	123,090	0	9,092	11,795	103	8,761	129,045
2020	129,045	0	9,341	12,081	92	9,188	135,401
2021	135,401	0	9,578	12,380	83	9,645	142,161
2022	142,161	0	9,697	12,691	74	10,126	149,219
2023	149,219	0	6,923	13,023	66	10,575	153,628
2024	153,628	0	4,332	13,306	59	10,739	155,334
2025	155,334	0	4,662	13,594	52	10,863	157,213
2026	157,213	0	4,830	13,760	46	11,001	159,238
2027	159,238	0	4,558	13,930	40	11,137	160,963
2028	160,963	0	3,750	14,067	35	11,232	161,843
2029	161,843	0	2,138	14,178	30	11,244	161,017
2030	161,017	0	987	14,285	25	11,123	158,817
2031	158,817	0	785	14,346	21	10,957	156,192
2032	156,192	0	489	14,301	17	10,759	153,122
2033	153,122	0	211	14,156	14	10,533	149,696
2034	149,696	0	54	14,007	12	10,285	146,016
2035	146,016	0	29	13,820	10	10,026	142,241
2036	142,241	0	24	13,587	8	9,761	138,431
2037	138,431	0	20	13,328	6	9,496	134,613
2038	134,613	0	16	13,086	5	9,230	130,768
2039	130,768	0	13	12,849	4	8,961	126,889
2040	126,889	0	10	12,618	3	8,690	122,968
2041	122,968	0	8	12,397	3	8,416	118,992
2042	118,992	0	6	12,193	2	8,136	114,939
2043	114,939	0	5	12,000	2	7,851	110,793
2044	110,793	0	3	11,792	1	7,561	106,564
2045	106,564	0	3	11,572	1	7,262	102,256
2046	102,256	0	2	11,315	1	6,963	97,905
2047	97,905	0	1	11,076	0	6,658	93,488
2048	93,488	0	1	10,870	0	6,346	88,965
2049	88,965	0	1	10,624	0	6,029	84,371
2050	84,371	0	0	10,341	0	5,710	79,740
2051	79,740	0	0	9,985	0	5,388	75,143
2052	75,143	0	0	9,555	0	5,072	70,660
2053	70,660	0	0	9,102	0	4,765	66,323
2054	66,323	0	0	8,655	0	4,469	62,137
2055	62,137	0	0	8,216	0	4,184	58,105
2056	58,105	0	0	7,785	0	3,908	54,228
2057	54,228	0	0	7,364	0	3,644	50,508
2058	50,508	0	0	6,953	0	3,391	46,946
2059	46,946	0	0	6,552	0	3,149	43,543
2060	43,543	0	0	6,162	0	2,917	40,298
2061	40,298	0	0	5,784	0	2,697	37,211
2062	37,211	0	0	5,418	0	2,487	34,280
2063	34,280	0	0	5,066	0	2,289	31,503
2064	31,503	0	0	4,728	0	2,101	28,876
2065	28,876	0	0	4,403	0	1,924	26,397
2066	26,397	0	0	4,092	0	1,755	24,060

## Appendix E: GASB 67 Fiduciary Net Position Projection

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

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2067	\$ 24,060	\$ 0	\$ 0	\$ 3,796	\$ 0	\$ 1,598	\$ 21,862
2068	21,862	0	0	3,513	0	1,450	19,799
2069	19,799	0	0	3,244	0	1,311	17,866
2070	17,866	0	0	2,988	0	1,180	16,058
2071	16,058	0	0	2,745	0	1,060	14,373
2072	14,373	0	0	2,514	0	946	12,805
2073	12,805	0	0	2,294	0	840	11,351
2074	11,351	0	0	2,087	0	744	10,008
2075	10,008	0	0	1,890	0	654	8,772
2076	8,772	0	0	1,704	0	572	7,640
2077	7,640	0	0	1,530	0	496	6,606
2078	6,606	0	0	1,364	0	427	5,669
2079	5,669	0	0	1,209	0	365	4,825
2080	4,825	0	0	1,063	0	310	4,072
2081	4,072	0	0	928	0	260	3,404
2082	3,404	0	0	804	0	217	2,817
2083	2,817	0	0	689	0	178	2,306
2084	2,306	0	0	585	0	145	1,866
2085	1,866	0	0	492	0	117	1,491
2086	1,491	0	0	408	0	93	1,176
2087	1,176	0	0	334	0	73	915
2088	915	0	0	270	0	56	701
2089	701	0	0	215	0	44	530
2090	530	0	0	168	0	32	394
2091	394	0	0	129	0	24	289
2092	289	0	0	97	0	17	209
2093	209	0	0	72	0	12	149
2094	149	0	0	52	0	8	105
2095	105	0	0	37	0	6	74
2096	74	0	0	26	0	5	53
2097	53	0	0	18	0	3	38
2098	38	0	0	12	0	2	28
2099	28	0	0	8	0	1	21
2100	21	0	0	6	0	2	17
2101	17	0	0	4	0	1	14
2102	14	0	0	3	0	1	12
2103	12	0	0	2	0	1	11
2104	11	0	0	2	0	0	9
2105	9	0	0	2	0	1	8
2106	8	0	0	1	0	0	7
2107	7	0	0	1	0	1	7
2108	7	0	0	1	0	0	6
2109	6	0	0	1	0	0	5
2110	5	0	0	1	0	0	4
2111	4	0	0	1	0	1	4
2112	4	0	0	1	0	0	3
2113	3	0	0	1	0	0	2
2114	2	0	0	1	0	1	2
2115	2	0	0	1	0	0	1
2116	1	0	0	1	0	1	1

## Appendix E: GASB 67 Fiduciary Net Position Projection

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

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments		
					Funded Payments at 7.20%	Unfunded Payments at 3.13%	Using Single Discount Rate of 7.20%
2017	\$ 113,183	\$ 11,428	\$ 11,428	\$ 0	\$ 11,038	\$ 0	\$ 11,038
2018	117,498	11,608	11,608	0	10,458	0	10,458
2019	123,090	11,795	11,795	0	9,913	0	9,913
2020	129,045	12,081	12,081	0	9,472	0	9,472
2021	135,401	12,380	12,380	0	9,054	0	9,054
2022	142,161	12,691	12,691	0	8,658	0	8,658
2023	149,219	13,023	13,023	0	8,288	0	8,288
2024	153,628	13,306	13,306	0	7,899	0	7,899
2025	155,334	13,594	13,594	0	7,528	0	7,528
2026	157,213	13,760	13,760	0	7,108	0	7,108
2027	159,238	13,930	13,930	0	6,713	0	6,713
2028	160,963	14,067	14,067	0	6,324	0	6,324
2029	161,843	14,178	14,178	0	5,945	0	5,945
2030	161,017	14,285	14,285	0	5,588	0	5,588
2031	158,817	14,346	14,346	0	5,235	0	5,235
2032	156,192	14,301	14,301	0	4,868	0	4,868
2033	153,122	14,156	14,156	0	4,495	0	4,495
2034	149,696	14,007	14,007	0	4,149	0	4,149
2035	146,016	13,820	13,820	0	3,819	0	3,819
2036	142,241	13,587	13,587	0	3,502	0	3,502
2037	138,431	13,328	13,328	0	3,205	0	3,205
2038	134,613	13,086	13,086	0	2,935	0	2,935
2039	130,768	12,849	12,849	0	2,688	0	2,688
2040	126,889	12,618	12,618	0	2,463	0	2,463
2041	122,968	12,397	12,397	0	2,257	0	2,257
2042	118,992	12,193	12,193	0	2,071	0	2,071
2043	114,939	12,000	12,000	0	1,901	0	1,901
2044	110,793	11,792	11,792	0	1,743	0	1,743
2045	106,564	11,572	11,572	0	1,595	0	1,595
2046	102,256	11,315	11,315	0	1,455	0	1,455
2047	97,905	11,076	11,076	0	1,329	0	1,329
2048	93,488	10,870	10,870	0	1,216	0	1,216
2049	88,965	10,624	10,624	0	1,109	0	1,109
2050	84,371	10,341	10,341	0	1,007	0	1,007
2051	79,740	9,985	9,985	0	907	0	907
2052	75,143	9,555	9,555	0	810	0	810
2053	70,660	9,102	9,102	0	719	0	719
2054	66,323	8,655	8,655	0	638	0	638
2055	62,137	8,216	8,216	0	565	0	565
2056	58,105	7,785	7,785	0	500	0	500
2057	54,228	7,364	7,364	0	441	0	441
2058	50,508	6,953	6,953	0	388	0	388
2059	46,946	6,552	6,552	0	341	0	341
2060	43,543	6,162	6,162	0	299	0	299
2061	40,298	5,784	5,784	0	262	0	262
2062	37,211	5,418	5,418	0	229	0	229
2063	34,280	5,066	5,066	0	200	0	200
2064	31,503	4,728	4,728	0	174	0	174
2065	28,876	4,403	4,403	0	151	0	151
2066	26,397	4,092	4,092	0	131	0	131

## Appendix E: GASB 67 Fiduciary Net Position Projection

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

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments		
					Funded Payments at 7.20%	Unfunded Payments at 3.13%	Using Single Discount Rate of 7.20%
2067	\$ 24,060	\$ 3,796	\$ 3,796	\$ 0	\$ 113	\$ 0	\$ 113
2068	21,862	3,513	3,513	0	98	0	98
2069	19,799	3,244	3,244	0	84	0	84
2070	17,866	2,988	2,988	0	72	0	72
2071	16,058	2,745	2,745	0	62	0	62
2072	14,373	2,514	2,514	0	53	0	53
2073	12,805	2,294	2,294	0	45	0	45
2074	11,351	2,087	2,087	0	38	0	38
2075	10,008	1,890	1,890	0	32	0	32
2076	8,772	1,704	1,704	0	27	0	27
2077	7,640	1,530	1,530	0	23	0	23
2078	6,606	1,364	1,364	0	19	0	19
2079	5,669	1,209	1,209	0	16	0	16
2080	4,825	1,063	1,063	0	13	0	13
2081	4,072	928	928	0	10	0	10
2082	3,404	804	804	0	8	0	8
2083	2,817	689	689	0	7	0	7
2084	2,306	585	585	0	5	0	5
2085	1,866	492	492	0	4	0	4
2086	1,491	408	408	0	3	0	3
2087	1,176	334	334	0	2	0	2
2088	915	270	270	0	2	0	2
2089	701	215	215	0	1	0	1
2090	530	168	168	0	1	0	1
2091	394	129	129	0	1	0	1
2092	289	97	97	0	1	0	1
2093	209	72	72	0	0	0	0
2094	149	52	52	0	0	0	0
2095	105	37	37	0	0	0	0
2096	74	26	26	0	0	0	0
2097	53	18	18	0	0	0	0
2098	38	12	12	0	0	0	0
2099	28	8	8	0	0	0	0
2100	21	6	6	0	0	0	0
2101	17	4	4	0	0	0	0
2102	14	3	3	0	0	0	0
2103	12	2	2	0	0	0	0
2104	11	2	2	0	0	0	0
2105	9	2	2	0	0	0	0
2106	8	1	1	0	0	0	0
2107	7	1	1	0	0	0	0
2108	7	1	1	0	0	0	0
2109	6	1	1	0	0	0	0
2110	5	1	1	0	0	0	0
2111	4	1	1	0	0	0	0
2112	4	1	1	0	0	0	0
2113	3	1	1	0	0	0	0
2114	2	1	1	0	0	0	0
2115	2	1	1	0	0	0	0
2116	1	1	1	0	0	0	0

## Appendix F: Detailed Tabulations of Member Data

**Table F-1: The Number of Active Members Distributed by Age and Service as of December 31, 2016**

Age	Years of Service										Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	0	0	4	0	0	0	0	0	0	0	4
25 to 29	0	0	887	274	0	0	0	0	0	0	1,161
30 to 34	0	0	438	813	180	0	0	0	0	0	1,431
35 to 39	0	0	141	331	583	75	0	0	0	0	1,130
40 to 44	0	0	55	127	245	295	50	0	0	0	772
45 to 49	0	0	42	94	163	216	266	28	0	0	809
50 to 54	0	0	2	36	75	78	99	151	11	0	452
55 to 59	0	0	0	1	25	27	27	52	45	2	179
60 to 64	0	0	0	0	2	4	1	2	2	2	13
65 to 69	0	0	0	0	1	0	0	0	1	0	2
70 & Up	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	0	0	1,569	1,676	1,274	695	443	233	59	4	5,953

## Appendix F: Detailed Tabulations of Member Data

**Table F-2: The Number of Active Members Distributed by Age  
as of December 31, 2016**

Age	Number
24	4
25	52
26	171
27	280
28	316
29	342
30	305
31	263
32	286
33	287
34	290
35	271
36	237
37	220
38	208
39	194
40	171
41	150
42	158
43	160
44	133
45	151
46	188
47	184
48	156
49	130
50	118
51	110
52	94
53	76
54	54
55	59
56	45
57	30
58	23
59	22
60	7
61	4
62	1
64	1
65	2
Total	5,953



## Appendix F: Detailed Tabulations of Member Data

**Table F-3: The Number of Active Members Distributed by Service as of December 31, 2016**

Service	Number
7	483
8	576
9	510
10	475
11	331
12	276
13	279
14	315
15	329
16	279
17	235
18	217
19	214
20	172
21	151
22	141
23	122
24	109
25	104
26	92
27	99
28	75
29	73
30	63
31	47
32	51
33	41
34	31
35	19
36	22
37	12
38	5
39	1
40	3
41	1
Total	5,953

## Appendix F: Detailed Tabulations of Member Data

**Table F-4: The Number and Deferred Annual Retirement Allowances of Terminated Vested Members Distributed by Age as of December 31, 2016**

Age	Number	Allowances
18	1	\$ 2,268
25	1	2,520
26	4	10,080
27	3	7,560
28	4	10,080
29	6	15,120
30	4	10,080
31	5	12,600
32	7	17,640
33	2	5,040
34	2	3,780
35	1	2,520
36	4	10,080
37	2	3,780
38	4	6,426
39	7	10,458
40	14	18,270
41	30	42,462
42	45	63,126
43	58	82,656
44	74	111,258
45	117	179,802
46	133	205,254
47	152	236,754
48	170	275,184
49	197	332,640
50	214	362,376
51	225	376,992
52	290	508,536
53	298	506,646
54	327	584,262
55	308	548,478
56	301	536,508
57	308	540,918
58	252	439,740

## Appendix F: Detailed Tabulations of Member Data

**Table F-4: The Number and Deferred Annual Retirement Allowances of Terminated Vested Members Distributed by Age as of December 31, 2016 (continued)**

Age	Number	Allowances
59	245	\$ 429,786
60	208	370,062
61	99	176,148
62	91	155,358
63	86	146,412
64	63	99,162
65	79	128,772
66	71	129,150
67	111	192,528
68	112	190,008
69	111	184,212
70	105	181,062
71	78	134,064
72	86	149,184
73	53	92,736
74	63	112,518
75	45	77,112
76	40	72,576
77	30	55,440
78	25	44,730
79	17	28,098
80	26	48,510
81	20	41,958
82	18	34,146
83	8	16,632
84	17	35,028
85	19	40,698
86	18	36,666
87	17	31,878
88	4	10,080
89	2	3,654
90	1	2,520
Total	5,538	\$ 9,532,782

## Appendix F: Detailed Tabulations of Member Data

**Table F-5: The Number and Annual Retirement Allowances of Retired Members Distributed by Age as of December 31, 2016**

Age	Number	Allowances
41	1	\$ 1,890
52	1	2,520
60	60	133,367
61	144	279,661
62	165	301,874
63	166	302,507
64	217	389,740
65	269	486,640
66	289	521,089
67	293	535,159
68	332	599,130
69	330	593,663
70	326	582,246
71	222	417,311
72	209	384,678
73	199	372,078
74	168	321,678
75	127	228,816
76	87	166,698
77	95	192,654
78	119	234,486
79	98	197,064
80	92	184,842
81	78	160,272
82	76	160,776
83	66	141,750
84	59	116,802
85	49	100,170
86	53	112,392
87	45	86,184
88	40	79,128
89	19	40,824
90	14	33,768
91	7	16,380
92	4	7,686
93	5	11,466
94	2	4,914
95	6	10,962
96	5	10,836
97	1	1,260
98	1	2,520
99	1	2,394
100	1	1,260
Total	4,541	\$ 8,531,535