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PERA

Public Employees
Retirement Association
of New Mexico

INVESTED IN TOMORROW.

**Public Employees Retirement Association (PERA)
of New Mexico
Annual Actuarial Valuation
as of June 30, 2020**





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 29, 2020

The Retirement Board
Public Employees Retirement Association
Santa Fe, New Mexico

Members of the Board:

We have conducted the annual actuarial valuation of the Public Employees Retirement Association (PERA) of New Mexico as of June 30, 2020; the results of the valuation are contained in the following report. The annual valuation is used to determine the sufficiency of the statutory contribution rates and, if necessary, the amount required to fund the annual normal cost and amortize the unfunded actuarial accrued liability over a 25-year period. The results of this valuation apply to the fiscal year beginning July 1, 2020 and ending June 30, 2021 (FY 2021). Information contained in our report for plan years prior to June 30, 2010 is based upon valuations performed by the association's prior actuary.

In performing the valuation, we relied on data supplied by the Public Employees Retirement Association (PERA) and performed limited tests on the data for consistency and reasonableness. In determining the Fund's liabilities, future events, such as investment returns, deaths, retirements, etc., are anticipated based upon the set of actuarial assumptions as approved by the Board. The valuation reflects the passage of Senate Bill 72, which established a new COLA structure effective July 1, 2020; changed employee and employer required contribution rates for some coverage plans; and allowed certain State General and State Juvenile Corrections members to transfer to the State Adult Corrections plan. Under SB 72, future COLAs are provided through a profit-sharing mechanism using PERA's asset performance. Based on Asset Liability Model (ALM) output, we assume future COLA rates equal the 30-year average COLA rates under the median ALM output, currently 1.60% annually.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: fund experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

This actuarial valuation was performed to determine the adequacy of statutory contributions to fund the plan. The asset values used to determine unfunded liabilities and funded ratios are not market values but less volatile market related values. A smoothing technique is applied to market values to determine the market related values. The unfunded liability amounts and funded ratios using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.



Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from expected. Actuarial valuations include the risk that actual future measurements will deviate from expected future measurements due to actual experience that is different than the actuarial assumptions. The primary areas of risk in this actuarial valuation are:

- Investment Risk – the potential that investment returns will be different than expected. Appendix D of this report demonstrates the sensitivity of future projected results to asset returns deviating from expected returns.
- Longevity and Other Demographic Risks – the potential that mortality or other demographic experience will be different than expected.
- Contribution Risk – The potential that actual contributions are different than the actuarially determined contributions.

Annual actuarial valuations are performed for PERA which re-measure the assets and liabilities and compute a new actuarially determined contribution. PERA also has experience studies performed every four to five years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and periodic experience studies are practical ways to monitor and reassess risk.

This is to certify that the undersigned are members of the American Academy of Actuaries and have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the Fund.

Respectfully submitted,

A handwritten signature in blue ink that reads 'John J. Garrett'.

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Jonathan T. Craven'.

Jonathan T. Craven, ASA, EA, FCA, MAAA
Consulting Actuary



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Section I: Board Summary

The table below summarizes the results of the June 30, 2020 actuarial valuation as compared with the prior year.

Table I-1(a): Comparative Summary of Principal Results (All PERA Divisions)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 2,409,950,766	\$ 2,271,770,279
Total Valuation Payroll	\$ 2,482,249,289	\$ 2,339,923,387
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 7,542,860,001	\$ 7,073,283,818
Retired Members and Survivors	<u>14,846,010,868</u>	<u>15,089,714,530</u>
Total	\$ 22,388,870,869	\$ 22,162,998,348
Actuarial Value of Assets	\$ 15,737,838,938	\$ 15,500,330,667
Funded Ratio	70.3 %	69.9 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 6,651,031,931	\$ 6,662,667,681
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	15.50 %	15.12 %
Member Contribution Rate	<u>12.20 %</u>	<u>12.01 %</u>
Total	27.70 %	27.13 %
Less Normal Cost:		
Retirement	10.74 %	10.74 %
Termination	3.78 %	3.82 %
Pre-Retirement Survivors	0.85 %	0.84 %
Disability	<u>0.90 %</u>	<u>0.86 %</u>
Total Normal Cost	16.27 %	16.26 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	10.93 %	10.37 %
Amortization Period	106 years	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	6.37 %	6.27 %



Section I: Board Summary

Summary of Key Findings – PERA

An objective of the Board’s funding policy is to maximize the stability in the statutory contribution rates while maintaining the adequacy of funding necessary for the actuarial soundness of each Division in the Fund. The Board has set forth criteria for measuring actuarial soundness and making recommendations for adjustments to the statutory rates of each Division. The funding method for PERA determines the sufficiency of statutorily required contribution rates to fund the sum of the annual normal cost, administrative expenses and an amount to fully amortize the unfunded actuarial accrued liability (UAAL) over no more than 25 years for each Division.

The investment earnings of PERA is allocated on the basis of each Divisions’ share of the total PERA Fund balance as of the valuation date. Therefore, each Division shares in the asset experience of the total Fund and will demonstrate similar experience.

- The total PERA Fund experienced an investment loss of approximately \$223.5 million on the market value of assets. The actuarial value of assets smooth the unexpected portion of the market return over a four year period. The return on the actuarial value of assets was 5.45% compared to an expected return of 7.25%. As of June 30, 2020, the actuarial value of assets is 107.42% of market value. Table III-4 provides the development of the actuarial value of assets.
- Senate Bill 72 established a new COLA structure effective July 1, 2020; changed employee and employer required contribution rates for some coverage plans; and allowed certain State General members to transfer to the State Adult Corrections plan. These changes resulted in a decrease of \$788.4 million to Fund liabilities and an increase of 2.5% to the funded ratio.
- The total actuarial loss due to the investment experience of the total PERA Fund is \$273.8 million. The loss on non-investment related items totaled \$301.0 million. The net loss due to the plan’s experience was \$574.8 million.
- The total decrease to the UAAL of PERA is \$11.6 million since the previous valuation and the funded ratio increased from 69.9% to 70.3%.
- Based on the current statutory contribution rates and actuarial assumptions, the UAAL is projected to be fully amortized in 106 years. Under SB 72, there is expected to be further increases to both the employer and employee contributions.

The summary of results and discussion of key findings for each Division begins on the following page.

Section I: Board Summary



Table I-1(b): Comparative Summary of Principal Results (State General Division)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 1,002,475,715	\$ 935,478,450
Total Valuation Payroll	\$ 1,032,549,986	\$ 963,542,804
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 3,082,550,456	\$ 2,932,732,812
Retired Members and Survivors	<u>6,607,155,638</u>	<u>6,603,870,095</u>
Total	\$ 9,689,706,094	\$ 9,536,602,907
Actuarial Value of Assets	\$ 5,807,551,328	\$ 5,805,041,751
Funded Ratio	59.9 %	60.9 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 3,882,154,766	\$ 3,731,561,156
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	17.74 %	17.24 %
Member Contribution Rate	<u>9.42 %</u>	<u>8.92 %</u>
Total	27.16 %	26.16 %
Less Normal Cost:		
Retirement	9.66 %	9.75 %
Termination	3.62 %	3.68 %
Pre-Retirement Survivors	0.84 %	0.82 %
Disability	<u>1.08 %</u>	<u>1.05 %</u>
Total Normal Cost	15.20 %	15.30 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	11.46 %	10.36 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	12.81 %	12.27 %



Section I: Board Summary

Summary of Key Findings – State General Division

The UAAL increased from \$3.73 billion to \$3.88 billion. The funded ratio decreased from 60.9% to 59.9%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The State General Division experienced a net actuarial loss of \$401.1 million during the plan year ended June 30, 2020. The non-investment related loss of \$296.9 million is primarily due to higher than expected salary increases, new service retirements, and new members. In addition, the plan experienced a \$104.2 million loss due to investment related experience. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The passage of Senate Bill 72 resulted in a \$400.0 million reduction in the UAAL.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the twelfth consecutive year.

Section I: Board Summary



Table I-1(c): Comparative Summary of Principal Results (State Police/Corrections Division)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 113,842,830	\$ 88,220,403
Total Valuation Payroll	\$ 117,258,115	\$ 90,867,015
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 388,547,885	\$ 299,347,891
Retired Members and Survivors	<u>659,603,204</u>	<u>685,634,245</u>
Total	\$1,048,151,089	\$ 984,982,136
Actuarial Value of Assets	\$1,332,772,683	\$1,282,058,570
Funded Ratio	127.2 %	130.2 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ (284,621,594)	\$ (297,076,434)
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	25.56 %	25.58 %
Member Contribution Rate	<u>8.99 %</u>	<u>8.74 %</u>
Total	34.55 %	34.32 %
Less Normal Cost:		
Retirement	14.96 %	15.98 %
Termination	4.29 %	4.08 %
Pre-Retirement Survivors	0.68 %	0.71 %
Disability	<u>1.69 %</u>	<u>1.60 %</u>
Total Normal Cost	21.62 %	22.37 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	12.43 %	11.45 %
Amortization Period	0	0
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	N/A	N/A



Section I: Board Summary

Summary of Key Findings – State Police/Corrections Division

As of June 30, 2020, the actuarial value of assets exceeded accrued liabilities by \$283.9 million. As of June 30, 2019, the actuarial value of assets exceeded accrued liabilities by \$297.1 million. This represents an increase in the UAAL of about \$13.2 million from the previous year. The funded ratio decreased from 130.2% to 127.1%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The State Police/Corrections Division experienced a net actuarial loss of \$15.2 million during the plan year ended June 30, 2020. The actuarial loss is comprised of a \$22.0 million investment related loss and a \$6.8 million gain due to non-investment related experience, primarily due to post retirement mortality gains. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The passage of Senate Bill 72 resulted in a \$30.5 million increase in the UAAL.

Section I: Board Summary



Table I-1(d): Comparative Summary of Principal Results (Municipal General Division)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 924,361,625	\$ 901,598,748
Total Valuation Payroll	\$ 952,092,474	\$ 928,646,710
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 2,548,387,539	\$ 2,477,879,338
Retired Members and Survivors	<u>4,506,418,609</u>	<u>4,579,055,430</u>
Total	\$ 7,054,806,148	\$ 7,056,934,768
Actuarial Value of Assets	\$ 5,410,004,791	\$ 5,301,086,178
Funded Ratio	76.7 %	75.1 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 1,644,801,357	\$ 1,755,848,590
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	10.03 %	10.02 %
Member Contribution Rate	<u>13.53 %</u>	<u>13.49 %</u>
Total	23.56 %	23.51 %
Less Normal Cost:		
Retirement	8.04 %	8.13 %
Termination	4.04 %	4.08 %
Pre-Retirement Survivors	0.93 %	0.91 %
Disability	<u>0.76 %</u>	<u>0.73 %</u>
Total Normal Cost	13.77 %	13.85 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	9.29 %	9.16 %
Amortization Period	35 years	45 years
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	1.86 %	1.89 %



Section I: Board Summary

Summary of Key Findings – Municipal General Division

The UAAL decreased from \$1.76 billion to \$1.65 billion. The current statutory rate will amortize the UAAL over a 35-year period. The funded ratio increased from 75.1% to 76.7%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal General Division experienced a net actuarial loss of \$93.4 million during the plan year ended June 30, 2020. The actuarial loss is comprised of a \$93.2 million investment related loss and a \$0.2 million loss due to non-investment related experience.
- The passage of Senate Bill 72 resulted in a \$241.1 million reduction in the UAAL.
- The amortization period decreased from 45 years to 35 years.
- Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.

Section I: Board Summary



Table I-1(e): Comparative Summary of Principal Results (Municipal Police Division)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 229,730,475	\$ 214,508,600
Total Valuation Payroll	\$ 236,622,389	\$ 220,943,858
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 912,825,415	\$ 808,317,496
Retired Members and Survivors	<u>1,973,722,843</u>	<u>2,075,880,383</u>
Total	\$ 2,886,548,258	\$ 2,884,197,879
Actuarial Value of Assets	\$ 2,161,723,690	\$ 2,109,268,722
Funded Ratio	74.9 %	73.1 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 724,824,568	\$ 774,929,157
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	18.93 %	18.91 %
Member Contribution Rate	<u>17.28 %</u>	<u>17.24 %</u>
Total	36.21 %	36.15 %
Less Normal Cost:		
Retirement	17.75 %	17.55 %
Termination	3.73 %	3.77 %
Pre-Retirement Survivors	0.68 %	0.68 %
Disability	<u>0.54 %</u>	<u>0.53 %</u>
Total Normal Cost	22.70 %	22.53 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	13.01 %	13.12 %
Amortization Period	70 years	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	6.77 %	7.38 %



Section I: Board Summary

Summary of Key Findings – Municipal Police Division

The UAAL decreased from \$774.9 million to \$724.7 million. The funded ratio increased from 73.1% to 74.9%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal Police Division experienced a net actuarial loss of \$49.4 million and a 1.8% increase to the funded ratio during the plan year ended June 30, 2020. The gain is comprised of a \$36.8 million investment related loss and a \$12.6 million loss due to non-investment related experience. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The passage of Senate Bill 72 resulted in a \$118.1 million reduction in the UAAL.
- Based upon the statutory contribution rates, the financing period for the unfunded liability is now 70 years.

Section I: Board Summary



Table I-1(f): Comparative Summary of Principal Results (Municipal Fire Division)

Valuation Date	June 30, 2020	June 30, 2019
Total Annual Payroll	\$ 139,540,121	\$ 131,964,078
Total Valuation Payroll	\$ 143,726,325	\$ 135,923,000
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 610,548,706	\$ 555,006,281
Retired Members and Survivors	<u>1,099,110,574</u>	<u>1,145,274,377</u>
Total	\$ 1,709,659,280	\$ 1,700,280,658
Actuarial Value of Assets	\$ 1,025,786,446	\$ 1,002,875,446
Funded Ratio	60.0 %	59.0 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 683,872,834	\$ 697,405,212
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	21.81 %	21.80 %
Member Contribution Rate	<u>17.57 %</u>	<u>17.56 %</u>
Total	39.38 %	39.36 %
Less Normal Cost:		
Retirement	21.31 %	21.06 %
Termination	2.92 %	2.92 %
Pre-Retirement Survivors	0.75 %	0.75 %
Disability	<u>0.53 %</u>	<u>0.52 %</u>
Total Normal Cost	25.51 %	25.25 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	13.37 %	13.61 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	17.35 %	16.37 %



Section I: Board Summary

Summary of Key Findings – Municipal Fire Division

The UAAL decreased from \$697.4 million to \$683.6 million and the funded ratio increased from 59.0% to 60.0%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal Fire Division experienced a net actuarial loss of \$15.7 million. The gain is comprised of a \$17.6 million investment related loss and a \$1.9 million gain due to non-investment related experience. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The passage of Senate Bill 72 resulted in a \$58.6 million reduction in the UAAL.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the twelfth consecutive year.

Section II of the report provides summarized information on the membership data used in the valuation. Section III covers the Fund's assets and Section IV covers the Fund's liabilities. The results of the valuation are provided in Section V and additional disclosure information is in Section VI. The appendices provide additional information on A) the Fund members, B) the actuarial assumptions and methods, and C) the summary of the benefit provisions of the Fund. It is important to note that all information contained in this report for periods prior to June 30, 2010 were produced by a prior actuarial consulting firm.



Section II: PERA Membership Data

Data regarding the membership of the Fund for use in the valuation were furnished by PERA. The following tables summarize the membership data as of June 30, 2020.

Table II-1: Summary of Membership Data as of June 30, 2020

Group	Count					Totals
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	
Total Active Members	19,065	2,294	21,137	3,773	2,431	48,700
Inactive Members						
Deferred Vested	3,205	115	2,170	224	124	5,838
Other	5,711	475	8,110	570	226	15,092
Total Inactive Members	8,916	590	10,280	794	350	20,930
Retirees						
Service*	16,985	1,326	11,794	3,298	1,790	35,193
Disabled	742	48	598	66	19	1,473
Beneficiaries	2,260	216	1,983	360	211	5,030
Total Retirees	19,987	1,590	14,375	3,724	2,020	41,696
Totals	47,968	4,474	45,792	8,291	4,801	111,326

* Counts include Co-Payees as follows:

- State General - 467
- State Police - 92
- Municipal General - 331
- Municipal Police - 253
- Municipal Fire - 146



Section II: PERA Membership Data

Table II-2: Summary of Active Membership Valuation Data

Division	Number		Annual Payroll		Average Salary	
	2020	2019	2020	2019	2020	2019
State Division						
General*	19,065	18,923	\$1,002,475,715	\$ 935,478,450	\$52,582	\$49,436
Police	579	560	37,374,302	34,925,740	64,550	62,367
Adult Corrections*	1,578	1,026	71,182,420	42,131,193	45,109	41,064
Juvenile Corrections*	137	277	5,286,108	11,163,470	38,585	40,301
Total State Division	21,359	20,786	\$1,116,318,545	\$1,023,698,853	\$52,265	\$49,249
Municipal Division						
General Coverage Plans						
Plan 1	949	1,023	\$ 33,996,613	\$ 36,240,607	\$35,824	\$35,426
Plan 2	6,209	6,288	249,740,077	247,111,667	40,222	39,299
Plan 3	12,598	12,537	583,894,391	563,040,025	46,348	44,910
Plan 4	715	711	27,242,753	27,070,205	38,102	38,073
Detention Officers Plan 1	666	639	29,487,791	28,136,244	44,276	44,032
Total General	21,137	21,198	\$ 924,361,625	\$ 901,598,748	\$43,732	\$42,532
Police Coverage Plans						
Plan 1	107	109	\$ 5,061,524	\$ 4,986,938	\$47,304	\$45,752
Plan 2	54	58	2,457,687	2,606,424	45,513	44,938
Plan 3	62	55	3,092,839	2,689,508	49,885	48,900
Plan 4	117	129	5,538,508	6,124,580	47,338	47,477
Plan 5	3,433	3,336	213,579,917	198,101,150	62,214	59,383
Total Police	3,773	3,687	\$ 229,730,475	\$ 214,508,600	\$60,888	\$58,180
Fire Coverage Plans						
Plan 1	19	19	\$ 978,757	\$ 901,469	\$51,514	\$47,446
Plan 2	16	19	748,303	885,365	46,769	46,598
Plan 3	7	7	297,536	342,370	42,505	48,910
Plan 4	6	6	254,135	325,220	42,356	54,203
Plan 5	2,383	2,338	137,261,390	129,509,654	57,600	55,393
Total Fire	2,431	2,389	\$ 139,540,121	\$ 131,964,078	\$57,400	\$55,238
Total Municipal Division	27,341	27,274	\$1,293,632,221	\$1,248,071,426	\$47,315	\$45,760
Total PERA	48,700	48,060	\$2,409,950,766	\$2,271,770,279	\$49,486	\$47,269

*Reflects members transferring from State General and State Juvenile Corrections to State Adult Corrections under the provisions of Senate Bill 72



Section II: PERA Membership Data

Table II-3: Summary of Deferred Vested Members as of June 30, 2020

Division	Number	Average Age	Average Service	Average Annual Benefit
State Division				
General	3,205	51.43	9.08	\$ 12,748
Police/Hazardous Duty	<u>115</u>	48.55	9.83	11,223
Total State Division	3,320	51.33	9.10	\$ 12,695
Municipal Division				
General	2,170	51.67	9.14	\$ 10,525
Police	224	44.24	8.77	14,531
Fire	<u>124</u>	44.45	8.09	14,814
Total Municipal Division	2,518	50.65	9.06	\$ 11,092
PERA Totals	5,838	51.04	9.08	\$ 12,004



Section II: PERA Membership Data

Table II-4: Summary of Retirees and Survivors as of June 30, 2020

Type of Retirement	Division					Total
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	
Service						
Number	16,985	1,326	11,794	3,298	1,790	35,193
Total Annual Benefits	\$ 528,681,651	\$ 46,874,757	\$ 340,863,097	\$ 139,027,683	\$ 79,788,443	\$ 1,135,235,631
Avg Annual Benefit	\$ 31,126	\$ 35,350	\$ 28,901	\$ 42,155	\$ 44,575	\$ 32,257
Avg Age	69.92	64.28	69.20	61.02	62.64	68.27
Disability						
Number	742	48	598	66	19	1,473
Total Annual Benefits	\$ 13,446,082	\$ 915,897	\$ 10,805,116	\$ 1,917,579	\$ 501,628	\$ 27,586,302
Avg Annual Benefit	\$ 18,121	\$ 19,081	\$ 18,069	\$ 29,054	\$ 26,401	\$ 18,728
Avg Age	59.55	59.20	58.52	51.96	51.15	58.67
Survivors						
Number	2,260	216	1,983	360	211	5,030
Total Annual Benefits	\$ 44,482,545	\$ 5,519,161	\$ 36,920,880	\$ 10,645,724	\$ 7,061,935	\$ 104,630,245
Avg Annual Benefit	\$ 19,683	\$ 25,552	\$ 18,619	\$ 29,571	\$ 33,469	\$ 20,801
Avg Age	70.67	68.52	69.63	66.69	71.98	69.92
Total						
Number	19,987	1,590	14,375	3,724	2,020	41,696
Total Annual Benefits	\$ 586,610,278	\$ 53,309,815	\$ 388,589,093	\$ 151,590,986	\$ 87,352,006	\$ 1,267,452,178
Avg Annual Benefit	\$ 29,350	\$ 33,528	\$ 27,032	\$ 40,706	\$ 43,244	\$ 30,397
Avg Age	69.62	64.70	68.81	61.41	63.51	68.13



Section II: PERA Membership Data

Table II-5: Summary of Historical Active Membership Valuation Data by Division

Valuation Date	Number	Annual Payroll	Average Annual Pay	% Change In Average Pay
State General Division				
6/30/2020	19,065	\$ 1,002,475,715	\$ 52,582	6.36 %
6/30/2019	18,923	935,478,450	49,436	4.93 %
6/30/2018	19,114	900,513,193	47,113	(2.55)%
6/30/2017	19,213	928,864,843	48,346	5.02 %
6/30/2016	19,655	904,829,688	46,036	(0.62)%
State Police/Corrections Division				
6/30/2020	2,294	\$ 113,842,830	\$ 49,626	4.80 %
6/30/2019	1,863	88,220,403	47,354	7.60 %
6/30/2018	1,928	84,845,998	44,007	(4.57)%
6/30/2017	1,907	87,941,130	46,115	10.00 %
6/30/2016	1,866	78,225,782	41,922	(19.04)%
Municipal General Division				
6/30/2020	21,137	\$ 924,361,625	\$ 43,732	2.82 %
6/30/2019	21,198	901,598,748	42,532	1.47 %
6/30/2018	21,511	901,617,649	41,914	4.22 %
6/30/2017	21,673	871,633,574	40,217	1.16 %
6/30/2016	21,274	845,735,646	39,754	(1.61)%
Municipal Police Division				
6/30/2020	3,773	\$ 229,730,475	\$ 60,888	4.66 %
6/30/2019	3,687	214,508,600	58,180	5.39 %
6/30/2018	3,748	206,898,932	55,202	4.53 %
6/30/2017	3,726	196,767,735	52,809	1.63 %
6/30/2016	3,708	192,670,656	51,961	(14.67)%
Municipal Fire Division				
6/30/2020	2,431	\$ 139,540,121	\$ 57,400	3.91 %
6/30/2019	2,389	131,964,078	55,238	0.27 %
6/30/2018	2,309	127,203,502	55,090	3.15 %
6/30/2017	2,232	119,207,608	53,408	2.86 %
6/30/2016	2,190	113,709,690	51,922	(15.31)%

Table II-6: Summary of Historical Active Membership Valuation Data for All Divisions

Valuation Date	Number	Annual Payroll	Average Annual Pay	% Change In Average Pay
6/30/2020	48,700	\$ 2,409,950,766	\$ 49,486	4.69 %
6/30/2019	48,060	2,271,770,279	47,269	3.45 %
6/30/2018	48,610	2,221,079,274	45,692	1.05 %
6/30/2017	48,751	2,204,414,890	45,218	3.12 %
6/30/2016	48,693	2,135,171,462	43,850	(4.09)%



Section III: PERA Assets

The following tables provide a summary of PERA's market value and actuarial value of assets (excluding Legislative Division) as of June 30, 2020.

Table III-1: Market Value Summary as of June 30, 2020

Division	June 30, 2020	June 30, 2019
State General	\$ 5,406,336,447	\$ 5,791,625,077
State Police/Corrections	1,240,698,037	1,279,095,463
Municipal General	5,036,254,426	5,288,834,252
Municipal Police	2,012,380,935	2,104,393,758
Municipal Fire	954,919,955	1,000,557,590
Total Market Value of Assets	\$ 14,650,589,800	\$ 15,464,506,140

Table III-2: Actuarial Value Summary as of June 30, 2020

Division	June 30, 2020	June 30, 2019
State General	\$ 5,807,551,328	\$ 5,805,041,751
State Police/Corrections	1,332,772,683	1,282,058,570
Municipal General	5,410,004,791	5,301,086,178
Municipal Police	2,161,723,690	2,109,268,722
Municipal Fire	1,025,786,446	1,002,875,446
Total Actuarial Value of Assets	\$ 15,737,838,938	\$ 15,500,330,667



Section III: PERA Assets

The following tables provide information on PERA's assets at market value and cash flow.

Table III-3: Market Value Reconciliation (Total PERA with Legislature)

	June 30, 2020	June 30, 2019
Beginning of Year Market Value	\$ 15,507,545,549	\$ 15,210,482,641
Audit Adjustment	-	-
Revised Beginning of Year Market Value	\$ 15,507,545,549	\$ 15,210,482,641
Revenues:		
a. Member Contributions	\$ 289,776,597	\$ 274,026,281
b. Employer Contributions	367,524,721	339,676,103
c. Appropriations	55,900,000	-
d. Purchases of Service	7,376,041	7,616,812
e. Investment Income		
1. Interest, dividends, etc.	295,948,452	415,268,426
2. Realized/Unrealized gains (losses)	(457,794,648)	581,382,118
3. Security lending and other gains (losses)	3,072,416	3,351,124
f. Other Income	1,645,633	2,046,688
g. Settlement Award	-	-
h. Total Revenues	\$ 563,449,212	\$ 1,623,367,552
Expenditures :		
a. Benefit Payments	\$ 1,255,018,086	\$ 1,193,943,794
b. Refunds of Member Contributions	44,903,265	54,336,705
c. Investment Expenses	64,770,855	64,440,773
d. Administrative Expenses	14,318,349	13,583,372
e. Total Expenditures	\$ 1,379,010,555	\$ 1,326,304,644
End of Year Market Value	\$ 14,691,984,206	\$ 15,507,545,549

The market value rate of return for the plan year is (1.47)% on both an adjusted basis and an unadjusted basis. This return is based on a simplified dollar-weighted basis which may not match more precise time-weighted return calculations. PERA's cash flow is (3.92)% as a percentage of average market value. A mature system such as PERA is expected to exhibit negative net cash flow as the number of members receiving benefit payments becomes a larger portion of total membership. There are 1.17 contributing active members for each member receiving a benefit as of June 30, 2020. We expect this measure to decline over future years and result in an increase in the percentage of negative cash flow.



Section III: PERA Assets

The actuarial value of assets represents a "smoothed" value developed with the purpose of dampening the impact of market volatility on the assets used in determining valuation results. The actuarial value of assets has been calculated by spreading the recognition of excess investment income over four years. The amount of excess investment income in each year is the difference between expected actuarial value investment income and actual market value investment income. Table III-4 provides the calculation of the amount of the current year excess investment income to be phased-in as well as the amount of deferred investment income from the prior years.

**Table III-4: Development of Actuarial Value of Assets as of June 30, 2020
(Total PERA with Legislative Division)**

A. Actuarial Value Beginning of Year		\$	15,543,469,780
B. Market Value End of Year			14,691,984,206
C. Revised Market Value Beginning of Year			15,507,545,549
D. Cash Flow			
D1. Contributions & Appropriations		\$	713,201,318
D2. Service Purchases			7,376,041
D3. Benefit Payments and Refunds			(1,299,921,351)
D4. Administrative Expenses			(14,318,349)
D5. Other			1,645,633
D6. Net		\$	(592,016,708)
E. Investment Income			
E1. Market Total (B - C - D6)		\$	(223,544,635)
E2. Assumed Rate			7.25%
E3. Amount for Immediate Recognition			1,105,440,953
E4. Amount for Phased-In Recognition			(1,328,985,588)
F. Phased-In Recognition of Investment Income			
F1. Current Year: 0.25 *E4		\$	(332,246,397)
F2. First Prior Year (2018/2019)	\$ (150,214,662) x 25%		(37,553,666)
F3. Second Prior Year (2017/2018)	(73,898,297) x 25%		(18,474,574)
F4. Third Prior Year (2016/2017)	454,743,664 x 25%		113,685,916
F5. Total Recognized Investment Gain		\$	(274,588,721)
G. Audit Adjustment		\$	-
H. Actuarial Value End of Year			\$15,782,305,304
(A + D6 + E3 + F5 + G)			
I. Difference Between Market & Actuarial Values		\$	(1,090,321,098)
J. Rate of Return on Actuarial Value			5.45 %
K. Actuarial Value as a Percentage of Market Value			107.42 %



Section III: PERA Assets

Table III-5: Allocation of Actuarial Value by Division as of June 30, 2020

	State Division		PERA Totals w/o Legislative
	General	Police	
Member Contribution Fund	\$ 924,990,774	\$ 72,530,634	\$ 2,751,855,026
Employer Contribution Fund	1,743,027,695	412,984,805	4,264,750,436
Retirement Reserve Fund	2,738,317,978	755,182,598	7,633,984,338
Total Fund Balances	\$ 5,406,336,447	\$ 1,240,698,037	\$ 14,650,589,800
Approximate % of Total Fund Balance*	36.89%	8.47%	100%
Actuarial Value Adjustment*	401,214,881	92,074,646	1,087,249,138
Total Actuarial Value of Assets	\$ 5,807,551,328	\$ 1,332,772,683	\$ 15,737,838,938

	Municipal Division			PERA Totals w/o Legislative
	General	Police	Fire	
Member Contribution Fund	\$ 1,199,236,797	\$ 327,110,526	\$ 227,986,295	\$ 2,751,855,026
Employer Contribution Fund	1,311,529,715	562,533,940	234,674,281	4,264,750,436
Retirement Reserve Fund	2,525,487,914	1,122,736,469	492,259,379	7,633,984,338
Total Fund Balances	\$ 5,036,254,426	\$ 2,012,380,935	\$ 954,919,955	\$ 14,650,589,800
Approximate % of Total Fund Balance*	34.38%	13.74%	6.52%	100.00%
Actuarial Value Adjustment*	373,750,365	149,342,755	70,866,491	1,087,249,138
Total Actuarial Value of Assets	\$ 5,410,004,791	\$ 2,161,723,690	\$ 1,025,786,446	\$ 15,737,838,938

* The actuarial value adjustment is the difference between the actuarial value of assets derived in Table III-4 and the total fund balance at market value. It was allocated to each group in proportion to the Total PERA Fund Balance. Please note that the Legislature Division accounted for approximately 0.28% of the Total PERA Fund Balance and is detailed in a separate report.



Section III: PERA Assets

The actuarial valuation assumes the rate of investment return on the assets of the Plan is 7.25% annually. This assumption is based upon the reasonable long-term expected return on the assets. In each year, the Fund will experience actuarial gains and losses due to the actual investment return of the assets. Table III-6 provides the calculation of the gain or loss due to the investment experience on the actuarial value of assets for the year ended June 30, 2020.

Table III-6: Actuarial Investment Gain (Loss) for the Year Ending June 30, 2020
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	Total
1. Beginning of Year Actuarial Value of Assets (AVA)	\$ 5,805.0	\$ 1,282.1	\$ 5,301.1	\$ 2,109.3	\$ 1,002.9	\$ 15,500.4
2. Employee and Employer Contributions	289.3	36.8	238.5	95.4	59.4	719.4
3. Benefit Payments	(587.7)	(55.2)	(410.1)	(155.1)	(89.7)	(1,297.8)
4. Administrative Expenses	(5.3)	(1.2)	(4.9)	(2.0)	(0.9)	(14.3)
5. Other	0.6	0.1	0.6	0.2	0.1	1.6
6. Interest [1 x 7.25% + (2 + 3 + 4 + 5) x 7.25% x 0.5]	409.9	92.2	378.0	150.7	71.6	1,102.4
7. Expected End of Year AVA	\$ 5,911.8	\$ 1,354.8	\$ 5,503.2	\$ 2,198.5	\$ 1,043.4	\$ 16,011.7
8. Actual End of Year AVA	5,807.6	1,332.8	5,410.0	2,161.7	1,025.8	15,737.9
9. Actuarial Investment Gain (Loss) (8 - 7)	\$ (104.2)	\$ (22.0)	\$ (93.2)	\$ (36.8)	\$ (17.6)	\$ (273.8)



Section III: PERA Assets

Statutory Reserve Transfers

Each year following receipt of the report of the annual actuarial valuation, the excess, if any, of the actuarial present value of pensions and refunds being paid or likely to be paid to members and survivors over the balance in the retirement reserve fund (RRF) shall be transferred to the retirement reserve fund from the employers accumulation fund (EAF). Table III-7 shows the necessary transfer amounts.

Table III-7: Statutory Reserve Transfers as of June 30, 2020

Division	Reported Fund Balances	Actuarial Present Value of Pensions Being Paid	Transfer
State General			
Members Contribution Fund	\$ 924,990,774		
Employers Accumulation Fund	1,743,027,695		\$ (3,868,837,660)
Retirement Reserve Fund	2,738,317,978	\$ 6,607,155,638	3,868,837,660
State Police/Corrections			
Members Contribution Fund	72,530,634		
Employers Accumulation Fund	412,984,805		-
Retirement Reserve Fund	755,182,598	659,603,204	-
Municipal General			
Members Contribution Fund	1,199,236,797		
Employers Accumulation Fund	1,311,529,715		(1,980,930,695)
Retirement Reserve Fund	2,525,487,914	4,506,418,609	1,980,930,695
Municipal Police			
Members Contribution Fund	327,110,526		
Employers Accumulation Fund	562,533,940		(850,986,374)
Retirement Reserve Fund	1,122,736,469	1,973,722,843	850,986,374
Municipal Fire			
Members Contribution Fund	227,986,295		
Employers Accumulation Fund	234,674,281		(606,851,195)
Retirement Reserve Fund	492,259,379	1,099,110,574	606,851,195
Total End of Year Market Value	\$ 14,650,589,800		



Section IV: PERA Liabilities

The total actuarial present value of benefits is the value as of the valuation date of all future benefits expected to be paid to current members of the Fund. An actuarial cost method allocates each individual's present value of benefits to past and future years of service. The actuarial accrued liability includes the portion of the active member present value of benefits allocated to past service as well as the entire present value of benefits for retirees, beneficiaries and inactive members. The portion of the actuarial present value allocated to the future service of active members is called the present value of future normal costs. Table IV-1 presents the calculation and allocation of the actuarial present value of benefits.

Table IV-1: Calculation and Allocation of the Actuarial Present Value as of June 30, 2020

	Actuarial Accrued Liability	Present Value of Future Normal Cost	Total Actuarial Present Value
Active Members			
Service Retirement	\$ 6,475,138,561	\$ 1,931,608,034	\$ 8,406,746,595
Termination Benefits	315,916,399	709,739,099	1,025,655,498
Survivor Benefits	159,191,904	144,844,738	304,036,642
Disability Retirement	103,097,179	163,304,283	266,401,462
Total for Active Members	\$ 7,053,344,043	\$ 2,949,496,154	\$ 10,002,840,197
Inactive Members	\$ 489,515,958		\$ 489,515,958
Retirees and Beneficiaries			
Service Retirements	\$ 13,440,094,683		\$ 13,440,094,683
Beneficiaries	994,139,470		994,139,470
Disability Retirements	411,776,715		411,776,715
Total for Retirees and Beneficiaries	\$ 14,846,010,868		\$ 14,846,010,868
Total	\$ 22,388,870,869	\$ 2,949,496,154	\$ 25,338,367,023

Under the valuation funding method, an unfunded actuarial accrued liability (UAAL) exists to the extent that the actuarial accrued liability exceeds the actuarial value of assets as presented in Section III. The calculation of the UAAL by Division as of the valuation date is shown in Table IV-2 on the following page.



Section IV: PERA Liabilities

Table IV-2: Calculation of the Unfunded Actuarial Accrued Liability and Funded Ratio
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire
1. Actuarial Accrued Liability	\$ 9,689.7	\$ 1,048.2	\$ 7,054.8	\$ 2,886.5	\$ 1,709.7
2. Actuarial Value of Assets	5,807.6	1,332.8	5,410.0	2,161.7	1,025.8
3. Unfunded Actuarial Accrued Liability (1-2)	3,882.1	(284.6)	1,644.8	724.8	683.9
Funded Ratio (2 / 1)	59.9%	127.2%	76.7%	74.9%	60.0%

Although the terminology used to describe the excess of PERA's actuarial accrued liability over the actuarial value of assets is called the "unfunded" actuarial accrued liability, the calculated annual contribution rates in the valuation include an annual amortization payment required to fully amortize the UAAL within 25 years. In some cases, the current statutory rates are less than these calculated rates.

The funded ratio is the ratio of the actuarial value of assets (Table III-2) divided by the actuarial accrued liability (Table IV-1) as of the valuation date. As of June 30, 2020, the funded ratio of PERA is 70.3% as compared to a ratio of 69.9% as of June 30, 2019. The ratio is a commonly used measure of the funding progress and can be useful in reviewing the historical trend of a Fund's funding progress. Such a review should also consider the impact to this measure over the historical period due to changes to fund benefits, changes to the actuarial assumptions and methods, and the significant impact that investment experience can have on the ratio over short-term periods. We caution that no single "point in time" measure can provide a universal basis for comparing one plan's funded status to another.



Section IV: PERA Liabilities

The calculation of PERA’s actuarial assets and liabilities requires the use of several assumptions concerning the future experience of PERA and its members. In each annual valuation, the latest year of actual experience is compared to that expected by the prior valuation. The differences are actuarial gains and losses which decrease or increase the UAAL. Table IV-3 provides the reconciliation of the UAAL.

Table IV-3: Reconciliation of the UAAL
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire
1. Beginning of Year UAAL	\$ 3,731.6	\$ (297.1)	\$ 1,755.8	\$ 774.9	\$ 697.4
2. Normal Cost	147.5	20.3	128.6	49.8	34.3
3. Contributions	(269.1)	(32.1)	(219.6)	(87.9)	(55.8)
4. Other Income/Expense	4.7	1.1	4.3	1.7	0.8
5. Interest [(1 x 7.25%) + (2 + 3 + 4) x 7.25% x 0.5]	266.3	(21.9)	124.2	54.9	49.8
6. Expected End of Year	3,881.0	(329.7)	1,793.3	793.4	726.5
7. Assumption Changes	0	0	0	0	0
8. Other Changes	(400.0)	29.8	(241.9)	(118.0)	(58.4)
9. Expected UAAL after changes (6 +7 + 8)	3,481.0	(299.9)	1,551.4	675.4	668.1
10. Actual UAAL	3,882.1	(284.6)	1,644.8	724.8	683.9
11. Total Actuarial Gain (Loss)	(401.1)	(15.3)	(93.4)	(49.4)	(15.8)

Tables IV-4 and IV-5 on the following pages provide details of the sources of actuarial gains and losses for state divisions and municipal divisions, respectively.



Section IV: PERA Liabilities

Table IV-4: Actuarial Gains & Losses by Source for State Divisions
(Dollar Amounts in Millions)

Source	State General			State Police/Corrections		
	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*
Expected Value	\$3,881.0	60.3 %	24.26 %	(\$329.7)	132.3 %	(18.15)%
Retirement	\$91.1	(0.5)%	0.46 %	\$2.6	(4.2)%	(0.43)%
Disability	(\$0.5)	0.0 %	0.00 %	(\$0.5)	0.8 %	0.08 %
Pre-Retirement Death	(\$2.9)	0.0 %	(0.01)%	(\$0.2)	0.3 %	0.03 %
Withdrawal	\$7.0	0.0 %	0.04 %	(\$3.0)	4.8 %	0.50 %
Pay Increases	\$89.9	(0.5)%	0.45 %	(\$2.1)	3.4 %	0.35 %
New Entrants	\$46.0	(0.3)%	0.23 %	\$5.2	(8.4)%	(0.86)%
Post-Retirement Death	\$16.9	(0.1)%	0.09 %	(\$10.2)	16.5 %	1.68 %
Data Adjustments	\$51.1	(0.3)%	0.26 %	\$1.9	(3.1)%	(0.31)%
Other	(\$1.7)	0.0 %	(0.01)%	(\$0.5)	0.8 %	0.08 %
Investment Return	\$104.2	(1.1)%	0.53 %	\$22.0	(12.2)%	(3.63)%
Total (Gain) or Loss	\$401.1	(2.8)%	2.03 %	\$15.2	(1.3)%	(2.51)%
Assumption Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Other Changes	(\$400.0)	2.4 %	(2.02)%	\$29.8	(3.8)%	4.99 %
Actual Value	\$3,882.1	59.9 %	24.27 %	(\$284.7)	127.2 %	(15.67)%

* Impact on Contribution Rate based on 25 year period and valuation payroll.



Section IV: PERA Liabilities

Table IV-5: Actuarial Gains & Losses by Source for Municipal Divisions
(Dollar Amounts in Millions)

Source	Municipal General			Municipal Police			Municipal Fire		
	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*
Expected Value	\$1,793.3	75.4 %	12.16 %	\$793.4	73.4 %	21.65 %	\$726.5	58.9 %	32.63 %
Retirement	(\$28.2)	3.5 %	(0.19)%	(\$0.9)	0.0 %	(0.02)%	\$2.4	0.1 %	0.11 %
Disability	(\$0.8)	0.1 %	(0.01)%	\$1.8	0.0 %	0.05 %	\$0.4	0.0 %	0.02 %
Pre-Retirement Death	(\$3.7)	0.5 %	(0.02)%	(\$0.5)	0.0 %	(0.01)%	(\$0.3)	0.0 %	(0.01)%
Withdrawal	(\$7.6)	1.0 %	(0.05)%	\$6.6	(0.2)%	0.18 %	\$2.8	0.1 %	0.12 %
Pay Increases	\$23.6	(3.0)%	0.16 %	\$25.9	(0.7)%	0.70 %	\$1.3	0.0 %	0.06 %
New Entrants	\$33.0	(4.2)%	0.22 %	\$10.2	(0.3)%	0.28 %	\$7.1	0.3 %	0.32 %
Post-Retirement Death	(\$56.6)	7.2 %	(0.39)%	(\$37.7)	1.1 %	(1.03)%	(\$17.0)	(0.6)%	(0.77)%
Data Adjustments	\$42.6	(5.4)%	0.29 %	\$8.6	(0.2)%	0.23 %	\$2.1	0.1 %	0.09 %
Other	(\$2.1)	0.3 %	(0.01)%	(\$1.4)	0.0 %	(0.04)%	(\$0.7)	0.0 %	(0.03)%
Investment Return	\$93.2	(1.3)%	0.63 %	\$36.8	(1.2)%	1.00 %	\$17.6	(1.0)%	0.80 %
Total (Gain) or Loss	\$93.4	(1.3)%	0.63 %	\$49.4	(1.5)%	1.34 %	\$15.7	(1.0)%	0.71 %
Assumption Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Other Changes	(\$241.9)	2.6 %	(1.64)%	(\$118.0)	3.0 %	(3.21)%	(\$58.4)	2.1 %	(2.62)%
Actual Value	\$1,644.8	76.7 %	11.15 %	\$724.8	74.9 %	19.78 %	\$683.8	60.0 %	30.72 %

* Impact on Contribution Rate based on 25 year period and valuation payroll.



Section V: Actuarial Funding Calculation

Section IV of this report presented PERA's actuarial accrued liability as the portion of the present value of benefits allocated to past years of service. The portion of the active members' present value of benefits allocated to future years of service is funded through annual normal cost contributions comprised of both active member and employer contributions.

The annual required contribution rate is the percentage of valuation payroll necessary to fund the annual normal cost of the Fund and fully amortize the UAAL over 25 years in accordance with the Board's funding objectives. The calculated rate is expected to remain constant over the remaining amortization period and is provided in Table V-1.

Table V-1(a): Valuation Results for State General Division

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$1,032,549,986	\$ 963,542,804
2. Present Value of Future Benefits	10,794,082,980	10,575,027,384
3. Present Value of Future Normal Costs	1,104,376,886	1,038,424,477
4. Actuarial Accrued Liability (2 - 3)	\$9,689,706,094	\$9,536,602,907
5. Actuarial Value of Assets	5,807,551,328	5,805,041,751
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$3,882,154,766	\$3,731,561,156
7. UAAL Amortization Payment (25 year funding)	\$ 250,618,311	\$ 218,060,985
a. Amortization Payment as a Percent of Payroll (7 / 1)	24.27 %	22.63 %
8. Total Normal Cost	\$ 156,917,411	\$ 147,459,227
a. Normal Cost as a Percent of Payroll (8 / 1)	15.20 %	15.30 %
9. Expected Administrative Expenses	\$ 5,162,750	\$ 4,817,714
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 412,698,472	\$ 370,337,926
a. ADC Rate (7a + 8a + 9a)	39.97 %	38.43 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	17.74 %	17.24 %
b. Member Contribution Rate	9.42 %	8.92 %
c. Total Statutory Contribution Rate (a + b)	27.16 %	26.16 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	12.81 %	12.27 %



Section V: Actuarial Funding Calculation

Table V-1(b): Valuation Results for State Police/Correction Division

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$ 117,258,115	\$ 90,867,015
2. Present Value of Future Benefits	1,249,400,733	1,147,989,270
3. Present Value of Future Normal Costs	201,249,644	163,007,134
4. Actuarial Accrued Liability (2 - 3)	\$1,048,151,089	\$ 984,982,136
5. Actuarial Value of Assets	1,332,772,683	1,282,058,570
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ (284,621,594)	\$(297,076,434)
7. UAAL Amortization Payment (25 year funding)	\$ (18,374,173)	\$ (17,360,235)
a. Amortization Payment as a Percent of Payroll (7 / 1)	(15.67)%	(19.11)%
8. Total Normal Cost	\$ 25,347,154	\$ 20,322,473
a. Normal Cost as a Percent of Payroll (8 / 1)	21.62 %	22.37 %
9. Expected Administrative Expenses	\$ 586,291	\$ 454,335
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 7,559,272	\$ 3,416,573
a. ADC Rate (7a + 8a + 9a)	6.45 %	3.76 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	25.56 %	25.58 %
b. Member Contribution Rate	<u>8.99 %</u>	<u>8.74 %</u>
c. Total Statutory Contribution Rate (a + b)	34.55 %	34.32 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	(28.10)%	(30.56)%



Section V: Actuarial Funding Calculation

Table V-1(c): Valuation Results for Municipal General Division

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$ 952,092,474	\$ 928,646,710
2. Present Value of Future Benefits	7,989,795,233	7,977,381,962
3. Present Value of Future Normal Costs	934,989,085	920,447,194
4. Actuarial Accrued Liability (2 - 3)	\$7,054,806,148	\$7,056,934,768
5. Actuarial Value of Assets	5,410,004,791	5,301,086,178
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$1,644,801,357	\$1,755,848,590
7. UAAL Amortization Payment (25 year funding)	\$ 106,182,613	\$ 102,606,405
a. Amortization Payment as a Percent of Payroll (7 / 1)	11.15 %	11.05 %
8. Total Normal Cost	\$ 131,105,944	\$ 128,576,278
a. Normal Cost as a Percent of Payroll (8 / 1)	13.77 %	13.85 %
9. Expected Administrative Expenses	\$ 4,760,462	\$ 4,643,234
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 242,049,019	\$ 235,825,917
a. ADC Rate (7a + 8a + 9a)	25.42 %	25.40 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	10.03 %	10.02 %
b. Member Contribution Rate	<u>13.53 %</u>	<u>13.49 %</u>
c. Total Statutory Contribution Rate (a + b)	23.56 %	23.51 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	1.86 %	1.89 %



Section V: Actuarial Funding Calculation

Table V-1(d): Valuation Results for Municipal Police Division

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$ 236,622,389	\$ 220,943,858
2. Present Value of Future Benefits	3,289,742,056	3,263,285,332
3. Present Value of Future Normal Costs	403,193,798	379,087,453
4. Actuarial Accrued Liability (2 - 3)	\$2,886,548,258	\$2,884,197,879
5. Actuarial Value of Assets	2,161,723,690	2,109,268,722
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 724,824,568	\$ 774,929,157
7. UAAL Amortization Payment (25 year funding)	\$ 46,792,135	\$ 45,284,482
a. Amortization Payment as a Percent of Payroll (7 / 1)	19.78 %	20.50 %
8. Total Normal Cost	\$ 53,704,774	\$ 49,768,564
a. Normal Cost as a Percent of Payroll (8 / 1)	22.70 %	22.53 %
9. Expected Administrative Expenses	\$ 1,183,112	\$ 1,104,719
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 101,680,021	\$ 96,157,765
a. ADC Rate (7a + 8a + 9a)	42.98 %	43.53 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	18.93 %	18.91 %
b. Member Contribution Rate	<u>17.28 %</u>	<u>17.24 %</u>
c. Total Statutory Contribution Rate (a + b)	36.21 %	36.15 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	6.77 %	7.38 %



Section V: Actuarial Funding Calculation

Table V-1(e): Valuation Results for Municipal Fire Division

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$ 143,726,325	\$ 135,923,000
2. Present Value of Future Benefits	2,015,346,021	1,989,117,421
3. Present Value of Future Normal Costs	305,686,741	288,836,763
4. Actuarial Accrued Liability (2 - 3)	\$1,709,659,280	\$1,700,280,658
5. Actuarial Value of Assets	1,025,786,446	1,002,875,446
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 683,872,834	\$ 697,405,212
7. UAAL Amortization Payment (25 year funding)	\$ 44,148,434	\$ 40,754,221
a. Amortization Payment as a Percent of Payroll (7 / 1)	30.72 %	29.98 %
8. Total Normal Cost	\$ 36,663,987	\$ 34,325,836
a. Normal Cost as a Percent of Payroll (8 / 1)	25.51 %	25.25 %
9. Expected Administrative Expenses	\$ 718,632	\$ 679,615
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 81,531,053	\$ 75,759,672
a. ADC Rate (7a + 8a + 9a)	56.73 %	55.73 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	21.81 %	21.80 %
b. Member Contribution Rate	17.57 %	17.56 %
c. Total Statutory Contribution Rate (a + b)	39.38 %	39.36 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	17.35 %	16.37 %



Section V: Actuarial Funding Calculation

Table V-1(f): Valuation Results for All PERA Divisions

	June 30, 2020	June 30, 2019
1. Total Valuation Payroll	\$ 2,482,249,289	\$ 2,339,923,387
2. Present Value of Future Benefits	25,338,367,023	24,952,801,369
3. Present Value of Future Normal Costs	2,949,496,154	2,789,803,021
4. Actuarial Accrued Liability (2 - 3)	\$22,388,870,869	\$22,162,998,348
5. Actuarial Value of Assets	15,737,838,938	15,500,330,667
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 6,651,031,931	\$ 6,662,667,681
7. UAAL Amortization Payment (25 year funding)	\$ 429,367,320	\$ 389,345,858
a. Amortization Payment as a Percent of Payroll (7 / 1)	17.30 %	16.64 %
8. Total Normal Cost	\$ 403,739,270	\$ 380,452,378
a. Normal Cost as a Percent of Payroll (8 / 1)	16.27 %	16.26 %
9. Expected Administrative Expenses	\$ 12,411,246	\$ 11,699,617
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 845,517,836	\$ 781,497,853
a. ADC Rate (7a + 8a + 9a)	34.07 %	33.40 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	15.50 %	15.12 %
b. Member Contribution Rate	12.20 %	12.01 %
c. Total Statutory Contribution Rate (a + b)	27.70 %	27.13 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	6.37 %	6.27 %

Table V-2: Contribution Rate Summary

Division	Employer Only		
	Current Statutory Rate	25-year Rate	(Excess)/ Shortfall
State General	17.74 %	30.55 %	12.81 %
State Police/Corrections	25.56 %	(2.54)%	(28.10)%
Municipal General	10.03 %	11.89 %	1.86 %
Municipal Police	18.93 %	25.70 %	6.77 %
Municipal Fire	21.81 %	39.16 %	17.35 %
PERA Total	15.50 %	21.87 %	6.37 %



Section V: Actuarial Funding Calculation

Table V-3: Statutory Contribution Rate Summary

Division and Coverage Plan	Contribution Rates	
	Member	Employer
State Division		
General Coverage Plan 3	9.42 %	17.74 %
Police and Adult Corrections Plan 1	9.10 %	25.50 %
Hazardous Duty (Juvenile Correctional Officers) Plan 2	6.78 %	26.87 %
Weighted Average for Police/Corrections*	8.99 %	25.56 %
Municipal Division		
General Coverage Plans		
Plan 1	8.50 %	7.65 %
Plan 2	10.65 %	9.80 %
Plan 3	14.65 %	9.80 %
Plan 4	17.15 %	12.30 %
Detention Officers Plan 1	18.15 %	17.30 %
Weighted Average*	13.53 %	10.03 %
Police Coverage Plans		
Plan 1	8.50 %	10.65 %
Plan 2	8.50 %	15.65 %
Plan 3	8.50 %	19.15 %
Plan 4	13.85 %	19.15 %
Plan 5	17.80 %	19.15 %
Weighted Average*	17.28 %	18.93 %
Fire Coverage Plans		
Plan 1	9.50 %	11.65 %
Plan 2	9.50 %	18.15 %
Plan 3	9.50 %	21.90 %
Plan 4	14.30 %	21.90 %
Plan 5	17.70 %	21.90 %
Weighted Average*	17.57 %	21.81 %

* PERA financial records do not provide an asset breakdown by coverage plan which necessitates the use of a weighted average contribution rate for the purpose of comparing assets to the actuarial accrued liability and determining the financing period for the unfunded actuarial accrued liability. Contribution rates are weighted by payroll.



Section VI: Additional Disclosure Information

The tables provided in this section present information relevant for the annual financial reporting of PERA. GASB Statement No. 67 required disclosure information will be provided in a separate supplemental report. Additional disclosure information is provided below.

Table VI-1: Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Plan Assets (a)	Actuarial Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Annual Payroll* (c)	UAAL as a Percentage of Annual Payroll ((b - a) / c)
6/30/2020	\$ 15,737,838,938	\$ 22,388,870,869	\$6,651,031,931	70.3 %	\$2,409,950,766	276.0 %
6/30/2019	15,500,330,667	22,162,998,348	6,662,667,681	69.9 %	2,271,770,279	293.3 %
6/30/2018	15,252,860,672	21,313,451,183	6,060,590,511	71.6 %	2,221,079,274	272.9 %
6/30/2017	15,124,167,297	20,194,698,290	5,070,530,993	74.9 %	2,204,414,890	230.0 %
6/30/2016	14,654,814,373	19,474,241,384	4,819,427,011	75.3 %	2,135,171,462	225.7 %
6/30/2015	14,074,919,042	18,786,486,550	4,711,567,508	74.9 %	2,248,254,276	209.6 %
6/30/2014	13,482,815,522	17,784,376,686	4,301,561,164	75.8 %	2,102,265,325	204.6 %
6/30/2013	12,438,151,665	17,057,380,022	4,619,228,357	72.9 %	2,049,737,510	225.4 %
6/30/2012	11,612,047,019	17,788,043,847	6,175,996,828	65.3 %	1,994,280,107	309.7 %
6/30/2011	11,855,217,373	16,826,392,409	4,971,175,036	70.5 %	1,935,013,761	256.9 %
6/30/2010	12,243,712,850	15,601,461,460	3,357,748,610	78.5 %	1,993,516,921	168.4 %

* Beginning with the 2016 valuation, annual payroll reflects the change from total to pensionable earnings.



Section VI: Additional Disclosure Information

Table VI-2: Solvency Test by Division

State General

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	(1)		(2)	(3)	
6/30/2020	\$ 924,990,774	\$ 6,884,617,226	\$ 1,880,098,094	\$ 5,807,551,328	100.00%	70.92%	0.00%	
6/30/2019	896,762,967	6,893,274,726	1,746,565,214	5,805,041,751	100.00	71.20	0.00	
6/30/2018	892,279,750	6,620,228,801	1,682,936,866	5,799,854,720	100.00	74.13	0.00	
6/30/2017	878,994,137	6,218,179,179	1,714,643,642	5,831,916,099	100.00	79.65	0.00	
6/30/2016	853,069,949	6,055,630,306	1,620,222,312	5,720,834,981	100.00	80.38	0.00	

State Police/Corrections

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	(1)		(2)	(3)	
6/30/2020	\$ 72,530,634	\$ 666,980,924	\$ 308,639,531	\$ 1,332,772,683	100.00%	100.00%	100.00%	
6/30/2019	69,799,978	695,901,232	219,280,926	1,282,058,570	100.00	100.00	100.00	
6/30/2018	67,111,945	677,224,121	201,630,652	1,231,975,474	100.00	100.00	100.00	
6/30/2017	64,332,242	645,636,929	199,904,014	1,196,338,715	100.00	100.00	100.00	
6/30/2016	59,921,229	635,036,352	180,402,152	1,136,076,589	100.00	100.00	100.00	



Section VI: Additional Disclosure Information

Municipal General

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2020	\$ 1,199,236,797	\$ 4,682,479,829	\$ 1,173,089,522	\$ 5,410,004,791	100.00%	89.93%	0.00%
6/30/2019	1,161,061,009	4,771,658,727	1,124,215,032	5,301,086,178	100.00	86.76	0.00
6/30/2018	1,137,899,276	4,528,287,174	1,131,956,929	5,184,797,302	100.00	89.37	0.00
6/30/2017	1,104,575,618	4,191,453,200	1,099,006,703	5,106,489,938	100.00	95.48	0.00
6/30/2016	1,053,649,176	4,071,034,047	1,035,772,981	4,916,985,846	100.00	94.90	0.00

Municipal Police

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2020	\$ 327,110,526	\$ 1,993,453,153	\$ 565,984,579	\$ 2,161,723,690	100.00%	92.03%	0.00%
6/30/2019	303,167,527	2,095,697,284	485,333,068	2,109,268,722	100.00	86.18	0.00
6/30/2018	289,967,593	2,011,087,857	449,322,578	2,058,403,842	100.00	87.93	0.00
6/30/2017	275,702,207	1,882,156,157	404,904,171	2,027,593,334	100.00	93.08	0.00
6/30/2016	260,474,657	1,810,426,144	382,129,648	1,952,310,191	100.00	93.45	0.00

Municipal Fire

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2020	\$ 227,986,295	\$ 1,107,995,694	\$ 373,677,291	\$ 1,025,786,446	100.00%	72.00%	0.00%
6/30/2019	214,452,786	1,158,090,653	327,737,219	1,002,875,446	100.00	68.08	0.00
6/30/2018	205,989,875	1,099,223,887	318,303,879	977,829,334	100.00	70.22	0.00
6/30/2017	194,507,068	1,033,070,516	287,632,507	961,829,211	100.00	74.28	0.00
6/30/2016	175,510,949	1,026,377,371	254,584,111	928,606,766	100.00	73.37	0.00



Section VI: Additional Disclosure Information

Table VI-2: Solvency Test for All PERA Divisions

PERA Totals

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)			(1)	(2)	(3)
6/30/2020	\$ 2,751,855,026	\$ 15,335,526,826	\$ 4,301,489,017		\$ 15,737,838,938	100.00%	84.68%	0.00%
6/30/2019	2,645,244,267	15,614,622,622	3,903,131,459		15,500,330,667	100.00	82.33	0.00
6/30/2018	2,593,248,439	14,936,051,840	3,784,150,904		15,252,860,672	100.00	84.76	0.00
6/30/2017	2,518,111,272	13,970,495,981	3,706,091,037		15,124,167,297	100.00	90.23	0.00
6/30/2016	2,402,625,960	13,598,504,220	3,473,111,204		14,654,814,373	100.00	90.10	0.00



Section VI: Additional Disclosure Information

**Table VI-3: Schedule of Retirants Added to and Removed from Rolls by Division
State General**

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	1,229	\$43,864,347	492	\$11,705,908	19,987	\$586,610,278	5.80%	\$ 29,350
6/30/2019	1,017	38,014,119	537	12,503,719	19,250	554,451,839	4.82	28,803
6/30/2018	986	35,111,580	427	9,977,306	18,770	528,941,439	4.99	28,180
6/30/2017	912	31,124,051	536	11,387,703	18,211	503,807,165	4.08	27,665
6/30/2016	1,105	30,796,909	440	9,067,427	17,835	484,070,817	4.70	27,142

State Police/Corrections

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	52	\$ 2,615,081	29	\$ 809,380	1,590	\$53,309,815	3.51%	\$ 33,528
6/30/2019	58	2,826,753	44	1,195,773	1,567	51,504,114	3.27	32,868
6/30/2018	62	2,532,699	31	992,132	1,553	49,873,134	3.19	32,114
6/30/2017	51	2,309,111	38	882,314	1,522	48,332,567	3.04	31,756
6/30/2016	65	2,479,773	26	578,925	1,509	46,905,770	4.22	31,084



Section VI: Additional Disclosure Information

Municipal General

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	725	\$25,400,841	385	\$ 8,249,790	14,375	\$388,589,093	4.62%	\$ 27,032
6/30/2019	946	29,052,180	426	8,634,982	14,035	371,438,042	5.82	26,465
6/30/2018	911	27,278,930	313	6,346,069	13,515	351,020,844	6.34	25,973
6/30/2017	717	21,257,836	418	7,607,253	12,917	330,087,983	4.31	25,555
6/30/2016	933	24,135,156	342	6,564,419	12,618	316,437,400	5.88	25,078

Municipal Police

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	71	\$ 5,531,990	52	\$ 1,634,353	3,724	\$151,590,986	2.64%	\$ 40,706
6/30/2019	177	9,107,704	70	2,029,823	3,705	147,693,349	5.03	39,863
6/30/2018	165	8,523,713	44	1,491,360	3,598	140,615,468	5.26	39,082
6/30/2017	166	8,150,488	61	1,633,073	3,477	133,583,115	5.13	38,419
6/30/2016	211	9,918,243	49	1,493,127	3,372	127,065,700	7.10	37,683

Municipal Fire

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	61	\$ 4,093,428	34	\$ 1,423,643	2,020	\$87,352,006	3.15%	\$ 43,244
6/30/2019	95	5,867,307	40	1,447,080	1,993	84,682,221	5.51	42,490
6/30/2018	81	4,982,102	27	1,063,296	1,938	80,261,994	5.13	41,415
6/30/2017	34	2,496,048	22	816,881	1,884	76,343,188	2.25	40,522
6/30/2016	110	5,799,234	33	1,012,932	1,872	74,664,021	6.85	39,885



Section VI: Additional Disclosure Information

Table VI-3: Schedule of Retirants Added to and Removed from Rolls for All PERA Divisions

PERA Totals

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2020	2,138	\$81,505,687	992	\$23,823,074	41,696	\$ 1,267,452,178	4.77%	\$ 30,397
6/30/2019	2,293	84,868,063	1,117	25,811,377	40,550	1,209,769,565	5.13	29,834
6/30/2018	2,205	78,429,024	842	19,870,163	39,374	1,150,712,879	5.36	29,225
6/30/2017	1,880	65,337,534	1,075	22,327,224	38,011	1,092,154,018	4.10	28,733
6/30/2016	2,424	73,129,315	890	18,716,830	37,206	1,049,143,708	5.47	28,198

Table VI-4: Summary of Actuarial Methods and Assumptions

Valuation date	June 30, 2020
Actuarial cost method	Entry Age Normal
Amortization method	Level Percent of Payroll, Open
Payroll growth rate	3.00%
Remaining amortization period	25 years
Asset valuation method	4-year Smoothed Market
Actuarial assumptions:	
Investment rate of return*	7.25%
Administrative expenses	0.50% of payroll
Projected salary increases*	3.25% – 13.50%
Post-retirement benefit increases	1.60% compounded annually beginning 7/1/2023. (2.50% for certain retirees and disabled participants age 75 or older or with annual benefits less than \$25,000)

* Includes inflation at 2.50%



Appendix A: Additional Membership Data

Table A-1: Schedule of Active Participant Data as of June 30, 2020 by Division

State General

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	19								19	\$ 525,447
20 to 24	519	5							524	17,670,262
25 to 29	1,317	198	4						1,519	61,679,464
30 to 34	1,377	654	187	7					2,225	102,500,038
35 to 39	1,090	646	517	198	8				2,459	123,569,038
40 to 44	864	532	480	406	192	4			2,478	134,258,518
45 to 49	733	503	393	486	418	55			2,588	146,050,318
50 to 54	612	506	390	455	373	112	3		2,451	140,574,306
55 to 59	517	442	415	462	337	110	13		2,296	126,139,122
60	75	104	81	68	58	20	3		409	22,729,761
61	83	66	83	79	53	14	7		385	22,949,064
62	86	60	84	58	41	15	1		345	19,574,596
63	66	59	68	45	28	17	5		288	16,882,682
64	50	57	52	45	22	14	4		244	15,163,687
65	45	40	35	40	23	12	6		201	12,993,837
66	35	39	37	23	18	7	2		161	9,657,374
67	27	19	18	17	10	5	3		99	6,051,603
68	23	29	16	8	8	5	7		96	6,248,317
69	10	22	13	9	9	3			66	4,066,485
70	11	10	9	10	6	7	1		54	3,567,714
71	6	9	10	9	2		1		37	2,115,268
72	7	8	3	4	8	3			33	1,793,720
73	5	3	3	5		1			17	990,951
74	6	2	9	3	2		2		24	1,645,850
75	1	1		1					3	129,660
76	1	3	2	1	2				9	856,966
77	2	3	2	4	2				13	800,984
78		2	1	2	1		1		7	398,845
79	2	2							4	185,267
80 & Over	2	3		2	2		2		11	706,574
Total	7,591	4,027	2,912	2,447	1,623	404	61		19,065	\$ 1,002,475,715

Average Age: 45.10

Average Service: 9.01



Appendix A: Additional Membership Data

State Police/Corrections

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	5								5	\$ 202,285
20 to 24	175	3							178	7,991,614
25 to 29	281	124	10	1					416	18,991,354
30 to 34	155	157	74	22					408	19,291,559
35 to 39	83	88	86	82	34				373	18,670,009
40 to 44	41	50	63	74	75	8			311	16,739,605
45 to 49	33	45	35	48	74	24	1		260	14,698,785
50 to 54	22	30	26	37	36	14	4		169	8,737,246
55 to 59	14	14	17	19	21	7	3		95	4,680,320
60	1	4	1	5	3	1	2		17	847,701
61	1	1	2	6	4				14	675,729
62	1		4	1	2	1			9	417,431
63	3		3	2	4				12	569,269
64				2	2	1			5	270,931
65		1	1		2	3	2		9	431,800
66	1	1				1	1		4	189,428
67		2		1					3	156,792
68				1					1	47,118
69				1		1			2	90,030
70										
71		1							1	54,898
72					1				1	44,439
73										
74										
75										
76										
77										
78	1								1	44,487
79										
80 & Over										
Total	817	521	322	302	258	61	13		2,294	\$113,842,830

Average Age: 37.77

Average Service: 9.91



Appendix A: Additional Membership Data

Municipal General

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	225							225	\$ 7,462,470
20 to 24	1,193	14						1,207	37,443,754
25 to 29	1,598	326	12					1,936	66,964,558
30 to 34	1,310	643	306	16				2,275	88,458,038
35 to 39	1,050	658	523	227	10	1		2,469	105,510,613
40 to 44	892	547	486	393	180	7		2,505	116,862,778
45 to 49	739	517	505	393	316	76		2,546	124,127,235
50 to 54	705	496	432	392	366	122	10	2,523	122,768,104
55 to 59	662	493	451	398	346	121	36	2,507	119,156,074
60	109	93	95	87	73	28	7	492	23,045,146
61	128	84	101	79	60	28	5	485	22,862,465
62	98	75	78	53	28	15	9	356	16,087,692
63	72	82	77	45	32	20	9	337	16,064,064
64	82	63	63	39	31	10	10	298	13,711,493
65	37	50	40	32	14	7	3	183	9,536,852
66	40	41	21	31	20	7	1	161	7,543,007
67	39	29	27	15	10	3	2	125	5,755,442
68	26	20	14	17	4	2	2	85	4,065,802
69	23	21	13	10	7	2	4	80	3,460,317
70	25	12	22	6	2	3		70	3,103,176
71	16	18	11	7	5	3	1	61	2,812,873
72	19	15	6	4	4	4	2	54	2,019,105
73	18	9	1	4	4	2	1	39	1,379,128
74	10	5	3	5			1	24	1,071,886
75	7	3	2	2	1			15	607,649
76	6	2	2	1	2	1	1	15	375,173
77	10	2	6	1		1	1	21	764,267
78	4	2			2	1		9	205,654
79	5	2	2			1		10	353,796
80 & Over	11	4	2	2	3	2		24	783,011
Total	9,159	4,326	3,301	2,259	1,520	467	105	21,137	\$ 924,361,625

Average Age: 44.24

Average Service: 8.47



Appendix A: Additional Membership Data

Municipal Police

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20									
20 to 24	225	4						229	\$ 10,039,362
25 to 29	521	174	2					697	35,036,233
30 to 34	270	358	135	5				768	43,416,323
35 to 39	115	161	263	114	2			655	41,771,097
40 to 44	61	98	156	208	47			570	39,051,774
45 to 49	37	50	71	143	96	7		404	28,888,484
50 to 54	28	18	53	85	46	12	2	244	17,330,860
55 to 59	18	21	23	38	19	6	5	130	9,259,003
60		3	3	4	3			13	770,471
61	1		2	7	2			12	691,928
62	3	2	5	5		1		16	1,036,686
63	1		1		1	1	1	5	411,667
64	1	1	2	2	2			8	461,955
65	2		2	3				7	429,471
66		1	2	2	1			6	399,373
67	1					1		2	258,576
68	2		1					3	224,059
69							1	1	73,779
70							1	1	92,715
71									
72									
73		1						1	27,960
74									
75									
76									
77									
78									
79									
80 & Over		1						1	58,697
Total	1,286	893	721	616	219	28	10	3,773	\$ 229,730,475

Average Age: 37.24

Average Service: 9.31



Appendix A: Additional Membership Data

Municipal Fire

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	3							3	\$ 123,035
20 to 24	164	1						165	6,241,363
25 to 29	284	82	2					368	16,538,162
30 to 34	161	194	94	2				451	23,295,791
35 to 39	77	123	227	84	1			512	30,247,392
40 to 44	30	67	144	179	40			460	29,824,738
45 to 49	13	24	54	89	63	7		250	17,654,417
50 to 54	10	11	32	48	36	4	2	143	9,618,961
55 to 59	3	2	7	15	16	5	2	50	3,760,344
60	1		2	1			1	5	347,113
61			4		2		1	7	510,781
62				1	1			2	193,309
63									
64		1			2	1		4	496,368
65		1	1				1	3	214,149
66	1							1	80,605
67					1		1	2	153,806
68							1	1	78,507
69									
70									
71	1	1						2	62,665
72									
73									
74									
75	1							1	31,186
76									
77									
78									
79									
80 & Over				1				1	67,431
Total	749	507	567	420	162	17	9	2,431	\$ 139,540,121

Average Age: 37.13

Average Service: 9.96



Appendix A: Additional Membership Data

All PERA Divisions

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	252							252	\$ 8,313,237	
20 to 24	2,276	27						2,303	79,386,355	
25 to 29	4,001	904	30	1				4,936	199,209,771	
30 to 34	3,273	2,006	796	52				6,127	276,961,750	
35 to 39	2,415	1,676	1,616	705	55	1		6,468	319,768,149	
40 to 44	1,888	1,294	1,329	1,260	534	19		6,324	336,737,414	
45 to 49	1,555	1,139	1,058	1,159	967	169	1	6,048	331,419,239	
50 to 54	1,377	1,061	933	1,017	857	264	21	5,530	299,029,477	
55 to 59	1,214	972	913	932	739	249	59	5,078	262,994,862	
60	186	204	182	165	137	49	13	936	47,740,193	
61	213	151	192	171	121	42	13	903	47,689,966	
62	188	137	171	118	72	32	10	728	37,309,714	
63	142	141	149	92	65	38	15	642	33,927,683	
64	133	122	117	88	59	26	14	559	30,104,432	
65	84	92	79	75	39	22	12	403	23,606,109	
66	77	82	60	56	39	15	4	333	17,869,786	
67	67	50	45	33	21	9	6	231	12,376,219	
68	51	49	31	26	12	7	10	186	10,663,803	
69	33	43	26	20	16	6	5	149	7,690,612	
70	36	22	31	16	8	10	2	125	6,763,605	
71	23	29	21	16	7	3	2	101	5,045,704	
72	26	23	9	8	13	7	2	88	3,857,264	
73	23	13	4	9	4	3	1	57	2,398,038	
74	16	7	12	8	2		3	48	2,717,735	
75	9	4	2	3	1			19	768,495	
76	7	5	4	2	4	1	1	24	1,232,139	
77	12	5	8	5	2	1	1	34	1,565,251	
78	5	4	1	2	3	1	1	17	648,986	
79	7	4	2			1		14	539,063	
80 & Over	13	8	2	5	5	2	2	37	1,615,713	
Total	19,602	10,274	7,823	6,044	3,782	977	198	48,700	\$ 2,409,950,766	

Average Age: 43.37

Average Service: 8.89



Appendix A: Additional Membership Data

Table A-2: Number of Annual Retirement Allowances of Benefit Recipients as of June 30, 2020

Type of Pension	Number	Total Annual Benefits	Average Annual Pension
Service Retirement Pensions			
Single Life Pension Terminating Upon Death*	16,107	\$ 502,570,678	\$ 31,202
Two Life 100% Survivor Pension			
Retired Member Recipient*	13,802	450,128,365	32,613
Survivor Recipient	2,586	65,204,638	25,214
Two Life 50% Survivor Pension			
Retired Member Recipient*	5,092	174,975,685	34,363
Survivor Recipient	990	14,074,515	14,217
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	177	7,464,072	42,170
Child Recipient	6	155,847	25,975
Total Service Retirement Pensions	38,760	\$ 1,214,573,800	\$ 31,336
Disability Retirement Pensions			
Single Life Pension Terminating Upon Death*	503	\$ 9,326,815	\$ 18,542
Two Life 100% Survivor Pension			
Retired Member Recipient*	788	14,357,427	18,220
Survivor Recipient	220	3,533,326	16,061
Two Life 50% Survivor Pension			
Retired Member Recipient*	187	3,836,939	20,518
Survivor Recipient	28	238,262	8,509
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	10	161,954	16,195
Child Recipient	0	0	N/A
Total Disability Retirement Pensions	1,736	\$ 31,454,723	\$ 18,119
Pre-Retirement Survivor Pensions			
Spouse Recipient	1,163	\$ 21,033,261	18,085
Child Recipient	37	390,394	10,551
Total Pre-Retirement Survivor Pensions	1,200	\$ 21,423,655	\$ 17,853
Total Pensions Being Paid	41,696	\$ 1,267,452,178	\$ 30,397

* Includes Co-Payees



Appendix A: Additional Membership Data

Table A-3: Distribution of Participants Receiving Benefits as of June 30, 2020

Attained Age	Retired Member		Disabled Member		Survivor Beneficiaries		Totals	
	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions
Under 40	10	\$ 157,312	24	\$ 478,016	251	\$ 4,093,510	285	\$ 4,728,838
40 to 44	182	7,265,168	66	1,439,964	119	1,964,047	367	10,669,179
45 to 49	1,047	42,987,375	118	2,385,354	162	3,001,627	1,327	48,374,356
50 to 54	2,346	96,021,799	231	4,991,978	233	4,293,697	2,810	105,307,474
55 to 59	3,789	152,232,214	323	6,512,669	333	6,914,388	4,445	165,659,271
60 to 64	5,302	190,860,656	389	6,950,422	499	10,782,225	6,190	208,593,303
65 to 69	7,306	219,701,597	261	4,244,463	634	14,444,621	8,201	238,390,681
70 to 74	6,884	203,332,997	61	583,436	712	16,099,134	7,657	220,015,567
75 to 79	4,100	114,631,285			719	16,420,457	4,819	131,051,742
80 to 84	2,474	65,181,284			618	12,266,218	3,092	77,447,502
85 to 89	1,181	30,085,035			444	8,936,956	1,625	39,021,991
90 to 94	481	10,915,787			226	4,363,502	707	15,279,289
95 to 99	82	1,804,246			72	1,000,885	154	2,805,131
100 & Over	9	58,876			8	48,978	17	107,854
Total	35,193	\$ 1,135,235,631	1,473	\$ 27,586,302	5,030	\$104,630,245	41,696	\$ 1,267,452,178



Appendix A: Additional Membership Data

**Table A-4: Distribution of Retirees by Years of Service at Retirement
(not including Disabled Members, Beneficiaries, and Co-Payees)**

Division	Years of Credited Service at Retirement							
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total
State General								
Average Monthly Benefit*	\$ 967	\$ 906	\$ 1,521	\$ 2,212	\$ 2,996	\$ 3,530	\$3,608	\$2,637
Number of Retirees*	797	1,867	1,962	1,883	2,370	6,872	583	16,334
State Police/Corrections								
Average Monthly Benefit*	\$ 1,841	\$1,667	\$ 1,766	\$ 2,344	\$ 2,921	\$ 3,512	\$4,029	\$3,077
Number of Retirees*	38	58	57	79	347	583	65	1,227
Municipal General								
Average Monthly Benefit*	\$ 1,236	\$ 769	\$ 1,278	\$ 2,003	\$ 2,832	\$ 3,372	\$3,637	\$2,450
Number of Retirees*	505	1,368	1,513	1,429	1,661	4,499	457	11,432
Municipal Police								
Average Monthly Benefit*	\$ 2,768	\$1,649	\$ 2,158	\$ 3,355	\$ 3,858	\$ 4,484	\$4,584	\$3,708
Number of Retirees*	78	59	84	440	2,176	155	41	3,033
Municipal Fire								
Average Monthly Benefit*	\$ 3,612	\$2,364	\$ 2,846	\$ 3,543	\$ 4,028	\$ 4,846	\$3,724	\$3,925
Number of Retirees*	29	29	53	187	1,233	70	36	1,637
Totals for All Divisions								
Average Monthly Benefit*	\$ 1,234	\$ 889	\$ 1,458	\$ 2,327	\$ 3,362	\$ 3,490	\$3,680	\$2,749
Number of Retirees*	1,447	3,381	3,669	4,018	7,787	12,179	1,182	33,663

*Does not include the following number of retirees with missing years of service at retirement

State General - 184

State Police/Corrections - 7

Municipal General - 31

Municipal Police - 12

Municipal Fire - 7



Appendix A: Additional Membership Data

**Table A-5: Distribution of Recent Retiree Ages at Retirement
(not including Disabled Members, Beneficiaries, and Co-Payees)**

Division	2015-16 Retirees	2016-17 Retirees	2017-18 Retirees	2018-19 Retirees	2019-20 Retirees	All Current Retirees
State General						
Number	873	685	738	802	698	16,518
Average Monthly Benefit at Retirement	\$ 2,380	\$ 2,180	\$ 2,400	\$ 2,568	\$ 2,519	\$ 2,118
Average Age at Retirement	59.68	61.14	60.71	60.59	59.97	57.68
State Police/Corrections						
Number	45	27	44	37	54	1,234
Average Monthly Benefit at Retirement	\$ 2,597	\$ 3,063	\$ 2,776	\$ 3,489	\$ 3,130	\$ 2,467
Average Age at Retirement	51.47	51.61	54.01	51.47	53.21	51.15
Municipal General						
Number	657	499	664	727	670	11,463
Average Monthly Benefit at Retirement	\$ 2,125	\$ 1,934	\$ 2,191	\$ 2,172	\$ 2,358	\$ 2,013
Average Age at Retirement	60.59	61.91	60.60	61.35	60.76	58.23
Municipal Police						
Number	156	112	121	138	107	3,045
Average Monthly Benefit at Retirement	\$ 3,641	\$ 3,476	\$ 3,870	\$ 3,707	\$ 3,746	\$ 2,994
Average Age at Retirement	48.98	48.99	50.52	49.49	50.10	47.76
Municipal Fire						
Number	88	18	61	76	62	1,644
Average Monthly Benefit at Retirement	\$ 3,932	\$ 3,570	\$ 4,137	\$ 4,434	\$ 3,913	\$ 3,089
Average Age at Retirement	48.91	51.16	49.27	49.89	50.59	47.94
Totals for All Current Retirees						
Number	1,819	1,341	1,628	1,780	1,591	33,904
Average Monthly Benefit at Retirement	\$ 2,477	\$ 2,233	\$ 2,499	\$ 2,593	\$ 2,609	\$ 2,221
Average Age at Retirement	58.37	60.09	59.30	59.39	59.05	56.27



Appendix B: Summary of Actuarial Assumptions and Methods

Actuarial Cost Methods Used for the Valuation

An actuarial cost method is a procedure for allocating the actuarial present value of benefits and expenses to time periods. The method used for this valuation is known as the individual entry-age actuarial cost method and has the following characteristics:

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at the time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected compensation.

The individual entry-age actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's compensation between the entry-age of the member and the expected exit ages. The expected annual administrative expenses are included in the determination of the actuarially determined contributions.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future costs is called the actuarial accrued liability. Deducting actuarial value of assets from the actuarial accrued liability determines the unfunded actuarial accrued liability. Unfunded actuarial accrued liability was amortized as a level percent of payroll over 25 years to determine the actuarial determined contribution. This period is consistent with the policy established by the Retirement Board in October 1996.

Active member payroll was projected to increase 3.00% per year for the purpose of determining the contribution needed to amortize the unfunded actuarial accrued liability. This estimate is consistent with the base rate of increase in salaries used to calculate actuarial present values.

The actuarial value of assets used for funding purposes is derived as follows: prior year actuarial value of assets is increased by contributions and expected investment income and reduced by refunds, benefit payments and expenses. To this amount 25% of the difference between expected and actual investment income for each of the previous four years is added.



Appendix B: Summary of Actuarial Assumptions and Methods

Actuarial Assumptions Used for the Valuation (effective with June 30, 2018 Valuation, except as otherwise noted)

Assumed Rate of Investment Return. 7.25% per annum net of investment expenses. The administrative expenses are now loaded to the normal cost developed in each annual valuation.

Administrative Expenses. 0.50% of payroll.

Price Inflation. 2.50% per annum, compounded annually.

Real Investment Return. 4.75% over price inflation (4.00% over wage growth). This is the expected rate of return (net of investment expenses) above the rate of price inflation.

Annual Post-retirement Cost of Living Adjustment rate: 1.60% per year beginning 7/1/2023.

Salary Increases. Salary increases occur in recognition of (i) individual merit and longevity, (ii) inflation-related depreciation of the purchasing power of salaries, and (iii) other factors such as productivity gains and competition from other employers for personnel. Sample rates follow:

Attributable to:	Annual Rates of Salary Increase for Sample Years of Service				
	1	5	10	15	20
General Increase in Wage Level Due to:					
Inflation	2.50%	2.50%	2.50%	2.50%	2.50%
Other Factors	0.75	0.75	0.75	0.75	0.75
Increase Due to Merit/Longevity:					
State General	5.00	1.25	0.50	0.00	0.00
State Police	10.25	5.75	1.25	1.25	1.25
State Corrections	9.75	3.50	2.00	1.50	1.50
Municipal General*	2.50	1.50	0.50	0.00	0.00
Municipal Police	7.75	2.75	1.50	0.75	0.75
Municipal Fire	7.75	2.75	1.50	1.25	1.25

* Includes Municipal Detention Officers



Appendix B: Summary of Actuarial Assumptions and Methods

In the following schedules, State Corrections includes Adult Corrections Officers, Juvenile Corrections Officers and Municipal Detention Officers unless otherwise noted.

Mortality Assumption. The mortality assumptions are based on the RPH-2014 Blue Collar mortality table with female ages set forward one year. Future improvement in mortality rates is assumed using 60% of the MP-2017 projection scale generationally. For non-public safety groups, 25% of in-service deaths are assumed to be duty related and 35% are assumed to be duty-related for public safety groups.

Rates are shown for sample ages in the following schedule. Note that sex distinct mortality rates are used solely for determining the funded status and contribution rate adequacy. All benefit amounts are based on merged gender mortality rates.

Sample Mortality Rates (Base Rates)								
Pre-Commencement			Post-Commencement			Post-Commencement		
Age	Male	Female	Age	Male	Female	Age	Male	Female
25	0.000733	0.000244	35	0.001793	0.001169	80	0.053460	0.042932
30	0.000717	0.000317	40	0.002156	0.001611	85	0.088524	0.072752
35	0.000797	0.000417	45	0.003275	0.002671	90	0.146859	0.125111
40	0.000958	0.000598	50	0.005604	0.004235	95	0.223428	0.197901
45	0.001455	0.001013	55	0.007342	0.005165	100	0.313988	0.291040
50	0.002490	0.001685	60	0.009893	0.006890	105	Disabled retirees use the same assumption as healthy lives.	
55	0.004071	0.002510	65	0.014089	0.010092	110		
60	0.006743	0.003606	70	0.021101	0.016038	115		
65	0.011612	0.005456	75	0.032952	0.026199	120		



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Retirement.

First Eligibility Rates: These rates are used to measure the probability of members retiring in the first year eligible for retirement at the indicated ages.

Sample Percent Retiring at First Eligibility by Age									
Ages	State General		State Police		State	Municipal General		Municipal	Municipal
	Male	Female	Tier 1	Tier 2	Corrections	Male	Female	Police	Fire
40	25%	25%	25%	40%	40%	20%	25%	30%	30%
45	25	25	25	40	40	20	25	30	25
50	25	25	25	40	40	20	25	30	20
55	25	25	25	40	40	20	25	30	25
60	30	25	50	40	35	15	25	30	20
65	25	25	100	100	35	15	25	30	20
70	25	20			100	20	15	100	100
75	25	20				20	15		
80	100	100				100	100		

Subsequent Eligibility Rates: These rates are used to measure the probability of members retiring after the first year eligible for retirement at the indicated ages.

Sample Percent Retiring After First Eligibility by Age*										
Ages	State General		State Police**		State	Municipal General		Municipal Police***		Municipal
	Male	Female	Tier 1	Tier 2	Corrections	Male	Female	Tier 1	Tier 2	Fire
40	25%	25%	35%	20%	20%	20%	25%	35%	40%	30%
45	25	25	35	20	20	20	25	35	40	25
50	25	25	35	20	20	20	25	35	40	20
55	25	25	35	20	20	20	25	35	40	25
60	20	35	50	20	20	15	15	35	30	20
65	30	35	100	100	20	15	10	30	30	20
70	25	20			100	20	15	100	100	100
75	25	20				20	15			
80	100	100				100	100			

* Rates are 70% at 30 years of service for all ages except State General and Municipal General Tier 2 uses 75% at 36 years of service and Municipal Police Tier 1 uses 75% at 26 years of service.

** Rates for State Police Tier 1 are 45% at 27 years of service, 55% at 28 years of service, and 65% at 29 years of service.

*** Rates for Municipal Police Tier 1 are 35% at 21 years of service, 40% at 22 years of service, and 45% at 23 years of service, 55% at 24 years of service, and 65% at 25 years of service.

*** Rates for Municipal Police Tier 2 are 35% at 25 years of service, 40% at 26 years of service, and 45% at 27 years of service, 55% at 28 years of service, and 65% at 29 years of service.



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership. The rates are used to measure probabilities of active members terminating for a reason other than disability or death. The rates do not apply to members who are within the retirement rate range. Assumptions for State General and Municipal General are gender distinct and both based on age and service. Assumptions for all other plans are not gender distinct and are service related only; these rates do not vary by age.

State General Males					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	18.76%	10.86%	8.21%	7.78%	5.11%
25	17.72	11.06	8.10	7.07	4.65
30	16.45	11.27	7.97	6.18	4.13
35	15.31	10.81	7.59	5.58	3.89
40	14.30	9.97	7.08	5.40	3.86
45	13.55	9.06	6.63	5.40	3.86
50	13.26	8.45	6.49	5.40	3.86
55	13.26	8.37	6.49	5.40	3.86
60	13.26	8.37	6.49	5.40	3.86
65	13.26	8.37			
70	13.26	8.37			

State General Females					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	18.13%	11.95%	8.22%	6.05%	4.83%
25	17.76	11.95	8.02	5.81	4.25
30	17.28	11.89	7.81	5.54	3.55
35	16.34	11.23	7.45	5.28	3.46
40	15.22	10.24	6.99	5.06	3.46
45	14.19	9.20	6.58	4.95	3.46
50	13.52	8.55	6.45	4.80	3.46
55	13.37	8.50	6.45	4.70	3.46
60	13.37	8.50	6.45	4.70	3.46
65	13.37	8.50			
70	13.37	8.50			



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership (cont.)

Municipal General Males					
Rates of Active Members Terminating During Year					
	Sample Service (Yr):				
Sample Ages	2	4	6	8	10+
20	21.70%	14.59%	11.29%	8.93%	8.54%
25	20.00	13.52	10.26	8.05	7.32
30	17.73	12.04	8.96	6.94	5.69
35	15.77	10.65	8.01	6.20	4.61
40	14.06	9.37	7.29	5.73	3.92
45	12.80	8.39	6.87	5.58	3.65
50	12.20	8.01	6.79	5.58	3.65
55	12.18	8.01	6.79	5.58	3.65
60	12.18	8.01	6.79	5.58	3.65
65	12.18	8.01			
70	12.18	8.01			

Municipal General Females					
Rates of Active Members Terminating During Year					
	Sample Service (Yr):				
Sample Ages	2	4	6	8	10+
20	24.40%	17.77%	14.41%	11.94%	7.51%
25	21.96	16.06	12.80	10.32	6.38
30	18.85	13.77	10.63	8.16	4.94
35	16.69	11.96	9.08	6.70	4.09
40	15.16	10.49	7.84	5.74	3.67
45	14.28	9.49	6.50	5.31	3.62
50	14.01	9.14	6.50	5.30	3.62
55	14.01	9.14	6.50	5.30	3.62
60	14.01	9.14	6.50	5.30	3.62
65	14.01	9.14			
70	14.01	9.14			



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership (cont.)

Service Based Rates of Active Members Terminating During Year					
All Ages	Sample Service (Yr):				
	1	3	5	7	8+
State Police	8.00%	7.00%	4.00%	4.00%	4.00%
State Corrections	20.00	16.00	9.00	8.00	5.75
Municipal Detention	22.00	16.00	10.00	10.00	6.00
Municipal Police	14.00	9.50	6.80	5.15	3.50
Municipal Fire	10.00	7.50	5.00	3.30	2.75

Rates of Disability. The rates are used to measure the probabilities of active members becoming disabled. Rates for sample ages follow. For non-public safety groups, 25% disabilities are assumed to be duty related and 35% are assumed to be duty-related for public safety groups.

Rates Becoming Disabled at Indicated Ages (State Division)				
Sample Ages	State General		State	State
	Male	Female	Police	Corrections
25	0.02%	0.02%	0.03%	0.14%
30	0.04	0.03	0.06	0.16
35	0.08	0.06	0.08	0.21
40	0.13	0.12	0.21	0.27
45	0.24	0.20	0.25	0.46
50	0.41	0.39	0.41	0.90
55	0.57	0.61	0.95	1.40
60	0.74	0.73	1.39	1.88
65	0.75	0.73	1.39	1.88

Rates Becoming Disabled at Indicated Ages (Municipal Division)					
Sample Ages	Municipal General		Municipal	Municipal	Municipal
	Male	Female	Detention	Police	Fire
25	0.03%	0.04%	0.06%	0.01%	0.02%
30	0.06	0.04	0.10	0.01	0.02
35	0.09	0.04	0.15	0.05	0.02
40	0.13	0.06	0.22	0.11	0.08
45	0.18	0.14	0.32	0.18	0.08
50	0.30	0.25	0.51	0.28	0.33
55	0.49	0.39	0.85	0.46	0.33
60	0.60	0.51	1.04	0.74	1.17
65	0.62	0.59	1.07	1.08	1.17



Appendix B: Summary of Actuarial Assumptions & Methods

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses. It is assumed that spouses have no eligible children for purposes of death-in-service benefits.
Pay Increase Timing:	Beginning of plan year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing:	All decrements are assumed to occur at the beginning of the plan year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Neither disability nor withdrawal decrements operate during retirement eligibility.
Loads:	Retiree liabilities were increased by 1% to account for the pop-up provision.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report and the actual payroll payable at the time contributions are made.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Data Changes:	For missing dates of birth for active members, we assumed to enter the system at the average entry age. For retiree records with a joint and survivor option and a missing beneficiary date of birth, the beneficiary was assumed to be 3 years younger if the member was male and 3 years older if the member was female.



Appendix B: Summary of Actuarial Assumptions & Methods

Definitions of Technical Terms

Actuarial Accrued Liability. The difference between the actuarial present value of future benefits payments and the actuarial present value of future normal costs.

Actuarial Cost Method. A mathematical procedure for allocating the dollar amount of the “actuarial present value of future benefit payments” between future normal cost and actuarial accrued liability.

Actuarial Present Value. 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.

Amortization. Paying off an interest-discounted amount with periodic payments of interest and principal – as opposed to paying off with a lump sum payment.

Experience Gain (Loss). The difference between actual actuarial costs and anticipated actuarial costs – during the period between two valuation dates.

Normal Cost. The actuarial cost allocated to the current year by the actuarial cost method.

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



Appendix C: Summary of Plan Provisions

Benefit Tier

Effective July 1, 2013, Senate Bill 27 establishes two tiers of benefits under each PERA coverage plan:

Tier 1

- Current active members employed by a PERA affiliate on June 30, 2013
- Inactive members who did not receive a refund and have employee contributions on account on June 30, 2013
- Currently retired or will retire on or before June 30, 2013

Note: State and Municipal General members hired between July 1, 2010 and June 30, 2013 are grandfathered into Tier 1 coverage plans.

Tier 2

- Active members first hired on or after July 1, 2013
- Members who received a refund of employee contributions on or before June 30, 2013 and return to work for a PERA affiliate on or after July 1, 2013

Normal Retirement Eligibility Conditions

Tier 1

Applicable to all members:

- Any age with 25 or more years of credited service; or
- Age 60 or older with 20 or more years of credited service; or
- Age 61 or older with 17 or more years of credited service; or
- Age 62 or older with 14 or more years of credited service; or
- Age 63 or older with 11 or more years of credited services or
- Age 64 or older with 8 or more years of credited service; or
- Age 65 or older with 5 or more years of credited service.

Applicable to Municipal Police (Plans 3, 4, & 5) and Municipal Fire (Plans 3, 4, & 5) members:

- Any age with 20 or more years of credited service



Appendix C: Summary of Plan Provisions

Normal Retirement Eligibility Conditions (cont.)

Tier 2

Applicable to State General and Municipal General (Plan 1-4) members:

- Age 65 or older with 5 or more years of credited service; or
- Any age if the sum of the member's age and years of credited service equals at least 85, provided member has at least 5 years of credited service.

Applicable to State Police Officers, Adult Correctional Officers, Peace Officers, Juvenile Correctional Officers, Municipal Police, Municipal Fire, and Municipal Detention Officers:

- Age 60 or older with 5 or more years of credited service; or
- Any age with 25 or more years of credited service

Normal Retirement Pension Amount

The amount of normal retirement pension is based on:

- Final average salary:
 - For Tier 1 members, the average of salary for the 36 consecutive months of credited service producing the largest average;
 - For Tier 2 members, the average of salary for the 60 consecutive months of credited service producing the largest average;
- Credited service (years and months); and the
- Coverage plan.



Appendix C: Summary of Plan Provisions

The pension accrual factor and maximum pension, as a percent of final average salary, under each coverage plan are shown below:

Coverage Plan	Pension Factor Per Year of Credited Service		Maximum Pension as Percent of Final Average Salary
	Tier 1	Tier 2	Tier 1 & Tier 2
State General Member Coverage Plan 3	3.0%	2.5%	90%
Peace Officers Coverage Plan 3	3.0	3.0	90
State Police and Adult Corrections Officers Member Coverage Plan 1	3.0	3.0	90
Hazardous Duty (Juvenile Corrections Officer) Coverage Plan 2	3.0	3.0	90
Municipal General Member Coverage Plan 1	2.0	2.0	90
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	3.0	2.5	90
Coverage Plan 4	3.0	2.5	90
Municipal Detention Officer Coverage Plan 1	3.0	3.0	90
Municipal Police Member Coverage Plan 1	2.0	2.0	90
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	2.5	2.0	90
Coverage Plan 4	3.0	2.5	90
Coverage Plan 5	3.5	3.0	90
Municipal Fire Member Coverage Plan 1	2.0	2.0	90
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	2.5	2.0	90
Coverage Plan 4	3.0	2.5	90
Coverage Plan 5	3.5	3.0	90



Appendix C: Summary of Plan Provisions

Vested Termination of Membership (Employment)

Termination of employment and membership with at least 5 years of credited service. Accumulated member contributions must be left on deposit. Payment of the pension is available upon eligibility for normal retirement. In addition, certain disability and survivor pension provisions apply.

Normal and Optional Forms of Payment

The normal form of payment is for life. Optional contingent survivor beneficiary forms of payment are available on an actuarial equivalent basis. Total pension payments can never be less than the member's accumulated contributions.

Survivor Pensions – Death in the Line of Duty

Pensions are paid to the eligible spouse and eligible children if survivor coverage has not been elected under the Elective Survivor Pension Beneficiary provision. The amount of pension payable for life to an eligible spouse is the greater of 1) 50% of final average salary or 2) the accrued normal retirement pension reduced for option B election. The amount of pension payable to each eligible child is an equal share of 25% of final average salary. If there is not an eligible spouse or the eligible spouse dies, and if there are 2 or more eligible children, the amount of pension payable to each eligible child is an equal share of 50% of final average salary. An eligible child is an unmarried natural or adopted child who is under age 18. A child's pension terminates upon death, marriage or reaching age 18. The pension of any remaining eligible children is recalculated whenever a child's pension is terminated.

Survivor Pensions – Death Not in the Line of Duty

Requires 5 years of credited service. Benefit applies to members and vested former members who have not elected coverage under the Elective Survivor Pension Beneficiary provision. Pensions are paid to an eligible spouse OR eligible children. The amount of pension payable for the life of an eligible spouse is the greater of 1) 30% of final average salary or 2) accrued normal retirement pension reduced for option B election. An eligible child pension is paid if there is not an eligible spouse or following the death of an eligible spouse. The pension is payable to each child in equal shares. An eligible child is an unmarried natural or adopted child who is under age 18. A child's pension terminates upon death, marriage or reaching age 18. The pension of any remaining eligible children is recalculated whenever a child's pension is terminated.



Appendix C: Summary of Plan Provisions

Elective Survivor Beneficiary Pension

Applicable to members with 5 years of credited service. Also applicable to vested former members who have elected option B and designated a survivor pension beneficiary who has an insurable interest. The amount of pension is the amount of accrued normal retirement pension under optional form of payment B (100% continuation to beneficiary).

Disability Retirement

Applicable to members with 5 years of credited service. Also applicable to vested former members. The credited service requirement is waived if the disability is incurred in line of duty. The amount of disability pension is the accrued normal retirement pension at time of disability retirement. If the disability is in line of duty, the credited service used is the amount that would have been acquired when first eligible for normal retirement.

Cost-of-Living Increases

Effective July 1, 2020, there will be no COLA increases for fiscal years 2021, 2022, and 2023 (July 1, 2020, July 1, 2021, and July 1, 2022). In lieu of these COLAs, an annual non-compounding additional payment equal to 2% of annual benefit as of June 30, 2020 (inclusive of all past COLAs) will be payable.

Beginning July 1, 2023 and each July 1 thereafter, the COLA increase will be determined as an amount equal to the smoothed investment rate of return on the actuarial value of assets on June 30 of the preceding calendar year, less the COLA “hurdle rate,*” multiplied by the funded ratio on June 30 of the preceding calendar year; or 0.5%, whichever is greater, subject to the following:

- If the funded ratio of the fund is less than 100% on June 30 of the preceding calendar year, the COLA amount shall not exceed 3.0%.
- If the funded ratio of the fund is greater than or equal to 100% on June 30 of the preceding calendar year, the COLA amount shall not exceed 5.0%.
- The minimum COLA amount for any year will be 0.5%.

*The COLA “hurdle rate” is the investment rate of return required to fund a COLA in excess of 0.5% as determined by the fund’s actuaries.



Appendix C: Summary of Plan Provisions

Pensions are increased by the COLA amount determined above each July 1 subject to the following eligibility periods:

- Retirees who have been retired for at least 2 full calendar years.
- Retirees who attained at least age 65 and have been retired for at least 1 full calendar year.
- Disabled retirees who have been retired for at least 1 full calendar year.
- Survivor beneficiaries who have received a survivor pension for at least 2 full calendar years.
- Survivor beneficiaries of a deceased retiree who otherwise would have been retired for at least 2 full calendar years.

For certain retirees, pensions are increased each July 1 by 2.5% subject to the eligibility periods listed above, provided the conditions below are met:

- Retirees who retired with at least 25 years of service and whose annual pension is \$25,000 or less.
- Disabled retirees whose annual pension is \$25,000 or less.
- Retirees who attained at least age 75 prior to July 1, 2020.

Service Credit

Tier 1 Members in the State Police and Adult Corrections Officers Coverage Plan and members in the Municipal Detention Officers Coverage Plan receive 1.2 years of credited service for each year of service rendered. All other members receive 1.0 year of credited service for each year of service rendered.



Appendix C: Summary of Plan Provisions

Contributions by Members and Employers

Contributions by members and affiliated public employers are at the following rates shown below. The table reflects the changes resulting from the passage of Senate Bill 72.

Coverage Plan	Percent of Salary Member	Contribution Rate Employer
State Division¹		
State General Member Coverage Plan 3 ²	9.42%	17.74%
State Police Member and Adult Correctional Officer Member Coverage Plan 1	9.10	25.50
Hazardous Duty (Juvenile Corrections) Member Coverage Plan 2 ²	6.78	26.87
Municipal Division^{3,4}		
Municipal General Member Coverage Plan 1	8.50	7.65
Municipal General Member Coverage Plan 2	10.65	9.80
Municipal General Member Coverage Plan 3	14.65	9.80
Municipal General Member Coverage Plan 4	17.15	12.30
Municipal Detention Officer Member Coverage Plan 1	18.15	17.30
Municipal Police Member Coverage Plan 1	8.50	10.65
Municipal Police Member Coverage Plan 2	8.50	15.65
Municipal Police Member Coverage Plan 3	8.50	19.15
Municipal Police Member Coverage Plan 4	13.85	19.15
Municipal Police Member Coverage Plan 5	17.80	19.15
Municipal Fire Member Coverage Plan 1	9.50	11.65
Municipal Fire Member Coverage Plan 2	9.50	18.15
Municipal Fire Member Coverage Plan 3	9.50	21.90
Municipal Fire Member Coverage Plan 4	14.30	21.90
Municipal Fire Member Coverage Plan 5	17.70	21.90

Interest is credited to member contributions on each June 30 at the rates set annually by the Retirement Board. Effective July 1, 2012, the interest crediting rate for member contributions is 2%.

¹For employees whose annual salary is \$25,000 or less, the employee contribution rates shown above are reduced by 2.0%.

²Employee and employer rates will increase by 0.5% of payroll effective July 1, 2021, with another 0.5% increase each July 1 through FY 2024.

³For employees whose annual salary is \$25,000 or less, the employee contribution rates shown above are reduced by 1.50%.

⁴For all Municipal Coverage Plans, employee and employer rates will increase by 0.5% of payroll effective July 1, 2022, with another 0.5% increase each July 1 through FY 2026.



Appendix D: Investment Risk Sensitivity

