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***NEBRASKA PUBLIC EMPLOYEES  
RETIREMENT SYSTEM***

**STATE PATROL RETIREMENT SYSTEM**

**ACTUARIAL VALUATION REPORT  
AS OF JULY 1, 2016**

**Sixty-First Actuarial Report for  
System Plan Year Beginning July 1, 2016  
and  
State Fiscal Year Ending June 30, 2018**







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# Cavanaugh Macdonald

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November 14, 2016

Public Employees Retirement Board  
Nebraska Public Employees Retirement System  
Post Office Box 94816  
Lincoln, NE 68509

Dear Members of the Board:

At your request, we performed an actuarial valuation of the State Patrol Retirement System as of July 1, 2016 for purposes of determining the actuarial required contribution rate for the plan year ending June 30, 2017. It is our understanding that any additional required State contributions for this plan year will be made on July 1, 2017 (State fiscal year end 2018). The major findings of the valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2016. There were no changes to the actuarial assumptions and methods or plan provisions from the prior valuation. However, the results of an experience study covering the four-year period ending June 30, 2015 were recently presented to the Board. At their meeting on October 17, 2016, all of the recommended assumptions were adopted and will first be used for the July 1, 2017 actuarial valuation, based on the date of adoption selected by the Board.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We found this information to be reasonably consistent and comparable with the information received in prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

We further certify that all costs, liabilities, rates of interest and other factors for the State Patrol Retirement System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer the best estimate of anticipated experience affecting the System. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions. The Public Employees Retirement Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

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Public Employees Retirement Board  
November 14, 2016  
Page 2

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; 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. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

The actuarial computations presented in this report are for purposes of determining the funding amounts for the System as set out in the Nebraska state statutes. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standard Board Number 67 will be presented in a completely separate report.

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

We respectfully submit the following report and look forward to discussing it with you.

Sincerely,

A handwritten signature in blue ink that reads 'Patrice Beckham'.

Patrice A. Beckham, FSA, EA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Brent A. Banister'.

Brent A. Banister Ph.D., FSA, EA, MAAA, FCA  
Chief Pension Actuary



## SECTION 1 – BOARD SUMMARY

---

This report presents the results of the July 1, 2016 actuarial valuation of the State Patrol Retirement System (System). The primary purposes of performing this actuarial valuation are to:

- Determine the level of State contributions for the plan year ending June 30, 2017 which are sufficient to meet the funding policy set out in the Nebraska state statutes.
- Disclose asset and liability measurements as well as the current funded status of the System on the valuation date.
- Compare actual and expected experience under the System during the plan year ended June 30, 2016.
- Analyze and report on trends in System contributions, assets and liabilities over the past several years.

There were no changes to the actuarial assumptions and methods from the last valuation. However, the results of an experience study covering the four-year period ending June 30, 2015 were recently presented to the Board. At their meeting on October 17, 2016, all of the recommended assumptions were adopted and will first be used for the July 1, 2017 actuarial valuation, based on the date of adoption selected by the Board. The assumption changes will significantly increase actuarial liabilities in the 2017 valuation. Based on estimates provided in the experience study report, which were based on the July 1, 2015 actuarial valuation, the unfunded actuarial accrued liability is expected to increase by approximately \$30 to \$35 million, the funded ratio is expected to decline around 5-10%, and additional State contributions are expected to increase by approximately \$2 to 3 million.

The Nebraska statutes require the State to make an additional contribution if the regular, payroll-related contributions by members and the State are insufficient to meet the actuarial required contribution for the plan year. Based on the results of the July 1, 2016 actuarial valuation, an additional State contribution of \$2,541,558 is required for the plan year ending June 30, 2017 (expected to be paid July 1, 2017).

The actuarial valuation results provide a “snapshot” view of the System’s financial condition on July 1, 2016. The System’s unfunded actuarial accrued liability (UAAL) decreased from \$53.8 million last year to \$47.7 million this year and the funded ratio increased from 87% to 89%.

The valuation results reflect net favorable experience for the past plan year as demonstrated by an UAAL that was lower than expected. The UAAL on July 1, 2016 is \$47.7 million as compared to an expected UAAL of \$54.4 million. The favorable experience was due to the net impact of an experience gain on the System liabilities that exceeded the experience loss on the actuarial value of assets. The rate of return on the market value of assets for FY 2016 was 1.6%, as reported by the Nebraska Investment Council. However, the asset smoothing method only recognizes 20% of the shortfall between the 8.0% assumed rate of return and the actual return. The partial recognition of FY 2016 experience coupled with the recognition of part of the deferred gains from recent years resulted in a rate of return on the actuarial (smoothed) assets of 7.4%. This generated an experience loss of \$2.3 million on the actuarial value of assets. There was an actuarial gain of \$9.0 million on liabilities, largely as a result of salary increases that were lower than expected and a smaller COLA than expected being granted this year to members currently receiving benefits (0.64% actual versus 2.50% expected).



**SECTION 1 – BOARD SUMMARY**

The actuarial required contribution rate decreased from 41.59% of pay last year to 41.14% of pay in this year’s valuation, a decrease of 0.45% of pay. The number of active members in the current valuation decreased by 4.8% from last year. As a result, covered payroll decreased by 2.2% instead of the 4.0% assumed increase, resulting in a higher contribution rate (determined as a percent of payroll) to fund the UAAL. Favorable experience during FY 2016, as discussed above, was enough to offset the impact due to lower payroll than expected.

A summary of the key results from the July 1, 2016 actuarial valuation is shown in the following table. As the table indicates, the statutory contribution rates are not sufficient to meet the actuarial required contribution rate and an additional State appropriation of 9.14% of pay, or \$2,541,558, is required.

	Valuation Results	
	July 1, 2016	July 1, 2015
Unfunded Actuarial Accrued Liability	\$47,717,764	\$53,764,109
Funded Ratio (Actuarial Assets)	88.69%	86.89%
Normal Cost Rate	28.94%	28.85%
UAAL Amortization Rate	12.20%	12.74%
Total Actuarial Required Contribution	41.14%	41.59%
Member Contribution Rate	(16.00%)	(16.00%)
Employer Contribution Rate	(16.00%)	(16.00%)
Additional Required State Contribution Rate	9.14%	9.59%
Additional Required State Contribution	\$2,541,558	\$2,725,738

***EXPERIENCE FOR THE LAST PLAN YEAR***

Numerous factors contributed to the change in the System’s assets, liabilities, and actuarial required contribution rate between July 1, 2015 and July 1, 2016. The components are examined in the following discussion.

**ASSETS**

As of June 30, 2016, the System had net assets of \$361.2 million, when measured on a market value basis. This was a decrease of \$2.7 million from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarial required contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is applied to determine the value of assets used in the valuation. The resulting amount is called the actuarial value of assets. In this year’s valuation, the actuarial value of assets is \$374.2 million, an increase of \$17.8 million from the prior year. The components of change in the asset values are shown in the following table:

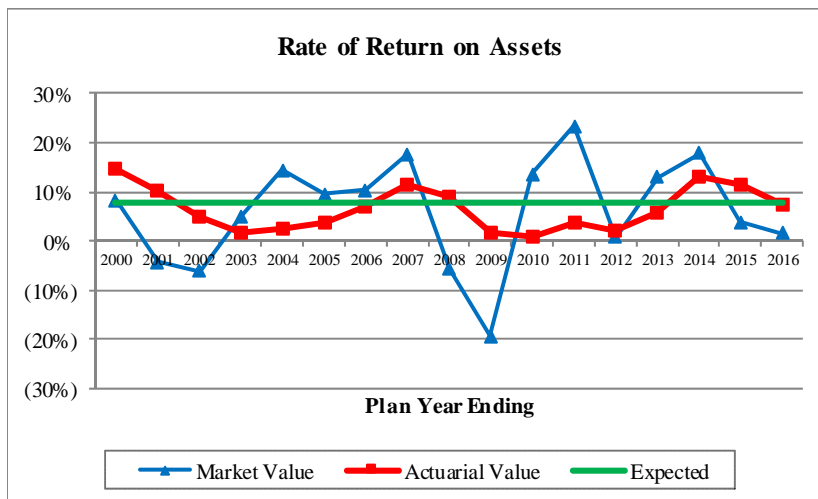




**SECTION 1 – BOARD SUMMARY**

	Market Value (\$M)		Actuarial Value (\$M)	
<b>Net Assets, June 30, 2015</b>	\$	363.92	\$	356.45
- Employer and Member Contributions	+	11.42	+	11.42
- Benefit Payments	-	19.58	-	19.58
- Net Investment Income	+	5.40	+	25.92
<b>Net Assets, June 30, 2016</b>	\$	361.16	\$	374.21
Estimated Rate of Return		1.6%		7.4%

The rate of return on the actuarial value of assets was 7.4%, which was lower than the 8.0% assumption. As a result, there was an experience loss on assets of \$2.3 million. The investment return on the market value of assets for FY 2016 of 1.6% changed the deferred investment experience from a net deferred gain of \$7.5 million in last year’s valuation to a net deferred loss of \$13.0 million in the current valuation. Please see Section 3 of this report for more detailed information on the market and actuarial value of assets.



*The rate of return of the actuarial value of assets has been less volatile than the market value return, illustrating the benefit of using an asset smoothing method.*

**LIABILITIES**

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets as of the valuation date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year’s UAAL.

The unfunded actuarial accrued liability is shown as of July 1, 2016 in the following table:



**SECTION 1 – BOARD SUMMARY**

	<b>Actuarial Value of Assets</b>	<b>Market Value of Assets</b>
Actuarial Accrued Liability	\$421,923,380	\$421,923,380
Value of Assets	<u>374,205,616</u>	<u>361,155,486</u>
UAAL Base Liability	\$47,717,764	\$60,767,894
Funded Ratio	88.69%	85.60%

See Section 4 of the report for the detailed development of the unfunded actuarial accrued liability.

The net change in the UAAL from July 1, 2015 to July 1, 2016 was a decrease of \$6.1 million. The components of this net change are shown in the following table (in millions):

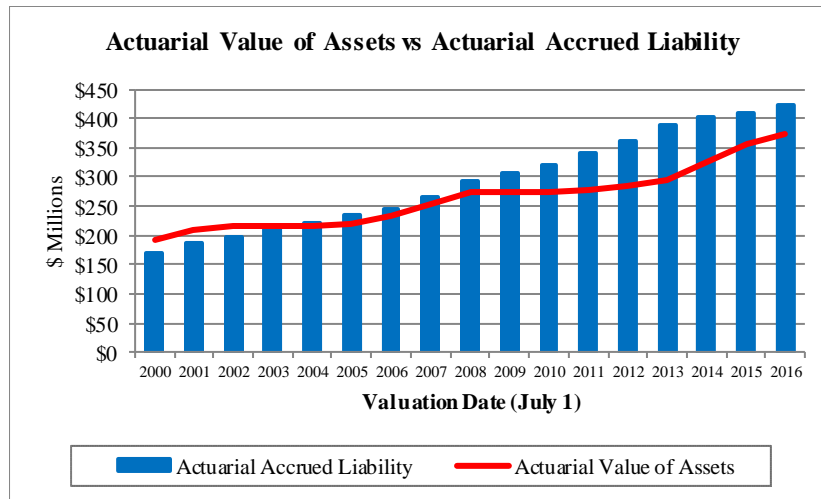
	<b>(\$ Millions)</b>
<b>UAAL Base Liability, July 1, 2015</b>	\$53.76
- Expected increase from amortization method	0.54
- Investment experience	2.34
- Liability experience	(8.98)
- Other experience	0.06
<b>UAAL Base Liability, July 1, 2016</b>	\$47.72

As shown above, various components impacted the UAAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAAL and are measured as the difference between the expected UAAL and the actual UAAL, taking into account any changes due to actuarial assumptions and methods, or benefit provision changes. Overall, the System experienced a net actuarial gain of \$6.6 million. The net actuarial gain may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a \$9.0 million gain on the System liabilities and an experience loss of \$2.3 million on the actuarial value of assets. The liability gain was the net result of various components of actuarial gains and losses, the largest of which were a gain from salary increases that were lower than expected and a gain from a smaller COLA than expected being granted to members currently receiving benefits. A breakdown of the components of experience gains/losses can be found in Table 8 of this report.

As the following graph of historical actuarial assets and accrued liabilities shows, the State Patrol Retirement System liabilities have steadily increased while the assets have grown more slowly, especially in the years after the fiscal year 2009 investment experience. However, asset growth has outpaced actuarial accrued liability growth in recent years and the gap is beginning to narrow.



**SECTION 1 – BOARD SUMMARY**



An evaluation of the UAAL on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the UAAL and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information, which is based on the actuarial value of assets, is shown below (in millions).

	7/1/2012	7/1/2013	7/1/2014	7/1/2015	7/1/2016
Funded Ratio (AVA/AAL)	78.06%	76.11%	81.20%	86.89%	88.69%
UAAL	\$79.49	\$92.41	\$75.45	\$53.76	\$47.72

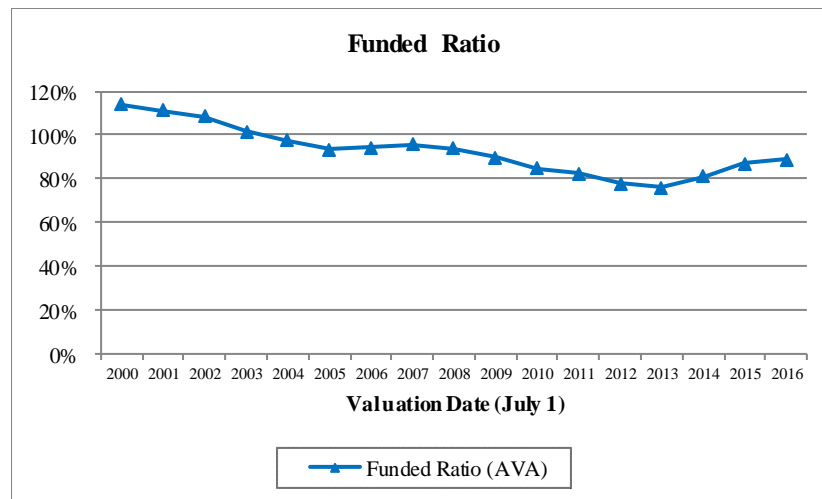
Note that the funded ratio does not indicate whether or not the System assets are sufficient to settle benefits earned to date. The funded ratio by itself also may not be indicative of future funding requirements. If the funded ratios were shown using the market value of assets, the results would differ.

The funded ratio over a longer period is shown in the following graph. Given the fixed contribution rate of 32.00% of pay (16.00% by members and 16.00% by the State) and a normal cost rate of 28.94% of pay, only a small portion of the total contribution is available to fund the UAAL. As a result, additional contributions from the State will be necessary to improve the funded ratio unless actual investment experience in future years is higher than the assumed rate of return.



## SECTION 1 – BOARD SUMMARY

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### ACTUARIAL REQUIRED CONTRIBUTION RATE

The System is funded by statutory contribution rates of 16.0% of pay each for members and the employer. State statutes require the State to make an additional contribution if the regular, payroll-related contributions by employees and employers are insufficient to meet the actuarial required contribution amount for the plan year. The additional State contributions for the plan year are made on the July 1 following the plan year end. Based on the results of the July 1, 2016 actuarial valuation, an additional State contribution of 9.14% of pay, or \$2,541,558, is necessary for the plan year ending June 30, 2017.

The actuarial contribution rate consists of two components:

- A “normal cost” for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date.
- An “unfunded actuarial accrued liability contribution” for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

See Section 5 of the report for the detailed development of the actuarial contribution rate and corresponding dollar amount, which are summarized in the following table:



**SECTION 1 – BOARD SUMMARY**

<b>Contribution Rates</b>	<b>July 1, 2016</b>	<b>July 1, 2015</b>
1. Normal Cost Rate	28.94%	28.85%
2. UAAL Contribution Rate	12.20%	12.74%
3. Total Actuarial Required Contribution Rate	41.14%	41.59%
4. Member Contribution Rate	(16.00%)	(16.00%)
5. Employer Contribution Rate	(16.00%)	(16.00%)
6. Total Statutory Contribution Rate	(32.00%)	(32.00%)
7. Additional Required State Contribution Rate [3 + 6]	9.14%	9.59%
8. Estimated Payroll	\$ 27,806,977	\$ 28,422,706
9. Additional State Required Contribution [7 * 8, but not less than \$0]	\$ 2,541,558	\$ 2,725,738

The actuarial required contribution rate for the plan year ending June 30, 2017 is 41.14%. The member contribution rate of 16.00% and the employer contribution rate of 16.00% result in a total statutory contribution rate of 32.00% of pay. As a result, there is a contribution rate shortfall this year of 9.14%, which is projected to be about \$2.5 million.

A history of expected employer contributions and any resulting additional State contributions is shown in the following table, whether or not actually contributed.



**SECTION 1 – BOARD SUMMARY**

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<b>History of Expected State Contributions</b>			
<b>Plan Year</b>	<b>Statutory State Contributions</b>	<b>Additional Appropriations</b>	<b>Total</b>
2016/2017	\$ 4,449,116	\$ 2,541,558	\$ 6,990,674
2015/2016	4,547,633	2,725,738	7,273,371
2014/2015	4,149,416	3,866,737	8,016,153
2013/2014	4,386,823	4,652,774	9,039,597
2012/2013	5,005,482	4,552,680	9,558,162
2011/2012	5,291,940	2,255,430	7,547,370
2010/2011	4,597,331	2,770,262	7,367,593
2009/2010	4,203,166	1,801,610	6,004,776
2008/2009	4,361,746	812,087	5,173,833
2007/2008	4,225,729	365,020	4,590,749
2006/2007	3,942,430	813,159	4,755,589
2005/2006	3,766,098	1,080,050	4,846,148
2004/2005	3,050,645	948,654	3,999,299
2003/2004	2,745,970	434,202	3,180,172
2002/2003	2,413,762	0	2,413,762

Note: Information before Plan Year 2013/2014 was produced by prior actuary.

The actuarial required contribution rate, which for this plan year is determined based on the snapshot of the System taken on the valuation date of July 1, 2016, will change each year as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the System.

**SUMMARY**

Due to a net experience gain, the actuarial required contribution rate decreased from 41.59% to 41.14% this year. However, because of the return on the market value of assets of 1.6, last year’s net deferred investment gain of \$7.5 million is now a net deferred investment loss of \$13.0 million in the current valuation. The deferred loss (the amount by which the actuarial value of assets exceeds the market value) will be reflected in the actuarial value of assets over the next four years, but may be offset by actual investment experience if it is more favorable than assumed. Despite the decrease in the actuarial required contribution rate, the fixed contribution rates for the members and the State of 16.00% each remain insufficient to meet the actuarial required contribution this year. The contribution rate shortfall in this valuation is 9.14% of covered payroll or about \$2.5 million.

**SECTION 1 – BOARD SUMMARY****SUMMARY OF PRINCIPAL RESULTS**

	<u>7/1/2016 Valuation</u>	<u>7/1/2015 Valuation</u>	<u>% Change</u>
<b>1. PARTICIPANT DATA</b>			
Number of:			
Active Members	393	413	(4.84%)
Retired Members and Beneficiaries	404	400	1.00%
DROP Participants	52	51	1.96%
Disabled Members	15	13	15.38%
Inactive Members	<u>27</u>	<u>25</u>	8.00%
Total Members	891	902	(1.22%)
Projected Annual Salaries of Active Members	\$ 27,806,977	\$ 28,422,706	(2.17%)
Annual Retirement Payments for Members in Receipt and DROP Participants	\$ 21,157,018	\$ 20,580,317	2.80%
<b>2. ASSETS AND LIABILITIES</b>			
a. Market Value of Assets	\$ 361,155,486	\$ 363,922,631	(0.76%)
b. Actuarial Value of Assets	374,205,616	356,446,470	4.98%
c. Total Actuarial Accrued Liability	421,923,380	410,210,579	2.86%
d. UAAL Base Liability [c - b]	\$ 47,717,764	\$ 53,764,109	(11.25%)
e. Funded Ratio (Actuarial Value of Assets) [b / c]	88.69%	86.89%	2.07%
f. Funded Ratio (Market Value of Assets) [a / c]	85.60%	88.72%	(3.52%)
<b>3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL</b>			
Normal Cost	28.94%	28.85%	0.31%
Amortization of Unfunded Actuarial Accrued Liability	<u>12.20%</u>	<u>12.74%</u>	(4.24%)
Actuarial Required Contribution Rate	41.14%	41.59%	(1.08%)
Member Contribution Rate	(16.00%)	(16.00%)	0.00%
Employer Contribution Rate	<u>(16.00%)</u>	<u>(16.00%)</u>	0.00%
Additional Required State Contribution Rate	9.14%	9.59%	(4.69%)
Additional Required State Contribution	\$ 2,541,558	\$ 2,725,738	(6.76%)



## SECTION 2 – SCOPE OF THE REPORT

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This report presents the actuarial valuation of the State Patrol Retirement System as of July 1, 2016. This valuation was prepared at the request of the Public Employees Retirement Board of the Nebraska Public Employees Retirement System.

Please pay particular attention to our actuarial certification letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings which result from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the System. Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use. Section 6 includes some historical funding and other information.

This report includes several appendices:

- Appendix A Schedules of valuation data classified by various categories of members.
- Appendix B A summary of the current benefit structure, as determined by the provisions of governing law on July 1, 2016.
- Appendix C A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D A glossary of actuarial terms.





## SECTION 3 – ASSETS

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In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2016. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System, which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the System assets and liabilities.

### **Market Value of Assets**

The current market value represents the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time. Table 1 is a comparison, at market values, of System assets as of July 1, 2016, and July 1, 2015, in total and by investment category. Table 2 summarizes the change in the market value of assets from July 1, 2015 to July 1, 2016.

### **Actuarial Value of Assets**

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book values of assets, representing the cost of investments, may be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value of assets for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. Under the asset smoothing methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five-year period.

Table 3 shows the development of the actuarial value of assets (AVA) as of the valuation date.



**TABLE 1**  
**STATE PATROL RETIREMENT SYSTEM**  
**MARKET VALUE OF ASSETS**  
**by Investment Category**

	<u>June 30, 2016</u>	<u>June 30, 2015</u>
1. Cash and Equivalents	\$ 132,452	\$ 177,134
2. Investments*	366,996,034	368,406,379
3. Capital Assets	38	55
4. Receivables and Prepaids	23,587,975	31,101,029
5. Accounts Payable	<u>(29,561,013)</u>	<u>(35,761,966)</u>
6. Net Assets Available for Pension Benefits	\$ 361,155,486	\$ 363,922,631

\* Includes DROP account balances.



**TABLE 2**  
**STATE PATROL RETIREMENT SYSTEM**  
**CHANGE IN MARKET VALUE OF ASSETS**

	2016	2015
1. Market Value of Assets, Beginning of Year	\$ 363,922,631	\$ 357,316,892
2. Contributions		
(a) Member (includes purchased service)	\$ 4,365,651	\$ 4,180,263
(b) State	4,327,670	4,207,087
(c) State appropriations*	2,725,738	4,439,339
(d) Total	\$ 11,419,059	\$ 12,826,689
3. Expenditures		
(a) Benefit payments	\$ 17,752,098	\$ 17,235,329
(b) Refunds	84,092	82,538
(c) DROP Disbursements	1,740,186	2,140,673
(d) Administrative expenses	128,156	116,679
(e) Total	\$ 19,704,532	\$ 19,575,219
4. Investment Return, Net of Investment Expenses		
(a) Investment income	\$ 4,847,590	\$ 4,661,861
(b) Securities lending income	78,977	51,183
(c) Securities lending expense	(26,790)	(11,032)
(d) Net appreciation/(depreciation) in fair value of investments	591,773	8,630,638
(e) Other	26,778	21,619
(f) Total investment return	\$ 5,518,328	\$ 13,354,269
5. Market Value of Assets, End of Year [1 + 2(d) - 3(e) + 4(f)]	\$ 361,155,486	\$ 363,922,631
6. Rate of Return, Net of Expenses**	1.6%	3.7%

\* For FY 2015, this includes \$572,602 of contributions made to fund military service credits.

\*\* As reported by the Nebraska Investment Council



**SECTION 3 – ASSETS**

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**TABLE 3**  
**STATE PATROL RETIREMENT SYSTEM**  
**DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS**

	Year End			
	6/30/2013	6/30/2014	6/30/2015	6/30/2016
1. Actuarial Value of Assets, Beginning of Year	\$ 282,810,785	\$ 294,468,029	\$ 325,966,725	\$ 356,446,470
2. Unrecognized Return Beginning of Year	(4,499,418)	15,121,755	31,350,167	7,476,161
3. Contributions During Year				
(a) Member	\$ 5,106,556	\$ 4,134,598	\$ 4,180,263	\$ 4,365,651
(b) State	5,111,325	4,099,853	4,207,087	4,327,670
(c) State appropriations	2,404,580	4,652,774	4,439,339	2,725,738
(d) Total	<u>\$ 12,622,461</u>	<u>\$ 12,887,225</u>	<u>\$ 12,826,689</u>	<u>\$ 11,419,059</u>
4. Benefit Payments	16,928,305	16,194,014	17,235,329	17,752,098
5. Refund of Contributions/DROP disbursements	1,600,719	3,816,399	2,223,211	1,824,278
6. Expected Investment Income on (1), (2), (3), (4) and (5) at 8%	22,094,841	24,554,315	28,389,923	28,858,929
7. Actual Return on Market Value Net of All Expenses	35,584,261	54,850,296	13,237,590	5,390,172
8. Return to be Spread, End of Year	\$ 13,489,420	\$ 30,295,981	\$ (15,152,333)	\$ (23,468,757)

[7 - 6]



**TABLE 3  
(continued)**

**STATE PATROL RETIREMENT SYSTEM**

9. Return to be Spread

Plan Year <u>Ending</u>	Return to be <u>Spread</u>	Unrecognized <u>Percent</u>	Unrecognized <u>Return</u>
2016	(\$23,468,757)	80%	(\$18,775,006)
2015	(15,152,333)	60%	(9,091,400)
2014	30,295,981	40%	12,118,392
2013	13,489,420	20%	2,697,884
			<hr/> (\$13,050,130)

10. Total Market Value of Assets as of July 1, 2016 \$361,155,486

11. Total Actuarial Value of Assets as of July 1, 2016 \$374,205,616  
[10 - 9]

12. Asset Ratios

(a) Actuarial Value to Market Value [11 / 10]	103.61%
(b) Market Value to Actuarial Value [10 / 11]	96.51%



## **SECTION 4 – SYSTEM LIABILITIES**

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In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the State Patrol Retirement System as of the valuation date, July 1, 2016. In this section, the discussion will focus on the commitments (future benefit payments) of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing active members, inactive members, retirees and their beneficiaries.

The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes the measurement of both benefits already earned and future benefits to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and for the lives of the surviving beneficiaries.

All liabilities reflect the benefit provisions in place as of July 1, 2016.

### **Actuarial Accrued Liability**

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

- (1) that which is attributable to the past and
- (2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability." The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost." Table 5 contains the calculation of actuarial accrued liability for the System. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.



**TABLE 4**  
**STATE PATROL RETIREMENT SYSTEM**  
**PRESENT VALUE OF FUTURE BENEFITS (PVFB)**  
**AS OF JULY 1, 2016**

1. Active Employees	
(a) Retirement	\$ 187,571,895
(b) Termination	6,638,751
(c) Disability	6,625,528
(d) Death	2,042,740
(e) Total	\$ <u>202,878,914</u>
2. Inactive Vested Members	3,064,179
3. Inactive Nonvested Members	166,393
4. DROP Account Balances	8,587,209
5. Disabled Members	6,039,794
6. Retirees	245,420,403
7. Beneficiaries	<u>19,534,237</u>
8. Total Present Value of Future Benefits	\$ 485,691,129



**TABLE 5**  
**STATE PATROL RETIREMENT SYSTEM**  
**ACTUARIAL ACCRUED LIABILITY**  
**AS OF JULY 1, 2016**

1. Present Value of Future Benefits for Active Members	\$	202,878,914
2. Present Value of Future Normal Costs for Active Members		
(a) Retirement	\$	53,693,743
(b) Termination		4,715,655
(c) Disability		3,912,776
(d) Death		1,445,575
(e) Total	\$	<u>63,767,749</u>
3. Actuarial Accrued Liability for Active Members [1 - 2(e)]	\$	139,111,165
4. Actuarial Accrued Liability for Inactive Members	\$	282,812,215
5. Total Actuarial Accrued Liability [3 + 4]	\$	421,923,380
6. Actuarial Value of Assets	\$	374,205,616
7. Unfunded Actuarial Accrued Liability [5 - 6]	\$	47,717,764





**TABLE 6**  
**STATE PATROL RETIREMENT SYSTEM**  
**ACTUARIAL BALANCE SHEET**

ASSETS

Actuarial Value of Assets	\$	374,205,616
Unfunded Actuarial Accrued Liability		47,717,764
Present Value of Future Normal Costs		<u>63,767,749</u>
Total Assets	\$	485,691,129

LIABILITIES

Present Value of Future Benefits			
Active members			
Retirement	\$	187,571,895	
Termination		6,638,751	
Disability		6,625,528	
Death		<u>2,042,740</u>	
Total			202,878,914
Inactive members			3,230,572
Retirees, disabilities and beneficiaries*			<u>279,581,643</u>
Total	\$		485,691,129

\* Includes DROP account balances.



**TABLE 7**  
**STATE PATROL RETIREMENT SYSTEM**  
**ACTUARIAL GAIN/(LOSS)**

**Liabilities**

1. Actuarial Accrued Liability as of July 1, 2015	\$ 410,210,579
2. Normal Cost for Plan Year Ending June 30, 2016	7,548,594
3. Benefit Payments During Plan Year Ending June 30, 2016	(19,576,376)
4. Interest at 8.0%	<u>32,717,877</u>
5. Expected Actuarial Accrued Liability as of July 1, 2016	\$ 430,900,674
6. Actuarial Accrued Liability as of July 1, 2016	\$ 421,923,380

**Assets**

7. Actuarial Value of Assets as of July 1, 2015	\$ 356,446,470
8. Contributions During Plan Year Ending June 30, 2016	11,419,059
9. Benefit Payments During Plan Year Ending June 30, 2016	(19,576,376)
10. Interest at 8.0%	<u>28,260,836</u>
11. Expected Actuarial Value of Assets as of July 1, 2016	\$ 376,549,989
12. Actuarial Value of Assets as of July 1, 2016	\$ 374,205,616

**Gain / (Loss)**

13. Actuarial Gain / (Loss) on Liabilities [5 - 6]	\$ 8,977,294
14. Actuarial Gain / (Loss) on Assets [12 - 11]	(2,344,373)
15. Total Actuarial Gain / (Loss) for Plan Year Ending June 30, 2016 [13 + 14]	\$ 6,632,921



**TABLE 8**  
**STATE PATROL RETIREMENT SYSTEM**  
**GAIN/(LOSS) ANALYSIS BY SOURCE**

<b>Liability Sources</b>	<b>Gain/(Loss)</b>
Retirement	\$ (334,539)
Termination	73,463
Disability	(146,810)
Mortality	1,851,313
Salary	3,021,458
New Entrants/Rehires	(407,769)
COLA	4,841,608
Miscellaneous	78,570
Total Liability Gain/(Loss)	\$ 8,977,294
Asset Gain/(Loss)	\$ (2,344,373)
Net Actuarial Gain/(Loss)	\$ 6,632,921



TABLE 9  
STATE PATROL RETIREMENT SYSTEM  
PROJECTED BENEFIT PAYMENTS  
AS OF JULY 1, 2016

<u>Plan Year Ending June 30</u>	<u>Current Active Members</u>	<u>Current In-Pay Members</u>	<u>Total</u>
2017	\$ 932,000	\$ 21,091,000	\$ 22,023,000
2018	1,453,000	21,372,000	22,825,000
2019	2,050,000	21,630,000	23,680,000
2020	3,507,000	21,916,000	25,423,000
2021	4,470,000	22,199,000	26,669,000
2022	5,663,000	22,475,000	28,138,000
2023	6,567,000	22,783,000	29,350,000
2024	8,046,000	23,020,000	31,066,000
2025	10,222,000	23,282,000	33,504,000
2026	12,061,000	23,518,000	35,579,000
2027	13,518,000	23,697,000	37,215,000
2028	17,062,000	23,838,000	40,900,000
2029	18,415,000	23,964,000	42,379,000
2030	19,797,000	24,038,000	43,835,000
2031	21,374,000	24,083,000	45,457,000
2032	22,556,000	24,103,000	46,659,000
2033	24,597,000	24,041,000	48,638,000
2034	26,032,000	23,909,000	49,941,000
2035	27,223,000	23,759,000	50,982,000
2036	28,557,000	23,534,000	52,091,000
2037	29,462,000	23,240,000	52,702,000
2038	31,072,000	22,888,000	53,960,000
2039	31,895,000	22,477,000	54,372,000
2040	33,566,000	22,006,000	55,572,000
2041	36,100,000	21,476,000	57,576,000
2042	38,179,000	20,886,000	59,065,000
2043	39,065,000	20,239,000	59,304,000
2044	39,957,000	19,534,000	59,491,000
2045	40,761,000	18,773,000	59,534,000
2046	41,479,000	17,960,000	59,439,000

Note: Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to any current nonvested inactive members and assume future retirees elect the normal form of payment.



## **SECTION 5 – EMPLOYER CONTRIBUTIONS**

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The previous two sections were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the present value of future benefits (total liability). This is expected in all but a completely closed fund, where no further contributions are anticipated. In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will deal with this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term "fully funded" is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated by the actuarial assumptions. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

### **Description of Contribution Rate Components**

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member's year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability/ (surplus) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains and losses.

In general, contributions are computed in accordance with a level percent-of-payroll funding objective. The actuarial contribution rate based on the July 1, 2016 actuarial valuation will be used to determine the actuarial required employer contribution rate to the State Patrol Retirement System for the plan year ending June 30, 2017. Any additional State contributions are expected to be deposited on July 1, 2017 (State fiscal year end 2018). In this context, the term "contribution rate" means the percentage, which is applied to a particular active member payroll to determine the actual employer contribution amount (i.e., in dollars) for the group.

### **Contribution Rate Summary**

In Table 10 the amortization payment related to the unfunded actuarial accrued liability, as of July 1, 2016, is developed. Table 11 develops the actuarial required contribution rate for the System and the amount of the required state contribution.

The actuarial contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C.



SECTION 5 – EMPLOYER CONTRIBUTIONS

TABLE 10
STATE PATROL RETIREMENT SYSTEM
AMORTIZATION SCHEDULE FOR THE
UNFUNDED ACTUARIAL ACCRUED LIABILITY

Table with 6 columns: Amortization Bases, Original Amount, July 1, 2016 Remaining Payments, Date of Last Payment, Outstanding Balance as of July 1, 2016, Annual Contribution\*. Rows include UAAL Bases from 2006 to 2016 and a Total row.

\* Contribution amount reflects mid-year timing.

- 1. Total UAAL Amortization Payments \$ 3,392,756
2. Projected Payroll for FY 2017 \$ 27,806,977
3. UAAL Amortization Payment Rate 12.20%

Note: Beginning with the July 1, 2013 valuation, the payments on each UAAL base are determined as a level percent of payroll using a 4% payroll growth assumption.



**TABLE 11**  
**STATE PATROL RETIREMENT SYSTEM**  
**ACTUARIAL REQUIRED CONTRIBUTION RATE**

1. Normal Cost	
(a) Amount	\$ 7,366,409
(b) Expected pay for current actives	25,453,565
(c) Normal Cost Rate as % of pay	28.94%
2. UAAL Amortization Rate (see Table 10)	12.20%
3. Total Actuarial Required Contribution Rate [1(c) + 2]	41.14%
4. Statutory Member Contribution Rate	16.00%
5. Statutory Employer Contribution Rate	16.00%
6. Additional Required State Contribution Rate [3 - 4 - 5, but not less than 0%]	9.14%
7. Projected Payroll for FY 2017	\$ 27,806,977
8. Additional Required State Contribution [6 * 7]	\$ 2,541,558
9. Total State Contributions	
(a) State statutory amount	\$ 4,449,116
(b) Additional State contribution	2,541,558
(c) Total	\$ <u>6,990,674</u>



## **SECTION 6 – OTHER INFORMATION**

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### **HISTORICAL FUNDING AND OTHER INFORMATION**

This section of the report provides a historical perspective on the System’s funding and contribution practices, along with other information that may be of interest.

The information required for financial reporting by the System and participating employers is established by the Governmental Accounting Standards Board (GASB). GASB Statement No. 67 is effective for plan years ending on or after June 15, 2014. GASB 67 basically separates accounting and financial reporting from funding requirements by creating disclosure and reporting requirements that are independent of the basis used for funding the System. A separate report that contains all of the information and exhibits of an actuarial nature that are necessary for the System’s financial reporting under GASB 67 for fiscal year 2016 will be issued in the future.

GASB Statement No. 68 establishes standards for the measurement, recognition, and display of pension expense and related liabilities. Annual pension cost is measured and disclosed on the accrual basis of accounting. GASB 68 was first effective for fiscal year-end 2015 for the state of Nebraska. A separate report containing all of the pertinent information under GASB 68 reporting for fiscal year 2016 will also be prepared in the future.





SECTION 6 – OTHER INFORMATION

TABLE 12  
STATE PATROL RETIREMENT SYSTEM  
HISTORICAL FUNDING INFORMATION  
SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded Actuarial Accrued Liability (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a % of Covered Payroll [(b - a) / c]
June 30, 2003	\$214,657,454	\$210,930,784	(\$3,726,670)	101.8%	\$21,929,399	(17.0%)
June 30, 2004	216,422,556	222,161,512	5,738,956	97.4%	22,640,907	25.3%
June 30, 2005	219,831,273	236,026,471	16,195,198	93.1%	22,882,413	70.8%
June 30, 2006	231,740,772	245,373,102	13,632,330	94.4%	24,057,960	56.7%
June 30, 2007	254,662,819	265,846,597	11,183,778	95.8%	26,072,859	42.9%
June 30, 2008	273,393,928	291,996,719	18,602,791	93.6%	26,979,643	69.0%
June 30, 2009	274,119,906	305,291,065	31,171,159	89.8%	25,922,439	120.2%
June 30, 2010	273,306,925	321,901,446	48,594,521	84.9%	26,765,816	181.6%
June 30, 2011	279,192,669	339,554,456	60,361,787	82.2%	26,195,473	230.4%
June 30, 2012	282,810,785	362,298,975	79,488,190	78.1%	25,794,219	308.2%
June 30, 2013	294,468,029	386,875,100	92,407,071	76.1%	27,417,644	337.0%
June 30, 2014	325,966,725	401,415,518	75,448,793	81.2%	25,933,848	290.9%
June 30, 2015	356,446,470	410,210,579	53,764,109	86.9%	28,422,706	189.2%
June 30, 2016	374,205,616	421,923,380	47,717,764	88.7%	27,806,977	171.6%

Note: Information before 2013 was produced by the prior actuary.



**TABLE 13**  
**STATE PATROL RETIREMENT SYSTEM**  
**HISTORICAL FUNDING INFORMATION**  
**SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER**  
**AND OTHER CONTRIBUTING ENTITIES**

<b>Plan Year Ending</b>	<b>Actuarial Required Contributions</b>	<b>Percent Contributed</b>
June 30, 2005	\$ 4,121,155	77%
June 30, 2006	5,081,930	100%
June 30, 2007	5,058,621	100%
June 30, 2008	4,855,700	100%
June 30, 2009	5,384,789	100%
June 30, 2010	6,260,122	100%
June 30, 2011	7,563,126	79%
June 30, 2012	7,774,506	100%
June 30, 2013	9,768,585	77%
June 30, 2014	8,752,627	100%
June 30, 2015	8,073,824	100%
June 30, 2016	7,053,408	100%



**APPENDIX A – MEMBERSHIP DATA**

**MEMBER DATA RECONCILIATION**

	<b>Active Members</b>	<b>Members in DROP</b>	<b>Inactive Vested</b>	<b>Inactive Non-vested</b>	<b>Retirees and Beneficiaries</b>	<b>Disabled Members</b>	<b>Total</b>
As of July 1, 2015	413	51	19	6	400	13	902
Changes in status							
a) Retirement	(3)	(7)	0	0	10	0	0
b) DROP	(9)	9	0	0	0	0	0
c) Death	0	(1)	0	0	(12)	0	(13)
d) Non-vested terminations	(3)	0	0	3	0	0	0
e) Vested terminations	(3)	0	3	0	0	0	0
f) Contribution refund	(4)	0	0	0	0	0	(4)
g) Beneficiaries in receipt	0	0	0	0	6	0	6
h) Disability retirements	(2)	0	0	0	0	2	0
i) Return to active service	4	0	(2)	(2)	0	0	0
j) Expired benefits	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total changes in status	(20)	1	1	1	4	2	(11)
New entrants	0	0	0	0	0	0	0
Net Change	(20)	1	1	1	4	2	(11)
As of July 1, 2016	393	52	20	7	404	15	891



**APPENDIX A – MEMBERSHIP DATA**

**SUMMARY OF MEMBERSHIP DATA**

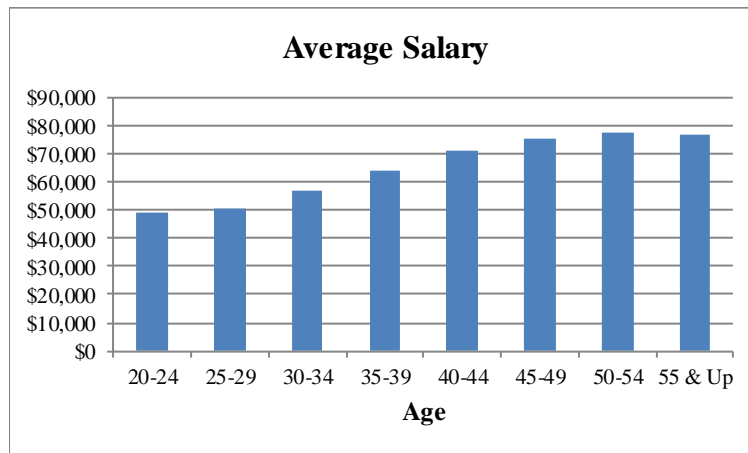
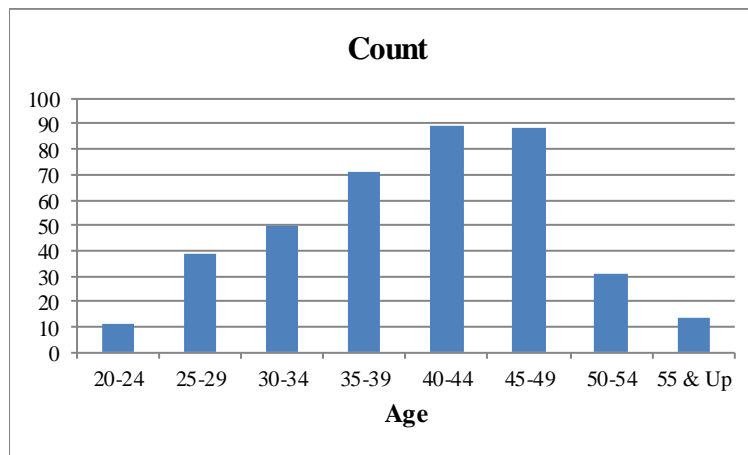
<b>A. ACTIVE MEMBERS</b>	<b>July 1, 2016</b>	<b>July 1, 2015</b>	<b>% Change</b>
1. Number of Active Members			
(a) Before assumed retirement age	377	400	(5.8%)
(b) Beyond assumed retirement age	16	13	23.1%
(c) Total	393	413	(4.8%)
2. Annual Reported Salary			
(a) Before assumed retirement age	\$ 25,000,142	\$ 25,752,322	(2.9%)
(b) Beyond assumed retirement age	1,233,812	1,044,724	18.1%
(c) Total	\$ 26,233,954	\$ 26,797,046	(2.1%)
3. Accumulated Contributions	\$ 42,684,305	\$ 41,141,082	3.8%
4. Active Member Averages			
(a) Age	40.7	39.9	2.0%
(b) Service	13.4	12.7	5.5%
(c) Compensation	\$ 66,753	\$ 64,884	2.9%
(d) Accumulated contributions	\$ 108,611	\$ 99,615	9.0%
<b>B. INACTIVE MEMBERS</b>			
1. Number of Inactive Members	27	25	8.0%
2. Accumulated Member Contributions	\$ 1,934,830	\$ 1,771,575	9.2%
3. Inactive Members Averages			
(a) Age (vested members only)	43.5	43.0	1.2%
(b) Accumulated member contributions	\$ 71,660	\$ 70,863	1.1%
<b>C. RETIREES, DISABLEDS, AND BENEFICIARIES</b>			
1. Number of Members			
(a) Retired	324	321	0.9%
(b) Disabled	15	13	15.4%
(c) Beneficiaries	80	79	1.3%
(d) DROP	52	51	2.0%
(e) Total	471	464	1.5%
2. Annual Benefits			
(a) Retired	\$ 15,446,286	\$ 15,156,530	1.9%
(b) Disabled	502,071	426,624	17.7%
(c) Beneficiaries	2,039,223	1,976,583	3.2%
(d) DROP	3,169,438	3,020,580	4.9%
(e) Total	\$ 21,157,018	\$ 20,580,317	2.8%
3. Market Value of DROP Account Balances	\$ 8,587,209	\$ 7,042,793	21.9%



**APPENDIX A – MEMBERSHIP DATA**

**ACTIVE MEMBERS  
AS OF JULY 1, 2016**

<u>Age</u>	<u>Count of Members</u>			<u>Reported FY 2016 Earnings for Current Members</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	11	0	11	\$ 541,320	\$ 0	\$ 541,320
25-29	32	7	39	1,613,473	348,320	1,961,793
30-34	47	3	50	2,655,755	175,200	2,830,955
35-39	66	5	71	4,206,279	310,992	4,517,271
40-44	86	3	89	6,106,948	181,804	6,288,752
45-49	84	4	88	6,293,131	321,687	6,614,818
50-54	30	1	31	2,334,172	68,063	2,402,235
55 & Up	13	1	14	999,377	77,433	1,076,810
<b>Total</b>	<b>369</b>	<b>24</b>	<b>393</b>	<b>\$ 24,750,455</b>	<b>\$ 1,483,499</b>	<b>\$ 26,233,954</b>





**APPENDIX A – MEMBERSHIP DATA**

**AGE AND SERVICE DISTRIBUTION  
AS OF JULY 1, 2016**

Age		0-4	5-9	10-14	15-19	20-24	Over 25	Total
<b>20-24</b>	Number	11	0	0	0	0	0	11
	Total Salary	\$ 541,320	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 541,320
	Average Sal.	\$ 49,211	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 49,211
<b>25-29</b>	Number	35	4	0	0	0	0	39
	Total Salary	\$ 1,748,453	\$ 213,340	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,961,793
	Average Sal.	\$ 49,956	\$ 53,335	\$ 0	\$ 0	\$ 0	\$ 0	\$ 50,302
<b>30-34</b>	Number	10	31	9	0	0	0	50
	Total Salary	\$ 511,986	\$ 1,754,200	\$ 564,769	\$ 0	\$ 0	\$ 0	\$ 2,830,955
	Average Sal.	\$ 51,199	\$ 56,587	\$ 62,752	\$ 0	\$ 0	\$ 0	\$ 56,619
<b>35-39</b>	Number	5	13	48	5	0	0	71
	Total Salary	\$ 261,599	\$ 734,714	\$ 3,193,501	\$ 327,457	\$ 0	\$ 0	\$ 4,517,271
	Average Sal.	\$ 52,320	\$ 56,516	\$ 66,531	\$ 65,491	\$ 0	\$ 0	\$ 63,624
<b>40-44</b>	Number	2	2	35	45	5	0	89
	Total Salary	\$ 101,501	\$ 97,884	\$ 2,300,773	\$ 3,395,013	\$ 393,581	\$ 0	\$ 6,288,752
	Average Sal.	\$ 50,751	\$ 48,942	\$ 65,736	\$ 75,445	\$ 78,716	\$ 0	\$ 70,660
<b>45-49</b>	Number	1	3	14	32	22	16	88
	Total Salary	\$ 48,193	\$ 174,680	\$ 914,046	\$ 2,295,748	\$ 1,823,329	\$ 1,358,822	\$ 6,614,818
	Average Sal.	\$ 48,193	\$ 58,227	\$ 65,289	\$ 71,742	\$ 82,879	\$ 84,926	\$ 75,168
<b>50-54</b>	Number	0	0	9	8	11	3	31
	Total Salary	\$ 0	\$ 0	\$ 741,515	\$ 564,650	\$ 849,025	\$ 247,045	\$ 2,402,235
	Average Sal.	\$ 0	\$ 0	\$ 82,391	\$ 70,581	\$ 77,184	\$ 82,348	\$ 77,491
<b>55 &amp; Up</b>	Number	1	0	4	3	6	0	14
	Total Salary	\$ 90,043	\$ 0	\$ 294,236	\$ 196,942	\$ 495,589	\$ 0	\$ 1,076,810
	Average Sal.	\$ 90,043	\$ 0	\$ 73,559	\$ 65,647	\$ 82,598	\$ 0	\$ 76,915
<b>Total</b>	Number	65	53	119	93	44	19	393
	Total Salary	\$ 3,303,095	\$ 2,974,818	\$ 8,008,840	\$ 6,779,810	\$ 3,561,524	\$ 1,605,867	\$ 26,233,954
	Average Sal.	\$ 50,817	\$ 56,129	\$ 67,301	\$ 72,901	\$ 80,944	\$ 84,519	\$ 66,753



**APPENDIX A – MEMBERSHIP DATA**

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**MEMBERS PARTICIPATING IN DROP  
AS OF JULY 1, 2016**

<u>Age</u>	<u>Count of Members</u>			<u>Annual Benefits</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
49 & Under	0	0	0	\$ 0	\$ 0	\$ 0
50-51	7	1	8	459,346	61,321	520,667
52-53	19	1	20	1,206,294	48,927	1,255,221
54-55	14	1	15	796,237	49,797	846,034
56-57	3	0	3	178,348	0	178,348
58-59	6	0	6	369,168	0	369,168
60 & Up	0	0	0	0	0	0
Total	49	3	52	\$ 3,009,393	\$ 160,045	\$ 3,169,438



**APPENDIX A – MEMBERSHIP DATA**

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**INACTIVE VESTED MEMBERS  
AS OF JULY 1, 2016**

<u>Age</u>	<u>Count of Members</u>			<u>Annual Benefits</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	0	0	0	\$ 0	\$ 0	\$ 0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	5	0	5	98,630	0	98,630
40-44	7	0	7	129,205	0	129,205
45-49	7	0	7	174,141	0	174,141
50-54	1	0	1	28,477	0	28,477
55 & Up	0	0	0	0	0	0
Total	20	0	20	\$ 430,453	\$ 0	\$ 430,453

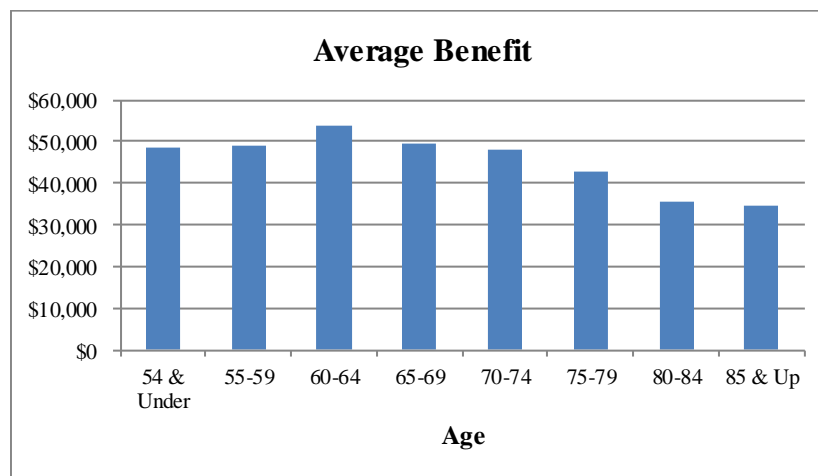
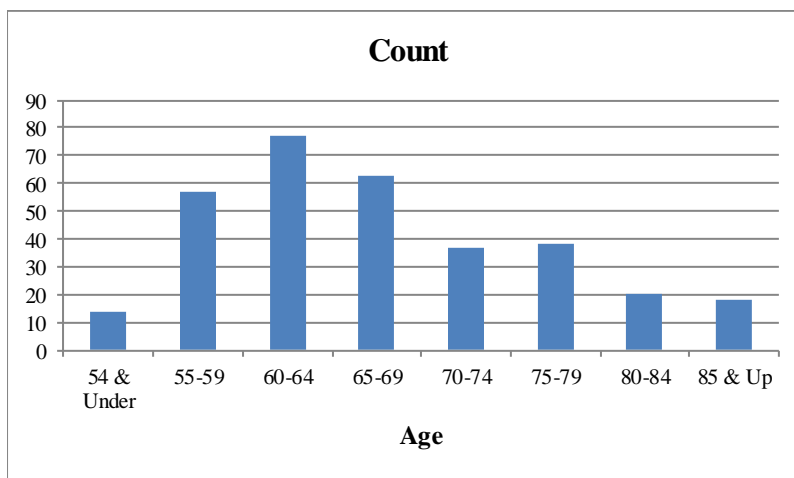




**APPENDIX A – MEMBERSHIP DATA**

**RETIRED MEMBERS  
AS OF JULY 1, 2016**

Age	Count of Members			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	11	3	14	\$ 612,393	\$ 69,932	\$ 682,325
55-59	46	11	57	2,328,391	454,800	2,783,191
60-64	76	1	77	4,112,485	28,037	4,140,522
65-69	62	1	63	3,087,352	20,518	3,107,870
70-74	36	1	37	1,716,999	59,293	1,776,292
75-79	38	0	38	1,627,087	0	1,627,087
80-84	20	0	20	708,399	0	708,399
85 & Up	18	0	18	620,600	0	620,600
<b>Total</b>	<b>307</b>	<b>17</b>	<b>324</b>	<b>\$14,813,706</b>	<b>\$632,580</b>	<b>\$15,446,286</b>

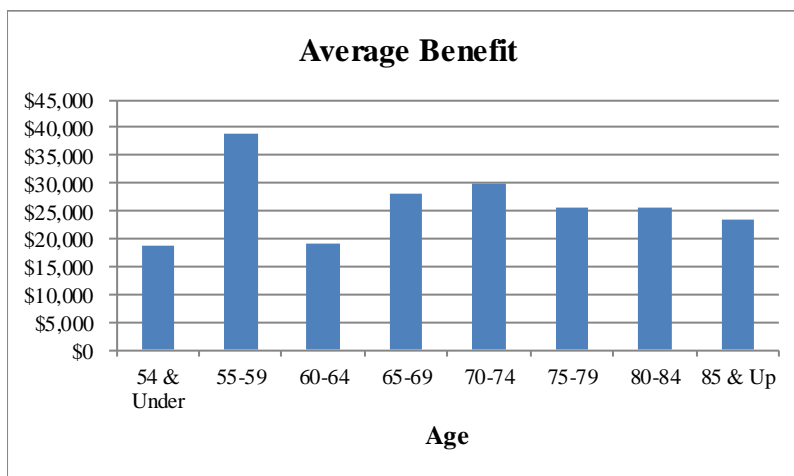
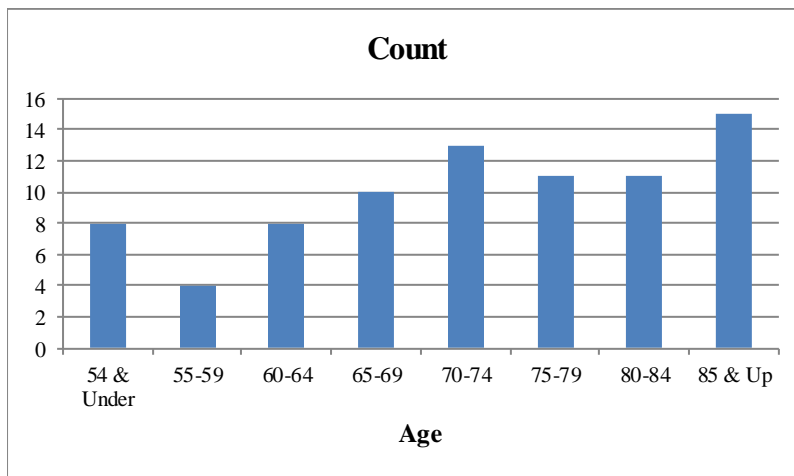




**APPENDIX A – MEMBERSHIP DATA**

**BENEFICIARIES  
AS OF JULY 1, 2016**

Age	Count of Members			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	1	7	8	\$ 5,089	\$ 143,752	\$ 148,841
55-59	0	4	4	0	155,632	155,632
60-64	0	8	8	0	154,364	154,364
65-69	0	10	10	0	281,536	281,536
70-74	0	13	13	0	388,763	388,763
75-79	1	10	11	29,954	250,285	280,239
80-84	0	11	11	0	280,485	280,485
85 & Up	0	15	15	0	349,363	349,363
<b>Total</b>	<b>2</b>	<b>78</b>	<b>80</b>	<b>\$ 35,043</b>	<b>\$ 2,004,180</b>	<b>\$ 2,039,223</b>





**APPENDIX A – MEMBERSHIP DATA**

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**DISABLED MEMBERS  
AS OF JULY 1, 2016**

Age	Count of Members			Annual Benefits		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
54 & Under	4	1	5	\$ 122,094	\$ 28,422	\$ 150,516
55-59	0	1	1	0	34,560	34,560
60-64	3	0	3	102,107	0	102,107
65-69	2	0	2	76,291	0	76,291
70-74	3	0	3	107,261	0	107,261
75-79	0	0	0	0	0	0
80-84	0	0	0	0	0	0
85 & Up	1	0	1	31,336	0	31,336
Total	13	2	15	\$ 439,089	\$ 62,982	\$ 502,071



## APPENDIX B – SUMMARY OF PLAN PROVISIONS

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<b>Member</b>	Any member of the Nebraska State Patrol, permanent force.
<b>Participation Date</b>	Date of becoming a member.
<b>Definitions</b>	
<i>Covered pay</i>	Gross annual earnings subject to contributions. For a patrol officer with service prior to January 4, 1979, total salary includes pay for unused sick leave accrued during his final three years of service, and pay for unused vacation leave (including leave not allowed to be carried over).
<i>Final average earnings</i>	The average of the highest three 12-month periods of covered pay, ending on the earlier of the participant's termination date or retirement date. For a patrol officer with service prior to January 4, 1979, it includes pay for 25% of unused sick leave accrued during his final three years of service, and pay for unused vacation leave (including leave not allowed to be carried over).
<i>Fiscal year</i>	Twelve month period ending June 30.
<i>Member and employer contributions</i>	16% of monthly salary plus 16% of pay received at termination for unused sick leave and vacation leave for a patrol officer with service prior to January 4, 1979. Such contributions are credited with interest based on the 1-year treasury yield curve on July 1 of each year, as determined by State Statutes. Employer contributions are 16% of monthly salary. The State makes any additional contributions that are actuarially required. (Prior to July 1, 2013, employee and employer contribution rates were 19% of pay.).
<i>Pension benefit</i>	3% of final average salary times pension service. The benefit is subject to a maximum of 75% of Final Average Salary. Effective July 1, 2001, an automatic annual cost-of-living adjustment (COLA) equal to the CPI-W index, with a maximum increase of 2.5% in any one year is provided for current and future retirees by LB 711. Also provided is a minimum floor benefit equal to 60% of the purchasing power of the original benefit.
<i>Normal Retirement Date (NRD)</i>	First of month coinciding with or next following (a) the completion of 25 years of service and attaining age 50, (b) the completion of ten years of service and attaining age 55, or (c) attaining age 60 regardless of service.
<i>Pension service</i>	Length of service includes all service with the Nebraska State Patrol, permanent force, computed to the nearest one-twelfth year, plus declared emergency service in the armed forces.



**APPENDIX B – SUMMARY OF PLAN PROVISIONS**

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**Eligibility for Benefits**

<i>Deferred vested</i>	Termination for reasons other than death, disability, or retirement after completing at least six years of pension service.
<i>Disability retirement</i>	Retirement by reason of disability as defined by statute.
<i>Early retirement</i>	Retirement before NRD and on or after both attaining age 50 and completing ten years of pension service.
<i>Normal retirement</i>	Retire on NRD.
<i>Postponed retirement</i>	Retire after NRD.
<i>Post-retirement death benefit</i>	Death after retirement with surviving spouse or dependent children under age 19. For non-disability retirement, the surviving spouse must have been married to the member at the date of retirement.
<i>Pre-retirement death benefit</i>	Death prior to retirement.

**Monthly Benefits Paid Upon the Following Events**

<i>Normal retirement</i>	Pension benefit determined as of NRD.
<i>Early retirement</i>	Pension benefit determined as of early retirement date, reduced by 5/9% for each month that commencement (which must be after age 50 and ten years of service) of payment precedes the earlier of age 55 or completion of 25 years of service. No reduction is made after 25 years of service.
<i>Postponed retirement</i>	Monthly pension benefit determined as of actual retirement date.
<i>Termination with deferred vested benefit</i>	Refund of contributions with regular interest <u>or</u> a percentage of the pension benefit determined as of termination date, reduced by 5/9% for each month that commencement (which must be after age 50 and ten years of service) of payment precedes the earlier of age 55 or completion of 25 years of service. This percentage is based upon completed years of pension service as follows:

<u>Years</u>	<u>Vested Percentage</u>
5 and under	0%
6	20
7	40
8	60
9	80
10 or more	100



## APPENDIX B – SUMMARY OF PLAN PROVISIONS

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<i>Disability retirement</i>	<p>A monthly benefit equal to 50% of current monthly salary at the date of disablement for members with less than 17 years of service.</p> <p>For members with more than 17 years of service, a monthly benefit equal to the product of 3% of final monthly salary, times total years of service subject to a maximum of 75% of final average monthly salary.</p>
<i>Pre-retirement death benefits</i>	<p><b>Surviving spouse or dependent children under age 19:</b> Benefit is computed as if member retired for disability on the date of death. This benefit is payable to the surviving spouse as long as spouse has dependent children under age 19. If spouse dies or remarries, 75% of this benefit continues to children until the youngest attains age 19. If there are no dependent children under age 19, 75% of this benefit is payable to the surviving spouse until death or remarriage.</p> <p><b>No surviving spouse or dependent children under age 19:</b> A lump sum equal to the member's contributions plus regular interest.</p>
<i>Post-retirement death benefits</i>	<p>100% of member's annuity is payable to the surviving spouse provided spouse has dependent children under 19. If there is no surviving spouse or spouse dies or remarries, 75% of member's annuity continues to children until the youngest attains age 19. If there are no dependent children under age 19, 75% of member's annuity continues to surviving spouse.</p>
<i>Forms of payment</i>	<p>Normal form is 75% Joint and Survivor benefit. Members may also elect a refund of contributions. If there is no surviving spouse or dependent children under age 19, the member's accumulated contributions with interest are paid to the beneficiary or estate.</p>
<i>Deferred Retirement Option Plan (DROP)</i>	<p>A member may elect to participate in the DROP after they attain age 50 with 25 years of service. A member can continue to work while participating in the DROP, but must terminate employment within 5 years of entry into the DROP. The member's retirement benefits would be calculated as of the DROP entry date. The monthly payments that begin at entry into the DROP are accumulated until the member terminates service, at which time the DROP accumulated benefits and investment income can be paid as a lump sum, rollover or annuity. The COLA for retirees would not apply to the member during participation in the DROP and both the member and employer contributions cease upon entry into the DROP.</p>



## **APPENDIX B – SUMMARY OF PLAN PROVISIONS**

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### **Benefits Reflected in Valuation**

All benefits were valued, including future cost of living increases granted by statute.

### **Plan Provisions Effective After July 1, 2016**

No future changes in plan provisions were recognized in determining the funded status or in determining the actuarial soundness of statutory contribution levels.

### **Changes in Plan Provisions Since the Prior Year**

There have been no changes to plan provisions since last year.



## ACTUARIAL METHODS

- 1. Calculation of Normal cost and Actuarial Accrued Liability:** The method used to determine the normal cost and actuarial accrued liability was the Entry Age Actuarial Cost Method described below.

### Entry Age Actuarial Cost Method

Projected pension and preretirement spouse's death benefits were determined for all active members who had not reached age 60 or 25 years of service. Cost factors designed to produce annual costs as a level percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members who had not reached age 60 or 25 years of service and determining an average normal cost rate which is then related to the total payroll of active members who had not reached age 60 or 25 years of service. The actuarial assumptions shown in Appendix C were used in determining the projected benefits and cost factors. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, active members who either reached age 60 or 25 years of service, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date. The initial unfunded actuarial accrued liability established July 1, 2004, is amortized with a level dollar payment amount over 25 years. At subsequent valuation dates, amortization bases equal to changes in the unfunded actuarial accrued liability are established and amortized with a level dollar payment over a 25-year period. The unfunded actuarial accrued liability was reinitialized as of July 1, 2006 and amortized over a 30-year period. At subsequent valuation dates, amortization bases equal to changes in the unfunded actuarial accrued liability are established and amortization over a level dollar payment over a 30-year period. If the unfunded actuarial accrued liability was \$0 or less as of the prior valuation date, all previous amortization bases are considered fully amortized. Effective with the July 1, 2013 valuation, amortization payments were recalculated to amortize the remaining bases as a level percentage of expected payroll, per LB 553.

Under the Entry Age Normal method, experience gains or losses, i.e., decreases or increases in actuarial accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.





## APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

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**2. Calculation of the Actuarial Value of Assets:** The actuarial value of assets is based on a five-year smoothing method and is determined by spreading the effect of each year's investment return in excess of or below the expected return. The Market Value of assets as the valuation date is reduced by the sum of the following:

- i. 80% of the return to be spread during the first year preceding the valuation date,
- ii. 60% of the return to be spread during the second year preceding the valuation date,
- iii. 40% of the return to be spread during the third year preceding the valuation date, and
- iv. 20% of the return to be spread during the fourth year preceding the valuation date.

The return to be spread is the difference between (1) the actual investment return on Market Value and (2) the expected return of Actuarial Value. Effective July 1, 2000, the expected return on Actuarial Value includes interest on the previous year's unrecognized return.

### **Changes in Methods and Procedures Since the Prior Year**

There have been no changes to the methods and procedures since last year.



**APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS**

**ECONOMIC ASSUMPTIONS**

- 1. Investment Return 8.00% per annum, compounded annually, net of expenses.
- 2. Inflation 3.25% per annum, compounded annually.
- 3. Salary Increase Rates vary by service. Sample rates are as follows:

Rates by Service	
Years	Rate*
<1	9.5%
5	6.6
10	5.6
15	5.5
20	5.5
25	5.5
30	4.0

\* Projected pay at retirement is adjusted by 8.7% to reflect Halpin decision for members hired before January 4, 1979.

- 4. Payroll Growth 4.00% per annum
- 5. Interest on Employee Contributions 4.25% per annum, compounded annually.
- 6. Increases on Compensation And Benefit Limits 3.25% per annum on the 401(a)(17) compensation limit and the 415 benefit limit

**DEMOGRAPHIC ASSUMPTIONS**

- 1. Mortality
  - The mortality assumption includes an appropriate amount of conservatism that reflects expected future mortality improvement.
  - a. Healthy lives – Active members 1994 Group Annuity Mortality Table, projected to 2015 using scale AA, set-back 1 year (sex distinct)
  - b. Healthy lives – Retired members and beneficiaries 1994 Group annuity Mortality table, projected to 2015 using scale AA, set-back 1 year (sex distinct)
  - c. Disabled lives 1983 Railroad Retirement Board Disabled Annuitants Mortality (unisex)
  - d. Healthy mortality rates and life expectancies are shown below at sample ages:



**APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS**

<b>Pre-retirement Mortality</b>				
<b>Sample Age</b>	<b>Mortality Rate</b>		<b>Life Expectancy (Years)</b>	
	<b>Males</b>	<b>Females</b>	<b>Males</b>	<b>Females</b>
20	0.03%	0.02%	62.3	65.8
30	0.07	0.03	52.6	55.9
40	0.09	0.05	42.9	46.1
50	0.16	0.09	33.4	36.4
60	0.51	0.35	24.1	26.9
70	1.62	1.14	16.0	18.4

<b>Post-retirement Mortality</b>				
<b>Sample Age</b>	<b>Mortality Rate</b>		<b>Life Expectancy (Years)</b>	
	<b>Males</b>	<b>Females</b>	<b>Males</b>	<b>Females</b>
50	0.16%	0.09%	33.4	36.4
60	0.51	0.35	24.1	26.9
70	1.62	1.14	16.0	18.4
80	4.43	3.05	9.2	11.0
90	12.55	9.82	4.5	5.4

e. Disabled mortality rates and life expectancies are shown below at sample ages:

<b>Disabled Mortality</b>		
<b>Sample Age</b>	<b>Mortality Rate</b>	<b>Life Expectancy (Years)</b>
30	1.06%	30.0
40	1.35	23.1
50	3.16	17.2
60	4.25	13.1
70	6.75	9.1
80	10.77	5.8



**APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS**

2. Retirement

Retirement is assumed to occur upon attaining certain age and service requirements. The retirement assumption varies depending on benefit eligibility and age at retirement.

Early/Normal Retirement Eligibility	Age and Service Requirements	Retirement Assumption
Reduced	Age 50 Service: 10 years	3% at each age
Unreduced	Age 55 Service: 10 years	10% at each age
Unreduced (Eligible for DROP)	Age 50 Service: 25 years	100% at each age
Unreduced (Mandatory)	Age 60	100% at each age

3. Termination

Rates vary by service. Sample rates are as follows:

Rates by Service	
Years	Rate
<1	4.0%
1	3.8
5	2.0
10	1.5
15	1.0
20	1.0
25+	1.0

4. Disability

Rates vary by age. Sample rates are as follows:

Rates by Age	
Age	Rate
25	.08%
30	.10
35	.13
40	.20
45	.31
50	.52
55	.91
60	1.36

**OTHER ASSUMPTIONS**

1. Form of Payment

75% Joint & Survivor Annuity. Deferred vesteds are assumed to take the greater of the present value of an annuity at earliest unreduced eligibility or a refund of contributions.



## **APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS**

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2. Marital Status	
a. Percent married	100% married
b. Spouse's age	Females assumed to be three years younger than males.
3. Children	All members are assumed to have one dependent child at death or retirement. The child is assumed to be 28 years younger than the member, and is assumed to always survive until age 19.
4. Administrative Expense	Investment return is assumed to be net of expenses.
5. Cost of living adjustments	2.50% per annum, compounded annually, and 3.25% per annum, compounded annually, after reaching 60% purchasing power floor benefit.
6. DROP participation	All members elect the DROP at the earliest possible date and remain in the DROP for 4 years or to age 60, if earlier.
7. State Contribution	Additional State contributions for the current plan year are assumed to be contributed in a lump sum on the July 1 following the plan year end. These amounts from the prior plan year are treated as a contribution receivable on the plan's financial statements.

### **Changes in Assumptions since the Prior Year**

There were no changes in the assumptions from the prior year.

## **TECHNICAL VALUATION PROCEDURES**

### **Data Procedures**

Salaries for first year members are annualized by using the client's Calculated Salary field. For continuing active members, the Accumulated Salary field is used.

When multiple records are received, the record with the oldest beneficiary date of birth is valued.

### **Other Valuation Procedures**

Salary increases are assumed to apply to annual amounts.

Decrement rates are assumed to occur mid-year, except that immediate retirement is assumed for those who are at or above the age at which retirement rates are 100%. Standard adjustments are made for multiple decrements.



## **APPENDIX D – GLOSSARY OF TERMS**

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<b>Actuarial Accrued Liability</b>	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as “accrued liability” or “actuarial liability”.
<b>Actuarial Assumptions</b>	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
<b>Accrued Service</b>	Service credited under the system which was rendered before the date of the actuarial valuation.
<b>Actuarial Equivalent</b>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate assumptions.
<b>Actuarial Cost Method</b>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the “actuarial funding method”.
<b>Experience Gain (Loss)</b>	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
<b>Actuarial Present Value</b>	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
<b>Amortization</b>	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
<b>Normal Cost</b>	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.



## APPENDIX D – GLOSSARY OF TERMS

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**Unfunded Actuarial Accrued Liability** The difference between actuarial accrued liability and the valuation assets. Sometimes referred to as “unfunded actuarial liability” or “unfunded accrued liability”.

Most retirement systems have unfunded actuarial accrued liability. They arise each time new benefits are added and each time an actuarial loss is realized.