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Via Electronic Mail

January 15, 2019

Mr. David C. Craik
 Pension Administrator
 Delaware Public Employees' Retirement System
 McArdle Building
 860 Silver Lake Boulevard, Suite 1
 Dover, Delaware 19904

Re: Closed State Police June 30, 2018 Actuarial Valuation

Dear Dave:

We have completed our Actuarial Valuation of the 483 members remaining in the Closed State Police Plan as of June 30, 2018. Our results are as follows.

Valuation Results	
Actuarial Liability (AL)	\$ 264,041,600
Actuarial Value of Assets (AVA)	<u>3,643,300</u>
AVA Unfunded AL (UAL)	\$ 260,398,300
Funded Ratio on AVA (AVA/AL)	1.4%
Market Value of Assets (MVA)	4,725,600
Funded Ratio on MVA (MVA/AL)	1.8%
Present Value Accumulated Plan Benefits (PVAB)	\$ 264,041,600
MVA	<u>4,725,600</u>
Unfunded PVAB	\$ 259,316,000
Accrued Benefit Funded Ratio (MVA/PVAB)	1.8%

The actuarial value of assets is a smoothed asset value that recognizes 20% of the difference between the expected actuarial value and the market value of assets. The expected actuarial value equals the prior year's actuarial value adjusted with contributions, payments, and investment earnings of 7.0%, the assumption as of last year's valuation date. This method tempers the volatile fluctuations in market value.

The Closed State Police Plan is funded on a pay-as-you-go basis. We have calculated an actuarially determined contribution amount for disclosure purposes, using a closed amortization period with 18 years remaining as of the June 30, 2018 valuation date. The amortization uses a level dollar method and a discount rate of 7.0% for a resulting contribution amount of \$25,066,300 (including a margin for expenses) for fiscal year 2019.

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Data and Assumptions

In completing the valuation and preparing our report, we relied on information, some oral and some written, supplied by staff of the Office of Pensions. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

We found the data to be reasonably consistent and comparable with data used in the prior valuation. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete.

Appendix A outlines the actuarial assumptions used. Appendix B contains a summary of the data, and Appendix C contains the disclosure information.

The Actuarial Liability was based on a 7.00% net investment return and mortality tables as outlined in Appendix A.

We believe these assumptions reflect our best estimate of anticipated future experience of the Plan. Our results are dependent upon future experience conforming to these assumptions. It is certain that actual experience will not conform exactly to these assumptions. Actual amounts will differ from projected amounts to the extent actual experience differs from expected experience.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board, including the use of assumptions and methods for funding purposes that comply with the Actuarial Standards of Practice. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This report was prepared for the Delaware Closed State Police Pension Plan for the purposes described herein and for the use by the Plan's auditor in completing an audit related to the matters herein. Other users of this valuation report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Sincerely,
Cheiron



Fiona E. Liston, FSA, MAAA, EA
Principal Consulting Actuary



Elizabeth Wiley, FSA, FCA, MAAA, EA
Consulting Actuary

Attachments

**DELAWARE CLOSED STATE POLICE PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

APPENDIX A – ACTUARIAL ASSUMPTIONS

A. Long-Term Assumptions Used to Determine Plan Costs and Liabilities

1. Demographic Assumptions

a. Rates of Mortality

Mortality rates are based on the sex-distinct employee, healthy annuitant, and disabled annuitant mortality tables described below, including adjustment factors applied to the published tables for each group. Future mortality improvements are reflected by applying a custom projection scale on a generational basis to adjusted base tables from the base year shown below.

**i. Sample Rates of Mortality for Healthy Annuitant Lives at Selected Ages
(number of deaths per 10,000 members):**

(2018 Values Shown)		
Age	Male	Female
50	43	26
55	61	36
60	83	52
65	117	79
70	182	128
75	296	209
80	498	354
85	869	628
90	1,537	1,126
95	2,434	1,859
100	3,486	2,785

Rates are based on 110% and 100% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Employee Mortality Table for ages prior to start of the Healthy Annuitant Mortality Table, both projected from the 2006 base rates using the RPEC-2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0% for ages 115-120, and convergence to the ultimate rate in the year 2020. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

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APPENDIX A – ACTUARIAL ASSUMPTIONS

**ii. Sample Rates of Mortality for Disabled Annuitant Lives at Selected Ages
(number of deaths per 10,000 members):**

(2018 Values Shown)		
Age	Male	Female
25	91	27
30	87	34
35	103	48
40	124	66
45	192	103
50	235	136
55	271	171
60	308	203
65	369	247
70	477	336
75	653	492
80	931	743
85	1,387	1,126
90	2,135	1,673
95	3,003	2,440
100	3,957	3,432

Rates are based on 120% of the RP-2014 Total Dataset Disabled Annuitant Mortality Table, projected from the 2006 base rates using the RPEC-2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0% for ages 115-120, and convergence to the ultimate rate in the year 2020. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

2. Economic Assumptions

- a. Investment Rate of Return: 7.00%
- b. Annual Assumed Cost-of-Living Increase Rate for Retirees: 2.50%

3. Rationale for Assumptions

The assumptions were adopted by the Board of Trustees upon the recommendation of the actuary, based on an experience study review performed in 2016 and covering the period July 1, 2010 to June 30, 2015. The Board continually reviews the investment rate of return assumption and adopted a reduced rate of 7.0% at the advice of its investment consultants, first effective for funding with the 2017 valuation.

4. Changes since Last Valuation

None.

**DELAWARE CLOSED STATE POLICE PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

APPENDIX B – DATA SUMMARY

Data Summary			
	Count	Average Age	Average Monthly Benefit
Healthy Retirees	305	72	4,197.44
Disabled Retirees	61	72	4,302.95
Beneficiaries	117	77	2,895.15

DELAWARE CLOSED STATE POLICE PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2018

APPENDIX C – DISCLOSURE INFORMATION

Analysis of Financial Experience

Gain and Loss in Accrued Liability During Years Ended June 30
Resulting from Differences between Assumed Experience and Actual Experience

Type of Activity	Gain (or Loss) for Year Ending June 30, (expressed in thousands)					
	2013	2014	2015	2016	2017	2018
Investment Income on Actuarial Assets	(95)	(114)	(56)	(256)	(279)	271
Combined Liability Experience	(2,739)	3,391	6,514	(54)	9,197	7,598
(Loss)/Gain during Year from Financial Experience	(2,834)	3,277	6,098	(310)	8,918	7,869
Non-Recurring Items	0	(9,314)	0	2,557	(5,447)	0
Composite Gain (or Loss) during Year	(2,834)	(6,037)	6,098	2,247	3,471	7,869

Schedule of Funded Liabilities by Type
Aggregate Accrued Liabilities for

(expressed in thousands)

Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member State-Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets		
					(1)	(2)	(3)
2018	\$0	\$ 264,042	\$0	\$ 3,643	N/A	1%	N/A
2017	0	275,757	0	3,085	N/A	1	N/A
2016	0	283,043	0	2,990	N/A	1	N/A
2015	0	288,849	0	2,879	N/A	1	N/A
2014	0	297,523	0	2,460	N/A	1	N/A
2013	0	294,533	0	2,668	N/A	1	N/A