



**Commonwealth of Pennsylvania
Retired Pennsylvania State Police Program
GASB Statement Nos. 74 and 75 Valuation Report**

Measurement date of June 30, 2017

Prepared by Deloitte Consulting LLP

March 2018

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Actuarial Valuation Opinion

This report presents results of the actuarial valuation of the Commonwealth of Pennsylvania's Retired Pennsylvania State Police Program ("the Plan" or "RPSP") measured as of June 30, 2017. In this report, we present disclosure information as of June 30, 2017 as required by Government Accounting Standards Board Statement Nos. 74 and 75 (GASB Nos. 74 and 75). In our opinion, this report is complete and accurate and represents fairly the actuarial position of the Plan for the purposes stated herein.

The Commonwealth of Pennsylvania provided the participant data, financial information and plan descriptions used in this valuation. The actuary has analyzed the data and other information provided for reasonableness, but has not independently audited the data or other information provided. The actuary has no reason to believe the data or other information provided is not complete and accurate and knows of no further information that is essential to the preparation of the actuarial valuation.

Actuarial information under GASB Nos. 74 and 75 is for purposes of fulfilling trust and employer financial accounting requirements. The results have been prepared on a basis consistent with our understanding of GASB Nos. 74 and 75 and are based upon assumptions prescribed by the Commonwealth of Pennsylvania. Determinations for purposes other than meeting employer financial accounting requirements may be significantly different from the results reported herein.

In our opinion, all costs, liabilities, rates of interest, and other factors underlying these actuarial computations have been determined on the basis of actuarial assumptions and methods that are each reasonable (or consistent with authoritative guidance) for the purposes herein taking into account the experience of the Plan and future expectations.

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 operations 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 program provisions or applicable law. Our scope for this actuarial valuation did not include analyzing the potential range of such future measurements, and we did not perform that analysis.

The undersigned with actuarial credentials collectively meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

This report was prepared solely for the benefit and internal use of the plan sponsor. This report is not intended for the benefit of any other party and may not be relied upon by any third party for any purpose, and Deloitte Consulting accepts no responsibility or liability with respect to any party other than the plan sponsor.

To the best of our knowledge, no employee of the Deloitte U.S. Firms is an officer or director of the employer. In addition, we are not aware of any relationship between the Deloitte U.S. Firms and the employer that may impair or appear to impair the objectivity of the work detailed in this report.

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Executive Summary

Governmental Accounting Requirements and Report Purpose

The Governmental Accounting Standards Board released the Statement of Governmental Accounting Standards Nos. 74 and 75 in June 2015. GASB No. 74 establishes financial reporting requirements for OPEB plans that have assets accumulated in a trust or equivalent arrangement for the purpose of funding OPEB. GASB No. 75 details the reporting and disclosure requirements for employers with payables (OPEB liabilities) to employees of state and local governmental employers through defined benefit OPEB plans that are administered through trusts or equivalent arrangements. The Commonwealth of Pennsylvania adopted GASB No. 74 in the fiscal year ended June 30, 2017 and will adopt GASB No. 75 in the fiscal year ending June 30, 2018.

The purpose of this actuarial valuation report is to provide information for the Commonwealth's trust and employer financial reporting. The information provided herein will be used for the fiscal year ended June 30, 2017 GASB No. 74 disclosures and fiscal year ending June 30, 2018 GASB No. 75 disclosures (the Commonwealth has elected to use a measurement date as of the end of the prior fiscal year end for GASB No. 75).

Summary of Results

The key results for the measurement period ended June 30, 2017 are:

- Net OPEB Liability (NOL) is \$6.1 billion, approximately 1582% of covered employee payroll.
- Plan Fiduciary Net Position (FNP) as a percentage of Total OPEB Liability (TOL) is 1.5%.
- OPEB Expense is \$0.2 billion.

For the June 30, 2017 measurement, there was a gain due to changes in assumptions that resulted in a decrease in the Total OPEB Liability of \$0.8 billion. This gain was caused by the increase in discount rate from 2.85% as of June 30, 2016 to 3.58% as of June 30, 2017.

Background and Comments

Overview of Plans

The Commonwealth sponsors the Retired Pennsylvania State Police Program (RPSPP) for eligible retirees and their dependents to receive subsidized health coverage for the retiree's lifetime.

Funding Policy

The Commonwealth created the OPEB Investment Pool, a Trust Equivalent Arrangement, during the fiscal year ended June 30, 2008. The Commonwealth plans to contribute \$1 million annually until assets cover the present value of future benefits, subject to annual evaluation.

RPSPP employer contribution requirements are established within collective bargaining agreements. During the fiscal year ended June 30, 2017, employing agencies contributed \$1,140 per biweekly pay period for each current RPSPP eligible active employee to the RPSPP Trust. RPSPP plan members are not required to make contributions.

Health Care Reform

The Patient Protection and Affordable Care Act ("PPACA") was signed into law on March 23, 2010. The primary objective of the act is to increase the number of Americans with health insurance coverage. There are several provisions within PPACA with potentially significant short- and long-term cost implications for employers. The applicable provisions of PPACA were first accounted for in the July 1, 2010 valuation. On December 18, 2015, the Consolidated Appropriations Act, 2016 became law. This legislation delayed the effective date of the high cost plan excise tax from 2018 to 2020 and made it tax deductible. In future years, there may continue to be increased cost impact to the extent the health & welfare program experiences increased utilization due to these changes, all of which are assumed to be in place indefinitely.

The provisions of PPACA considered are as follows:

- Prohibiting lifetime and annual limits on the dollar value of coverage for "essential health benefits"
- Increasing the dependent child age limit to age 26
- Elimination of cost sharing for in-network preventive services
- Reflecting manufacturer discounts available to certain Medicare beneficiaries receiving applicable covered Part D drugs (mostly brand) while in the coverage gap
- Transitional Reinsurance Fee
- Out-of-pocket limit includes both medical and Rx expenses
- Excise tax on "Cadillac Plans" effective in 2020

The impact of applicable provisions except for excise tax, which was valued separately, were incorporated in the per capita claims costs summarized in Appendix D.

Actuarial Methods and Assumptions

The Commonwealth of Pennsylvania State Employees' Retirement System (SERS) performs experience studies periodically to determine reasonable and appropriate economic and demographic assumptions for purposes of valuing the defined benefit pension plan. The most recent SERS experience study covered the years 2011 through 2015 and was presented to the State Employees' Retirement Board in March 2016. The approved recommendations from that study were used to determine the assumptions for this valuation, where applicable. The inflation assumption was selected by the SERS Board during an April of 2017 meeting based on a review of actual plan experience and the prevalent economic outlook. Consistent with prior valuations, these demographic assumptions assume beginning of year decrements (retirement, withdrawal, death, disability, etc.). In addition, Deloitte periodically reviews actuarial assumptions only applicable to the postemployment medical plan outside of the experience study, such as medical trend rates and age-graded medical rates.

One significant assumption where the recommendation of the experience study is not applicable to this retiree health benefit valuation is the discount rate. Since RPSPP has insufficient assets to meet next year's projected benefit payments, as prescribed by GASB Nos. 74 and 75, the discount rate will be based on the index rate for 20-year tax-exempt general obligation municipal bond index rate with an average rating of AA/Aa or higher as of the measurement date. The Commonwealth elected to determine the discount rate using the Bond Buyer 20-Bond General Obligation Index. The discount rate was 3.58% as of June 30, 2017 (2.85% as of June 30, 2016).

The treatment of Medicare Part D in this report is consistent with our understanding of the GASB technical bulletin 2006-1 issued in June 2006, which states that Medicare Part D subsidy payments should not be reflected under GASB No. 45 (predecessor statement to GASB No. 75).

The actuarial methods and assumptions are described in the appendices of this report.

Summary of Actuarial Valuation Results

This section provides a summary of the actuarial valuation results for the plan. All information is provided as of the measurement date except for the census data. As this is the implementation for GASB Nos. 74 and 75, the valuation results as of the June 30, 2016 and June 30, 2017 measurement dates were based on December 31, 2016 census data. All liabilities are net of expected retiree contributions.

(All dollar amounts are in thousands)

Measurement Date	6/30/2017	6/30/2016
Total OPEB Liability	\$ 6,209,658	\$ 6,746,387
Plan Fiduciary Net Position	93,666	82,532
Net OPEB Liability	\$ 6,115,992	\$ 6,663,855
Plan Fiduciary Net Position As A Percentage Of Total OPEB Liability	1.5%	1.2%
Net OPEB Liability As A Percentage Of Covered Employee Payroll	1582.0%	N/A
Discount Rate	3.58%	2.85%
Participant Counts		
Active Participants	4,299	4,299
Retired Participants*	<u>4,907</u>	<u>4,907</u>
Total	9,206	9,206
Covered Employee Payroll	\$ 386,602	N/A

* Retired participants include retirees, disabled participants, and surviving family members.

GASB Nos. 74 and 75 Disclosures

GASB Nos. 74 and 75 requires disclosure of notes to the financial statements and required supplementary information that includes information shown in this section. As this is the implementation for GASB Nos. 74 and 75, the valuation results as of the June 30, 2016 and June 30, 2017 measurement dates were based on December 31, 2016 census data and employer contributions for the fiscal year ended June 30, 2017. GASB No. 75 will be implemented for the fiscal year ending June 30, 2018.

Schedule of Changes in Net OPEB Liability

(All dollar amounts are in thousands)

	Discount Rate	Total OPEB Liability (a)	Plan Fiduciary Net Position (b)	Net OPEB Liability (a)-(b)
Measurement Date of June 30, 2016	2.85%	\$ 6,746,387	\$ 82,532	\$ 6,663,855
Service Cost		193,336		193,336
Interest		196,049		196,049
Changes In Benefit Terms		-		-
Changes In Assumptions - Discount Rate		(803,662)		(803,662)
Changes In Assumptions - Others		-		-
Differences Between Expected And Actual Experience		-		-
Benefit Payments				
Insurance Premiums - Employer Paid	\$ (122,452)			
Insurance Premiums - Retiree Paid	(1,143)			
Total		(123,595)	(123,595)	-
GASB 75 Defined Employer Contributions	\$ 122,870		122,870	(122,870)
Contributions - Employee			-	-
Contributions - Retiree		1,143	1,143	-
Administrative Expenses			(417)	417
Net Investment Income				
Expected Investment Earnings	\$ 4,127			
Differences Between Projected And Actual Investment Earnings	7,006			
Total			11,133	(11,133)
Net Change		\$ (536,729)	\$ 11,134	\$ (547,863)
Measurement Date of June 30, 2017	3.58%	\$ 6,209,658	\$ 93,666	\$ 6,115,992
Measurement Date			June 30, 2017	June 30, 2016
Plan Fiduciary Net Position As A Percentage Of Total OPEB Liability			1.5%	1.2%
Covered Employee Payroll			\$ 386,602	N/A
Net OPEB Liability As A Percentage Of Covered Employee Payroll			1582.0%	N/A
Sensitivity of Net OPEB Liability to changes in Discount Rate			June 30, 2017	% Change
A 1 percentage point change in discount rate would have the following effect in Measurement Date of June 30, 2017:				
1 Percentage Increase (4.58%)			\$ 5,301,271	-13%
1 Percentage Decrease (2.58%)			\$ 7,360,657	20%
Sensitivity of Net OPEB Liability to changes in Trend Rate			June 30, 2017	% Change
A 1 percentage point change in trend rate would have the following effect in Measurement Date of June 30, 2017:				
1 Percentage Increase (7.0% grading down to 4.9%)			\$ 7,413,819	21%
1 Percentage Decrease (5.0% grading down to 2.9%)			\$ 5,261,807	-14%
Key Assumptions			June 30, 2017	June 30, 2016
Discount Rate			3.58%	2.85%
Investment Rate of Return			5.00%	5.00%
Inflation			2.60%	2.60%
Initial Medical Trend Rate			6.0%	6.0%
Ultimate Medical Trend Rate			3.9%	3.9%
Year Ultimate Trend Rate Reached			2075	2075

Development of OPEB Expense for Fiscal Year Ending June 30, 2018 (Measurement Year June 30, 2017)

(All dollar amounts are in thousands)

Components of OPEB Expense	Measurement Year Ended 06/30/2017
Service Cost	\$ 193,336
Interest	196,049
Expected Investment Earnings	(4,127)
Contributions - Employee	-
Administrative Expenses	417
Changes In Benefit Terms	-
Recognition of Current Period Deferred Outflows and (Inflows)	
Changes in assumptions	(140,746)
Differences between expected and actual experience	-
Differences between expected and actual investment earnings	(1,401)
Recognition of Beginning Deferred Outflows	-
Recognition of Beginning Deferred Inflows	-
OPEB Expense	\$ 243,528
Assumptions Used to Determine OPEB Expense	Measurement Year Ended 06/30/2017
Discount Rate as of June 30, 2016	2.85%
Investment Rate of Return	5.00%
Inflation	2.60%
Initial Medical Trend Rate	6.0%
Ultimate Medical Trend Rate	3.9%
Year Ultimate Trend Rate Reached	2075

Schedule of Deferred Outflows and Deferred Inflows of Resources

(All dollar amounts are in thousands)

Measurement Date Established	Initial Amount	Deferred Outflows of Resources as of 06/30/2017	Deferred (Inflows) of Resources as of 06/30/2017**	Initial Years	Remaining Years	Outflows/(Inflows) Recognized in Measurement Year Ended 06/30/2017
Changes In Assumptions						
06/30/2017	\$ (803,662)	\$ -	\$ (662,916)	5.71	4.71	\$ (140,746)
Total		\$ -	\$ (662,916)			\$ (140,746)
Differences Between Expected And Actual Plan Experience						
06/30/2017	\$ -	\$ -	\$ -	-	-	\$ -
Total		\$ -	\$ -			\$ -
Net Difference Between Projected And Actual Earnings On Investments						
06/30/2017	\$ (7,006)	\$ -	\$ (5,605)	5.00	4.00	\$ (1,401)
Total		\$ -	\$ (5,605)			\$ (1,401)
Contributions subsequent to measurement date*						
To be determined by participating employers.						
Balance as of 06/30/17 Measurement Date		\$ -	\$ (668,521)			\$ (142,147)
* Reflects employer contributions made subsequent to 6/30/17. This will be recognized as a reduction in Net OPEB Liability next year.						
Deferred Outflows And Deferred (Inflows) Of Resources Will Be Recognized In Expense As Follows:						
Measurement Year Ending:						Outflows/(Inflows)
06/30/2018						\$ (142,147)
06/30/2019						(142,147)
06/30/2020						(142,147)
06/30/2021						(142,148)
06/30/2022						(99,932)
Thereafter						-

**Deferred (Inflows) should be disclosed as positive numbers in the CAFR.

10-Year Schedule of Net OPEB Liability

(All dollar amounts are in thousands)

Measurement Year Ended	Total OPEB Liability (a)	Plan Fiduciary Net Position (b)	Net OPEB Liability (c)	Plan Fiduciary Net Position As A Percentage Of Total OPEB Liability (d)	Covered Employee Payroll (e)	Net OPEB Liability As A Percentage Of Covered Employee Payroll (f)
			(a)-(b)	(b)/(a)		(c)/(e)
June 30, 2016	\$6,746,387	\$82,532	\$6,663,855	1.2%	N/A	N/A
June 30, 2017	\$6,209,658	\$93,666	\$6,115,992	1.5%	\$386,602	1582.0%

Participating Employers Results

The RPSPP is a single-employer defined-benefit OPEB Plan that is established and sponsored by the Commonwealth. There are several employers, all fund types within the primary government, that participate in the RPSPP. The results for each participating employer was provided in a separate excel workbook.

Each fund type and business area's allocated share was determined based on their contractually required contribution towards RPSPP relative to the total population during the period ending on the measurement date. The employer contractually required contribution towards RPSPP is different from the GASB No. 75 defined employer contribution. Each fund type and business area's GASB No. 75 defined employer contribution was determined based on their respective allocated share of the total trust eligible employer contribution during the period ending on the measurement date.

Appendix

Appendix A – Plan Participation Summary

The participant data used in the valuation was provided by the Commonwealth as of December 31, 2016. While the participant data was checked for reasonableness, the data was not audited, and the valuation results presented in this report are dependent upon the accuracy of the participant data provided. The table below and on the subsequent page present a summary of the basic participant information for the active and retired participants covered under the terms of the Plan.

a. Active Participants		Retired Participants by Medicare Status			
Total Counts	4,299				
Average Age	38.91				
Average Service	12.64				
b. Retired Participants*		Single Contracts	Family Contracts	Total	
Counts					
Under Age 65 Non-Medicare	2,304	Under Age 65			
Over age 65 Non-Medicare	461	Non-Medicare	260	2,044	2,304
Over age 65 Medicare	2,142	Age 65 and over			
Total Counts	4,907	Non-Medicare	104	357	461
Average Age	64.68	Medicare Part A only	265	1,480	1,745
Total Participants	9,206	Medicare	145	252	397

* Retired participants include retirees and 121 surviving spouses with minimal liability.

Distribution of Service Groups by Age Groups									
Age Group	Retired Participants	Active Participants - Years of Service							
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
<20	-	-	-	-	-	-	-	-	-
20-24	-	139	-	-	-	-	-	-	139
25-29	1	627	77	-	-	-	-	-	704
30-34	1	262	342	181	1	-	-	-	786
35-39	2	77	138	332	66	-	-	-	613
40-44	13	17	57	185	291	120	1	-	671
45-49	536	-	12	98	215	588	128	1	1,042
50-54	839	-	-	14	49	138	91	18	310
55-59	591	-	1	-	5	2	9	17	34
60-64	321	-	-	-	-	-	-	-	-
65-69	609	-	-	-	-	-	-	-	-
70-74	1,109	-	-	-	-	-	-	-	-
75-79	509	-	-	-	-	-	-	-	-
80-84	192	-	-	-	-	-	-	-	-
85-89	135	-	-	-	-	-	-	-	-
90+	49	-	-	-	-	-	-	-	-
Total	4,907	1,122	627	810	627	848	229	36	4,299

Appendix B – Program Provisions Summary

This section summarizes overall eligibility provisions for postemployment medical coverage and the various plans offered by the Commonwealth.

Note that in some cases the benefit programs offered to retirees are different based on date of retirement. The provisions shown below summarize the plan designs for the most recent retirees. All older “grandfathered” plan designs are not shown in this document.

Eligibility

Permanent enlisted employees of the Pennsylvania State Police who retire from the state and meet one of the following eligibility criteria are eligible to receive RPSPP benefits

- Superannuation retirement (excluding vesteds) – age 50 (age 55 for employees subject to Act 120 of 2010) with three years of service;
- Retirement with at least 25 years of service;
- Retirement with at least 20 but less than 25 years of service, with at least 10 years of enlisted service with State Police (Military time, civilian service and service with another agency are not considered service with the State Police);
- Disability retirement – no service requirement.

Covered Family Members

Spouses and dependents are eligible for postemployment medical coverage while the retiree is alive. The PPACA, signed into law on March 23, 2010, increased the dependent child age limit to age 26 and applied to the Commonwealth effective January 1, 2011.

Retiree Contribution

The Commonwealth pays the full cost of postemployment medical, dental, and Part B coverage while the retiree is alive.

Surviving spouses of deceased retirees may continue to participate in the plan (receive medical, Rx, and Part B coverage, but not dental) if they pay the full cost of the coverage.

Appendix B – Program Provisions Summary (cont.)

Medical Plans

The following tables list the medical plans offered to retirees and provide the basic benefit provisions.

Medical	Benefit Provisions	Eligibility
<p style="text-align: center;">PPO</p>	<p><u>In Network</u> Deductible None Out-of-Pocket Limit None Doctor Office Visits PCP: \$15 co-pay Specialist: \$25 co-pay Inpatient Covered in full Lifetime Maximum None</p> <p><u>Out of Network</u> Deductible \$250 Individual; \$750 Family Out-of-Pocket Limit \$1,500 Individual; \$3,000 Family Coinsurance 20% Inpatient 20% Lifetime Maximum None</p>	<p>Annuitants retired from the State Police and their eligible dependents</p>
<p style="text-align: center;">Traditional Plan (Major Medical)</p>	<p>(Combined with Facility and Professional program)</p> <p><u>Retired prior to 7/1/07</u> Deductible \$100 Individual \$300 Family Out-of-Pocket Limit (excluding deductible) \$380 Individual Coinsurance 20% Inpatient 20% Lifetime Maximum None</p> <p><u>Retired on or after 7/1/07</u> Deductible \$250 Individual \$750 Family Out-of-Pocket Limit \$380 Individual Coinsurance 20% Inpatient 20% Lifetime Maximum None</p>	<p>Annuitants retired from the State Police and their eligible dependents</p>
<p style="text-align: center;">Traditional Plan (Facility Program)</p>	<p>(Combined with Professional and Major Medical program)</p> <p>Deductible None Out-of-Pocket Limit N/A Doctor Office Visits N/A Inpatient Covered in full Lifetime Maximum N/A</p>	<p>Non-Medicare eligible annuitants retired from the State Police and their non-Medicare eligible dependents</p>

Appendix B – Program Provisions Summary (cont.)

Prescription Drug

The co-payments for all prescriptions covered by the plan are:

Retail: \$5 Generic / \$10 Preferred* / \$15 Non-Preferred*

Mail Order: \$10 Generic / \$20 Preferred* / \$30 Non-Preferred*

*Plus the cost difference between the brand and the generic, if one exists.

Medicare Part B Reimbursement

For employees hired on or after April 21, 1986, the Commonwealth reimburses the cost of Medicare Part B premium.

For employees hired before April 21, 1986, were not required to enroll in Medicare.

Dental

The basic benefit provisions are:

- Basic diagnostic and preventive work, restorations, endodontics, periodontics, oral surgery and prosthodontics: 100% UCR
- Orthodontics: 70% UCR (dependents under age 19 only)
- Orthodontics lifetime maximum for dependent children: \$1,250

Changes in Plan Provisions

None.

Appendix C – Actuarial Methods

Actuarial Cost Method

The Actuarial Cost Method used to determine the Total OPEB Liability and the Annual Required Contribution is the Entry Age Normal (EAN) method as prescribed by GASB No. 75. This method is in the family of future benefit cost methods, which requires an estimate of the projected benefit payable at retirement to determine costs and liabilities.

The Normal Cost (or Service Cost) is the annual allocation required for each participant from entry date to the assumed retirement date so that the accumulated allocation at retirement is equal to the liability for the projected benefit. The projected benefits are based on estimates of future years of service and projected health benefit costs. The normal cost is developed as a level percent of compensation as prescribed by GASB No. 75.

The Present Value of Future Benefits is equal to the value of the projected benefit payable at retirement discounted back to the participant's current age. Discounts include such items as interest and mortality. The present value of future normal cost allocations is equal to the discounted value of the normal costs allocated from the member's current age to retirement age.

The difference between the Present Value of Future Benefits and the present value of future normal cost allocations represents the Total OPEB Liability at the participant's current age.

The Total OPEB Liability for participants currently receiving payments is calculated as the actuarial present value of future benefits expected to be paid. No normal cost is allocated for these participants.

Actuarial Value of Assets

The actuarial value of assets on the valuation date is the market value of assets.

Financial and Census Data

The Commonwealth of Pennsylvania provided the participant data, financial information and plan descriptions used in this valuation. The actuary has checked the data for reasonableness, but has not independently audited the data. The actuary has no reason to believe the data is not complete and accurate, and knows of no further information that is essential to the preparation of the actuarial valuation.

Plan Fiduciary Net Position

Market value of assets as of the measurement date.

Census Date

December 31, 2016 for June 30, 2016 and June 30, 2017 measurements. As this is the implementation for GASB Nos. 74 and 75, the valuation results as of June 30, 2016 and June 30, 2017 measurements were developed based on the same census data.

Measurement Date

June 30, 2017 for fiscal year ended June 30, 2017 trust financial statements (GASB No. 74) and for fiscal year ending June 30, 2018 participating employer financial statements (measurement date as of the end of the prior fiscal year end for GASB No. 75).

Changes in Methods

None.

Appendix D – Actuarial Assumptions

Economic Assumptions

The economic assumptions were selected for consistency with SERS where applicable. The discount rate was selected based on the requirements prescribed in GASB Nos. 74 and 75.

Discount Rate	<p>3.58% as of June 30, 2017</p> <p>2.85% as of June 30, 2016</p> <p>Since RPSPP has insufficient assets to meet next year's projected benefit payments, as prescribed by GASB Nos. 74 and 75, the discount rate will be based on the index rate for 20-year tax-exempt general obligation municipal bond index rate with an average rating of AA/Aa or higher as of the measurement date. The Commonwealth elected to determine the discount rate using the Bond Buyer 20-Bond General Obligation Index.</p>																																																																
Inflation¹	2.60%																																																																
Payroll Growth¹	2.90%																																																																
Salary Scale¹	<p>The career salary scale shown below includes average increases in the employee salary due to promotions and longevity growth. The average career salary growth is 2.65 percent per year. In addition, it is assumed that the salary schedules will increase by 2.90 percent per year. The scale below does not include the assumed 2.90 percent general salary increase.</p> <p><u>Career Salary Scale for Members</u></p> <table border="1"> <thead> <tr> <th>Completed Years of Service</th> <th>Annual Increase</th> <th>Completed Years of Service</th> <th>Annual Increase</th> </tr> </thead> <tbody> <tr><td>1</td><td>6.00%</td><td>16</td><td>2.10%</td></tr> <tr><td>2</td><td>4.50</td><td>17</td><td>2.05</td></tr> <tr><td>3</td><td>4.00</td><td>18</td><td>2.00</td></tr> <tr><td>4</td><td>3.75</td><td>19</td><td>1.95</td></tr> <tr><td>5</td><td>3.50</td><td>20</td><td>1.90</td></tr> <tr><td>6</td><td>3.25</td><td>21</td><td>1.85</td></tr> <tr><td>7</td><td>3.00</td><td>22</td><td>1.75</td></tr> <tr><td>8</td><td>2.90</td><td>23</td><td>1.65</td></tr> <tr><td>9</td><td>2.80</td><td>24</td><td>1.55</td></tr> <tr><td>10</td><td>2.70</td><td>25</td><td>1.45</td></tr> <tr><td>11</td><td>2.60</td><td>26</td><td>1.25</td></tr> <tr><td>12</td><td>2.50</td><td>27</td><td>1.05</td></tr> <tr><td>13</td><td>2.40</td><td>28</td><td>0.90</td></tr> <tr><td>14</td><td>2.30</td><td>29</td><td>0.85</td></tr> <tr><td>15</td><td>2.20</td><td>30+</td><td>0.80</td></tr> </tbody> </table>	Completed Years of Service	Annual Increase	Completed Years of Service	Annual Increase	1	6.00%	16	2.10%	2	4.50	17	2.05	3	4.00	18	2.00	4	3.75	19	1.95	5	3.50	20	1.90	6	3.25	21	1.85	7	3.00	22	1.75	8	2.90	23	1.65	9	2.80	24	1.55	10	2.70	25	1.45	11	2.60	26	1.25	12	2.50	27	1.05	13	2.40	28	0.90	14	2.30	29	0.85	15	2.20	30+	0.80
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Appendix D – Actuarial Assumptions (cont.)

Demographic Assumptions

The demographic assumptions were selected for consistency with SERS where applicable. The retiree health specific assumptions were selected based on recent experience.

Mortality¹	<p>Pre-Retirement Mortality:</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>0.04%</td> <td>0.02%</td> </tr> <tr> <td>25</td> <td>0.04</td> <td>0.02</td> </tr> <tr> <td>30</td> <td>0.05</td> <td>0.02</td> </tr> <tr> <td>35</td> <td>0.06</td> <td>0.03</td> </tr> <tr> <td>40</td> <td>0.09</td> <td>0.04</td> </tr> <tr> <td>45</td> <td>0.13</td> <td>0.06</td> </tr> <tr> <td>50</td> <td>0.24</td> <td>0.09</td> </tr> <tr> <td>55</td> <td>0.29</td> <td>0.14</td> </tr> <tr> <td>60</td> <td>0.35</td> <td>0.24</td> </tr> </tbody> </table> <p>Post Retirement Mortality:</p> <p>Healthy Participants: The RP-2000 Male and Female Combined Healthy Mortality Tables projected (using Projection Scale AA) to 2016 for males and to 2020 for females, and then further adjusted to ensure sufficient margin improvement in certain age ranges. Each table includes a margin for future improvement in life expectancy.</p> <p>Disabled Participants: The RP-2000 Male and Female Disabled Retiree Mortality Tables projected (using Projection Scale AA) to 2021 for males and to 2017 for females. Each table includes a margin for future improvement in life expectancy.</p>	Age	Male	Female	20	0.04%	0.02%	25	0.04	0.02	30	0.05	0.02	35	0.06	0.03	40	0.09	0.04	45	0.13	0.06	50	0.24	0.09	55	0.29	0.14	60	0.35	0.24
Age	Male	Female																													
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Withdrawal¹	<table border="1"> <thead> <tr> <th>Years of Service</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>9.0%</td> </tr> <tr> <td>1</td> <td>4.0</td> </tr> <tr> <td>2</td> <td>3.0</td> </tr> <tr> <td>3</td> <td>3.0</td> </tr> <tr> <td>4</td> <td>2.0</td> </tr> <tr> <td>5</td> <td>1.0</td> </tr> <tr> <td>6</td> <td>1.0</td> </tr> <tr> <td>7</td> <td>0.5</td> </tr> <tr> <td>8</td> <td>0.5</td> </tr> <tr> <td>9</td> <td>0.5</td> </tr> <tr> <td>10+</td> <td>0.2</td> </tr> </tbody> </table>	Years of Service	Rate	0	9.0%	1	4.0	2	3.0	3	3.0	4	2.0	5	1.0	6	1.0	7	0.5	8	0.5	9	0.5	10+	0.2						
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Appendix D – Actuarial Assumptions (cont.)

<p>Early Retirement¹ (based on early retirement as defined by SERS; retirement prior to OPEB eligibility, as described above in Appendix B, will receive no postemployment health benefit)</p>	<p>1.4% at each age</p>																														
<p>Normal Retirement¹ (based on normal retirement as defined by SERS; retirement prior to OPEB eligibility, as described above in Appendix B, will receive no postemployment health benefit)</p>	<p>State Police with less than 19 years of service</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>50 – 59</td> <td>10.0%</td> </tr> <tr> <td>60 – 64</td> <td>10.0</td> </tr> <tr> <td>65</td> <td>27.0</td> </tr> <tr> <td>66 – 79</td> <td>32.0</td> </tr> <tr> <td>80</td> <td>100.0</td> </tr> </tbody> </table> <p>State Police with at least 19 years of service</p> <table border="1"> <thead> <tr> <th>Years of Service</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>19* – 23</td> <td>1.0%</td> </tr> <tr> <td>24*</td> <td>50.0</td> </tr> <tr> <td>25</td> <td>70.0</td> </tr> <tr> <td>26-29</td> <td>40.0</td> </tr> <tr> <td>30</td> <td>50.0</td> </tr> <tr> <td>31-32</td> <td>40.0</td> </tr> <tr> <td>33 – 39</td> <td>50.0</td> </tr> <tr> <td>40+</td> <td>100.0</td> </tr> </tbody> </table> <p>* State Police with 19 and 24 years of service at the beginning of the year are assumed to retire at the point they reach 20 and 25 years respectively during the year and to receive the Fraternal Order of Police (FOP) award.</p>	Age	Rate	50 – 59	10.0%	60 – 64	10.0	65	27.0	66 – 79	32.0	80	100.0	Years of Service	Rate	19* – 23	1.0%	24*	50.0	25	70.0	26-29	40.0	30	50.0	31-32	40.0	33 – 39	50.0	40+	100.0
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33 – 39	50.0																														
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<p>Spouse Age Difference¹</p>	<p>Females are assumed to be 2 years younger than males.</p>																														
<p>Participation Rate</p>	<p>All eligible employees are required to participate in the active health plan and are assumed to elect coverage at retirement. Retirees who currently elect to waive their coverage are assumed to remain uncovered in the future.</p>																														
<p>Coverage Level Election Rates</p>	<p>Employees are assumed to maintain their current coverage election when they retire. Current retirees are assumed to continue their current coverage election.</p>																														
<p>Surviving Spouse Continuing Coverage</p>	<p>45% of spouses are assumed to elect to continue coverage after the retiree's death.</p>																														

¹ For consistency with the pension plan of which these participants are members, these assumptions are based on those used for the SERS Actuarial Valuation Report as of December 31, 2016 and experience study presented to the Board in March 2016.

Appendix D – Actuarial Assumptions (cont.)

Benefit Assumptions

Per Capita Claims Costs

The per capita claims costs used in the valuation were developed from the self-insured rates that represent the expected claims costs and administrative expenses for 2017 for each plan. These first-year rates are on a “net basis” – they reflect plan costs after reduction of total benefit costs for member cost-sharing (deductibles, coinsurance, co-pays, provider savings, Medicare, etc.). Future year per capita costs were projected by applying trend assumptions to the first year costs.

The 2017 per adult member rates (by plan, and coverage category) and the current enrollment mix by plan, age and gender were used to develop net rates by age band. Rates were age-graded using the retiree age and gender distribution, separately for the non-Medicare eligible and Medicare population. These age-graded rates are the basis for projecting the gross cost for each individual, before member contributions for coverage. The aging factors are based on the Society of Actuaries age-curve study “Health Care Costs—From Birth to Death.”

Since the “flat” rates are specific to the experience of the Commonwealth’s retirees (i.e., not blended with employees) separately for non-Medicare and Medicare, there is no implicit subsidy. However, age-graded claims costs were developed to project the increases in costs related to the average age of the retiree population increasing over time.

2017 Annual Per Capita Claims Costs			
Age	Non-Medicare Eligible	Medicare Part A Eligible	Medicare Part A & B Eligible
45	\$ 9,567	N/A	N/A
50	11,578	N/A	N/A
55	14,166	N/A	N/A
60	17,248	N/A	N/A
64	20,454	N/A	N/A
65	21,370	\$ 17,414	\$ 9,374
70	25,604	18,381	10,166
75	30,261	19,700	10,832
80	35,114	20,838	11,321
85	39,861	21,746	11,532
90	44,079	22,137	11,488
95	46,547	21,549	11,223

The table below illustrates calendar year 2017 annual medical, dental and Rx (net of retiree drug subsidy) “flat” net rates for each plan that are charged to eligible surviving spouses who pay the full cost of coverage. For purposes of developing the annual per capita claims costs, retiree drug subsidy for Medicare Part D was excluded, consistent with GASB Technical Bulletin No. 2006-1.

<u>Non-Medicare</u>	<u>Per Adult Member Per Year</u>
Traditional	\$15,902.40
PPO	\$13,899.48
<u>Medicare</u>	<u>Per Adult Member Per Year</u>
Traditional with Part A	\$17,709.60
Traditional with Part A&B	\$8,187.24
PPO with Part A	\$17,709.60
PPO with Part A&B	\$8,187.24
<u>Dental</u>	<u>Per Adult Member Per Year</u>
	\$413.16

Expenses

Rates were developed to include administrative expenses as a component in the total rate.

Appendix D – Actuarial Assumptions (cont.)

<p>Trend Rates</p>	<p>The trend rates illustrated below are used to project age-graded claims and flat rates into future years. Trend rates were developed based on the SOA-Getzen trend rate model version 2016_a. The short-term trend assumptions were based on a review of the Commonwealth's historical trend rates during the years 2014 through 2016 and emerging experience. Regression curves were fit to the data to help predict short-term future per capita cost increases. The SOA-Getzen model was then used to determine the trend rates beginning in 2022 and thereafter, based on the long-term inflation assumption and reasonable macro-economic assumptions for the growth of health care expenditures during this period relative to the general economy.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>All benefits</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>6.0%</td> </tr> <tr> <td>2018</td> <td>5.9%</td> </tr> <tr> <td>2019</td> <td>5.8%</td> </tr> <tr> <td>2020</td> <td>5.7%</td> </tr> <tr> <td>2021</td> <td>5.6%</td> </tr> <tr> <td>2022</td> <td>5.5%</td> </tr> <tr> <td>2030</td> <td>5.5%</td> </tr> <tr> <td>2040</td> <td>5.4%</td> </tr> <tr> <td>2050</td> <td>4.9%</td> </tr> <tr> <td>2060</td> <td>4.7%</td> </tr> <tr> <td>2070</td> <td>4.2%</td> </tr> <tr> <td>2075+</td> <td>3.9%</td> </tr> </tbody> </table>	Year	All benefits	2017	6.0%	2018	5.9%	2019	5.8%	2020	5.7%	2021	5.6%	2022	5.5%	2030	5.5%	2040	5.4%	2050	4.9%	2060	4.7%	2070	4.2%	2075+	3.9%
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<p>Excise Tax</p>	<p>Effective in the 2020 calendar year, an excise tax on "Cadillac Plans" will apply as a result of PPACA. HMOs and other healthcare insurers, who offer plans with a higher cost than the excise tax threshold, will be charged a 40% tax on the costs exceeding the threshold. Due to the expectation that the medical trend rate will significantly exceed inflation over the long-term, most retiree health plans will be affected by the excise tax at some point in the future. After adjusting the thresholds for the age and gender characteristics of the Commonwealth's policy holders, however, the excise tax is projected to only have a minor impact on the liabilities. Claim costs are projected to exceed the excise tax threshold in year 2024.</p>																										
<p>Medicare Eligibility</p>	<p>Current non-Medicare retirees and spouses (if covered) over age 65 are assumed to remain non-Medicare eligible.</p> <p>Current Medicare retirees and spouses (if covered) hired before April 21, 1986 are assumed to be eligible for Medicare Part A only.</p> <p>Current non-Medicare retirees and spouses (if covered) under age 65 and hired before April 21, 1986 and all actives hired before April 21, 1986 are assumed to be split with 70% eligible for Medicare Part A only and 30% not eligible for Medicare. This is based on recent experience, which shows that 70% of pre-1986 hires are able to gain Medicare eligibility through a spouse or prior employment.</p> <p>All other retirees and spouses (if covered) are assumed to be non-Medicare eligible prior to age 65 and Medicare eligible at age 65.</p>																										

Appendix D – Actuarial Assumptions (cont.)

Coverage	Current retirees are assumed to remain in their currently elected plan.	
	Current employees are assumed to enroll at retirement in the same proportion as the current retiree mix. These proportions are established separately for non-Medicare and Medicare coverage.	
	The table below shows the enrollment percentage by plan.	
	Non-Medicare	Adult Member Enrollment
	Traditional	33.2%
	PPO	66.8%
	Medicare	Adult Member Enrollment
Traditional with Part A	43.7%	
Traditional with Part A&B	37.6%	
PPO with Part A	11.1%	
PPO with Part A&B	7.6%	
Changes in Assumptions	The discount rate was increased from 2.85% to 3.58%.	

Appendix E - Glossary

Brief explanations of terms used in this report:

Annual OPEB Expense

The change in Net OPEB Liability less the change in the Deferred Outflows of Resources plus the change in the Deferred Inflows of Resources.

Collective deferred outflows of resources and deferred inflows of resources related to OPEB

Deferred outflows of resources and deferred inflows of resources related to OPEB arising from certain changes in the collective net OPEB liability or collective total OPEB liability.

Covered Employee Payroll

The payroll of employees that are provided with OPEB through the OPEB plan.

Net OPEB liability (NOL)

The liability of employers and nonemployer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is administered through a trust that meets the criteria of the GASB Statements.

Normal Cost or Service Cost

The portion of the Total Present Value of Future Benefits attributed to employee service during the current fiscal year by the actuarial cost method. These terms are used interchangeably.

Other Postemployment Benefits (OPEB)

Retiree health care benefits and post-employment benefits provided separately from a pension plan (excluding termination offers and benefits).

Plan Fiduciary Net Position (FNP)

Set equal to the market value of assets as of the measurement date

Present Value of Future Benefits (PVFB)

The value, as of the valuation date, of the projected benefits payable to all members for their accrued service and their expected future service, discounted to reflect the time value (present value) of money and adjusted for the probabilities of retirement, withdrawal, death and disability.

Total OPEB liability (TOL)

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service in conformity with the GASB Statements. The total OPEB liability is the liability of employers and nonemployer contributing entities to plan members for benefits provided through a defined benefit OPEB plan that is not administered through a trust that meets the criteria of the GASB Statements.