



The Teachers' Pension and Annuity Fund of New Jersey

**GASB 67 Report
as of June 30, 2020**

Produced by Cheiron

March 2021

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**TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
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SECTION I – BOARD SUMMARY

The purpose of this report is to provide accounting and financial disclosure information under Governmental Accounting Standards Board Statement 67 for the Teachers' Pension and Annuity Fund of New Jersey (TPAF, Plan or Fund). This information includes:

- Projection of the Total Pension Liability (TPL) from the valuation date to the measurement date,
- Calculation of the Net Pension Liability (NPL) at the discount rate as well as discount rates 1% higher and lower than the discount rate, and
- Changes in the Net Pension Liability.

Highlights

The reporting date for the TPAF is June 30, 2020. Measurements as of the reporting date are based on the fair value of assets as of June 30, 2020 and the Total Pension Liability as of the valuation date, July 1, 2019, updated to June 30, 2020. There were two changes in the assumptions. The discount rate used to measure the Total Pension Liability was changed as of the measurement date. In addition, the mortality assumption was updated upon direction from the Division of Pensions and Benefits (DPB). This report also reflects a change to the plan provisions. The DPB adopted a new policy regarding the crediting of interest on member contributions for the purpose of refund of Accumulated Deductions. We are not aware of any other significant events that are measurable at this time between the valuation date and the measurement date, so the update procedures only include the addition of service cost and interest cost offset by actual benefit payments, and an adjustment to reflect the changes in assumptions.

The following table provides a summary of the key results during this reporting period.

Table I-1 Summary of Results		
Measurement Date	June 30, 2020	June 30, 2019
Total Pension Liability	\$ 87,522,678,686	\$ 84,215,846,719
Plan Fiduciary Net Position	<u>21,529,179,998</u>	<u>22,696,734,276</u>
Net Pension Liability	\$ 65,993,498,688	\$ 61,519,112,443

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SECTION II – CERTIFICATION

The purpose of this report is to provide accounting and financial reporting information under GASB 67 for the Teachers' Pension and Annuity Fund of New Jersey (TPAF). This report is for the use of TPAF, the DPB and their auditors in preparing financial reports in accordance with applicable law and accounting requirements. This report is not appropriate for other purposes, including the measurement of funding requirements for TPAF and estimating the price to settle TPAF's obligations.

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

Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

For purposes of this report, the projection of the Plan's contributions and projected benefit payments as of June 30, 2020 was based on the recommended demographic assumptions of the July 1, 2015 – June 30, 2018 Experience Study, approved by the Board of Trustees on February 6, 2020. The calculation of the Total Pension Liability as of June 30, 2020 was based on the same demographic assumptions except for the mortality assumption, which was based on the SOA's MP-2020 mortality improvement scale upon direction from the DPB. While we do not find the use of the SOA's Scale MP-2020 unreasonable, it does not reflect the analysis of actual mortality experience from our Experience Study which was the basis for our recommended mortality assumptions, including the mortality improvement scale.

This report was prepared using census data as of the July 1, 2019 valuation date and financial information as of the June 30, 2020 measurement date. Given the uncertainty and lack of credible data regarding the impact that COVID-19 may have had on the Fund's demographic experience between the measurement date and reporting date, no specific adjustments have been made at this time. We will continue to monitor developments regarding the COVID-19 pandemic and the impact it may have on the Fund. Actual experience, both demographic and economic, will be reflected in subsequent years as experience emerges.

This report reflects a change to the plan provisions. The DPB adopted a new policy regarding the crediting of interest on member contributions for the purpose of refund of Accumulated Deductions. Previously, after termination of employment but prior to retirement or death, interest was credited on member Accumulated Deductions at the valuation interest rate for the entire period. Effective July 1, 2018, interest is only credited at the valuation interest rate for the first two years of inactivity prior to retirement or death. Thereafter, no additional interest is credited. This policy change decreased the Total Pension Liability as shown under changes of benefits in Table V-1 in Section V.

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SECTION II – CERTIFICATION

Based on the State Treasurer's recommendation the following investment return assumptions are used to determine the actuarially determined contributions:

- Effective with the July 1, 2019 valuation: 7.30% per annum,
- Effective with the July 1, 2021 valuation: 7.00% per annum.

In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum. The discount rate used to measure the Total Pension Liability is 5.40% as of June 30, 2020 and is described in Section III of the report.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for TPAF for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.



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SECTION III – DETERMINATION OF DISCOUNT RATE

The discount rate used to measure the Total Pension Liability was 5.60% as of June 30, 2019 and 5.40% as of June 30, 2020. As discussed with the DPB, the projection of cash flows used to determine the discount rate as of June 30, 2020 assumed:

- In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum.
- In accordance with Paragraph 37 of GASB Statement No. 67, the projection of the Plan's contributions and projected benefit payments are based on the same assumptions used to determine the expected contributions for the Fund. The demographic assumptions are based on the recommendations of the July 1, 2015 – June 30, 2018 Experience Study as approved by the Board of Trustees on February 6, 2020.

Based on the State Treasurer's recommendation the following investment return assumptions are used to determine the actuarially determined contributions:

- Effective with the July 1, 2019 valuation: 7.30% per annum,
- Effective with the July 1, 2021 valuation: 7.00% per annum.
- It is assumed that the State will contribute 78% of the actuarially determined contribution and 100% of its Non-Contributory Group Insurance Premium Fund (NCGIPF) contribution for all years of the projection. The 78% contribution rate is the total State contribution rate expected to be paid in fiscal year ending June 30, 2021 with respect to the actuarially determined contribution for the fiscal year ending June 30, 2021 for all State-administered retirement systems.
- Consistent with Chapter 83, P.L. 2016, it is assumed that the State will make pension contributions in equal amounts at the end of each quarter.
- In accordance with Chapter 98, P. L. 2017, TPAF receives 77.78% of the proceeds of the Lottery Enterprise for a period of 30 years. Revenues received from lottery proceeds are assumed to be contributed to the Fund on a monthly basis.
- It is assumed that Local employers' contributions are expected to be received on April 1st, 21 months after the associated valuation date.
- The NCGIPF contributions are assumed to be paid monthly.
- Annual administrative expenses are assumed to be 0.29% of expected pension benefit payments.

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SECTION III – DETERMINATION OF DISCOUNT RATE

The Fiduciary Net Position (FNP) includes Local employers' contributions receivable as reported in the financial statements provided to us by the DPB. In determining the discount rate in Appendix D, the FNP at the beginning of each year does not reflect receivable contributions as those amounts are not available at the beginning of the year to pay benefits. The receivable contributions for the current year include receivable contributions of \$6,423,758 for Local employers' ERI.

Based on these assumptions, the pension Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current Plan members through fiscal year ending 2062. Municipal bond rates of 3.50% as of June 30, 2019 and 2.21% as of June 30, 2020 were used in the development of the blended GASB discount rate after the Plan's fiduciary net position was no longer sufficient to make future benefit payments. As selected by the State Treasurer, the rates are based on the Bond Buyer GO 20-Bond Municipal Bond Index. Based on the long-term rate of return of 7.00% and the municipal bond rate of 3.50% as of June 30, 2019 and the long-term rate of return of 7.00% and the municipal bond rate of 2.21% as of June 30, 2020, the blended GASB discount rates are 5.60% as of June 30, 2019 and **5.40%** as of June 30, 2020. The assumed discount rates have been determined in accordance with the method prescribed by GASB Statement No. 67.

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SECTION IV – PROJECTION OF TOTAL PENSION LIABILITY

The Total Pension Liability at the end of the measurement year, June 30, 2020, is measured as of a valuation date of July 1, 2019 and projected to June 30, 2020. The TPL and service cost were calculated using the Entry Age Normal Cost Method as prescribed by GASB 67. All TPL amounts shown in Table IV-1 below include liabilities attributable to the NCGIPF. In addition, net employer transfer contributions and net member transfer contributions with accumulated interest are added to the June 30, 2020 TPL.

During the measurement year there was a change in assumptions and a new policy regarding the crediting of interest on member contributions. There were no other significant events during the projection period of which we are aware. Because the TPL shown in the prior report was measured as of July 1, 2018 and projected to June 30, 2019, it will not match the amounts measured as of July 1, 2019 that are shown in this exhibit.

The following table shows the projection of the TPL at discount rates equal to the rate used for disclosure and plus and minus one percent from the rate used for disclosure.

Table IV-1			
Projection of Total Pension Liability from Valuation to Measurement Date			
Discount Rate	4.40%	5.40%	6.40%
Total Pension Liability, 7/1/2019			
Actives	\$ 43,065,093,786	\$ 36,223,484,259	\$ 30,681,135,066
Deferred Vested	104,351,525	89,369,789	77,384,682
Retirees	<u>53,974,763,711</u>	<u>49,491,686,408</u>	<u>45,634,987,157</u>
Total	\$ 97,144,209,022	\$ 85,804,540,456	\$ 76,393,506,905
Service Cost	2,235,331,350	1,720,251,028	1,336,847,742
Benefit Payments	(4,615,149,051)	(4,615,149,051)	(4,615,149,051)
Transfer Contributions - Employer	997,022	997,022	997,022
Transfer Contributions - Member	8,420,311	8,420,311	8,420,311
Interest	<u>4,272,464,399</u>	<u>4,603,618,920</u>	<u>4,829,644,846</u>
Total Pension Liability, 6/30/2020	\$ 99,046,273,053	\$ 87,522,678,686	\$ 77,954,267,775

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SECTION V – NOTE DISCLOSURES

The following table shows the changes in the Total Pension Liability, the Plan Fiduciary Net Position (i.e., fair value of System assets), and the Net Pension Liability during the Measurement Year. There were changes in assumptions as the mortality improvement rates used for the TPL were updated from the MP-2019 to the MP-2020 mortality improvement scale as directed by the DPB. In addition, the discount rate decreased from 5.60% as of June 30, 2019 to 5.40% as of June 30, 2020 in accordance with the method prescribed by GASB Statement No. 67. Finally, there was a new policy regarding the crediting of interest on member contributions which is shown under changes of benefits. The impact of these changes is displayed in the following table.

Table V-1 Change in Net Pension Liability			
	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 6/30/2019	\$ 84,215,846,719	\$ 22,696,734,276	\$ 61,519,112,443
Changes for the year:			
Service cost	1,643,902,335		1,643,902,335
Interest	4,680,942,056		4,680,942,056
Changes of benefits	(16,738,469)		(16,738,469)
Differences between expected and actual experience	(8,596,840)		(8,596,840)
Changes of assumptions	1,613,054,603		1,613,054,603
Contributions - employer (appropriations)		1,439,027,000	(1,439,027,000)
Contributions - employer (NCGIPF)		42,513,729	(42,513,729)
Contributions - employer (lottery)		789,467,000	(789,467,000)
Contributions - member		867,037,595	(867,037,595)
Transfers from other systems - employer	997,022	997,022	0
Transfers from other systems - member	8,420,311	8,420,311	0
Employer contribution - delayed enrollments	0	329,571	(329,571)
Employer contribution - delayed appropriations	0	(5,079,408)	5,079,408
Net investment income		318,393,101	(318,393,101)
Benefit payments	(4,615,149,051)	(4,615,149,051)	0
Administrative expense		(13,511,148)	13,511,148
Net changes	<u>3,306,831,967</u>	<u>(1,167,554,278)</u>	<u>4,474,386,245</u>
Balances at 6/30/2020	<u>\$ 87,522,678,686</u>	<u>\$ 21,529,179,998</u>	<u>\$ 65,993,498,688</u>

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SECTION V – NOTE DISCLOSURES

Changes in the discount rate affect the measurement of the TPL. Lower discount rates produce a higher TPL and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the NPL can be very significant for a relatively small change in the discount rate. The following table shows the sensitivity of the NPL to the discount rate.

Table V-2 Sensitivity of Net Pension Liability to Changes in Discount Rate			
	1% Decrease 4.40%	Discount Rate 5.40%	1% Increase 6.40%
Total Pension Liability	\$ 99,046,273,053	\$ 87,522,678,686	\$ 77,954,267,775
Plan Fiduciary Net Position	<u>21,529,179,998</u>	<u>21,529,179,998</u>	<u>21,529,179,998</u>
Net Pension Liability	<u>\$ 77,517,093,055</u>	<u>\$ 65,993,498,688</u>	<u>\$ 56,425,087,777</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	21.7%	24.6%	27.6%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

The schedule below shows the changes in NPL and related ratios required by GASB for the current and prior year.

Table VI-1 Schedule of Changes in Net Pension Liability and Related Ratios		
	FYE 2020	FYE 2019
<u>Total Pension Liability</u>		
Service cost	\$ 1,643,902,335	\$ 1,882,081,572
Interest (includes interest on service cost)	4,680,942,056	4,201,672,382
Changes of benefit terms	(16,738,469)	0
Differences between expected and actual experience	(8,596,840)	(155,621,840)
Changes of assumptions	1,613,054,603	(4,005,548,119)
Transfers from other systems - employer	997,022	1,561,113
Transfers from other systems - member	8,420,311	5,094,564
Benefit payments, including refunds of member contributions	(4,615,149,051)	(4,510,860,239)
Net change in total pension liability	\$ 3,306,831,967	\$ (2,581,620,567)
Total pension liability - beginning	<u>84,215,846,719</u>	<u>86,797,467,286</u>
Total pension liability - ending	<u>\$ 87,522,678,686</u>	<u>\$ 84,215,846,719</u>
<u>Plan fiduciary net position</u>		
Contributions - employer (appropriations)	\$ 1,439,027,000	\$ 1,114,920,000
Contributions - employer (NCGIPF)	42,513,729	41,107,648
Contributions - employer (lottery)	789,467,000	859,469,000
Contributions - member	867,037,595	846,166,328
Transfers from other systems - employer	997,022	1,561,113
Transfers from other systems - member	8,420,311	5,094,564
Employer contribution - delayed enrollments	329,571	272,985
Employer contribution - delayed appropriations	(5,079,408)	27,127
Net investment income	318,393,101	1,361,781,295
Benefit payments, including refunds of member contributions	(4,615,149,051)	(4,510,860,239)
Administrative expense	(13,511,148)	(13,922,385)
Net change in plan fiduciary net position	\$ (1,167,554,278)	\$ (294,382,564)
Plan fiduciary net position - beginning	<u>22,696,734,276</u>	<u>22,991,116,840</u>
Plan fiduciary net position - ending	<u>\$ 21,529,179,998</u>	<u>\$ 22,696,734,276</u>
Net pension liability - ending	<u>\$ 65,993,498,688</u>	<u>\$ 61,519,112,443</u>
Plan fiduciary net position as a percentage of the total pension liability	24.60%	26.95%
Covered payroll	\$ 11,061,603,138	\$ 10,823,504,797
Net pension liability as a percentage of covered payroll	596.60%	568.38%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

Since an Actuarially Determined Contribution (ADC) is calculated, the following schedule is required. An ADC is a contribution amount determined in accordance with Actuarial Standards of Practice. Amounts shown for the ADC and actual contributions in the following table include the amounts payable from the Lottery Enterprise. These amounts also include the Non-Contributory Group Insurance Premium Fund costs.

Table VI-2 Schedule of Employer Contributions		
	FYE 2020	FYE 2019
Actuarially Determined Contribution*	\$ 3,286,527,638	\$ 3,249,224,200
Contributions in Relation to the Actuarially Determined Contribution	<u>2,271,007,729</u>	<u>2,015,496,648</u>
Contribution Deficiency/(Excess)	<u>\$ 1,015,519,909</u>	<u>\$ 1,233,727,552</u>
Covered Payroll	\$ 11,061,603,138	\$ 10,823,504,797
Contributions as a Percentage of Covered Payroll	20.53%	18.62%

* Includes NCGIPF

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

The following summarizes key methods and assumptions used to determine the Actuarially Determined Contribution for FYE 2020.

Valuation Date:	July 1, 2018
Timing:	Actuarial determined contributions are calculated as of the July 1 preceding the fiscal year in which contributions are made.
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level dollar
Remaining amortization period:	Open 30-year period
Asset valuation method:	5-year smoothing of difference between market value and expected actuarial value
Investment rate of return:	7.50%, net of investment expenses
Salary increases:	Service-based rates scaling from 3.80% at enrollment to 1.55% through period ending June 30, 2026; Service-based rates scaling from 4.90% at enrollment to 2.00% following June 30, 2026
Mortality:	<i>Pre-Retirement:</i> RP-2006 Employee White Collar Mortality Tables, set back 3 years for males and 5 years for females, projected on a generational basis from a base year of 2006 using a 60-year average of improvement rates based on Social Security data from 1953 to 2013 <i>Post-Retirement Healthy Lives:</i> RP-2006 Healthy Annuitant White Collar Mortality Tables, with adjustments as described in the latest experience study , projected on a generational basis from a base year of 2006 using a 60-year average of improvement rates based on Social Security data from 1953 to 2013 <i>Disabled Lives:</i> RP-2006 Disabled Retiree Mortality Tables with rates adjusted by 90%

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APPENDIX A – MEMBERSHIP INFORMATION

Plan Membership		
	July 1, 2019	July 1, 2018
Contributing Actives	141,795	141,128
Non-Contributing Members	14,271	14,368
Terminated Vested	432	219
Inactive Receiving Benefits	106,388	104,703
Total	262,886	260,418
Annual Compensation for Contributing Actives	\$ 11,061,603,138	\$ 10,823,504,797
Annual Retirement Allowances for Those Receiving Benefits	\$ 4,391,260,795	\$ 4,295,446,681

* QDRO recipients are excluded from the counts.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

- 1. Investment Rate of Return for determining Actuarially Determined Contributions**
 - July 1, 2019 valuation: 7.30% per annum, compounded annually.
 - July 1, 2020 valuation: 7.30% per annum, compounded annually.
 - July 1, 2021 and later valuations: 7.00% per annum, compounded annually.

- 2. Long-Term Expected Rate of Return** 7.00% per annum, compounded annually.

- 3. Interest Crediting Rate on Accumulated Deductions** 7.30% per annum, compounded annually. Interest credits are assumed to end upon termination.

- 4. GASB 67 Effective Discount Rate**
 - June 30, 2019: 5.60% per annum, compounded annually.
 - June 30, 2020: 5.40% per annum, compounded annually.

- 5. Price Inflation** 2.75% per annum, compounded annually.

- 6. Wage Inflation** 3.25% per annum, compounded annually.

- 7. Cost-of-Living Adjustments (COLAs)** No future COLAs are assumed. Previously granted COLAs are included in the data.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

8. Salary Increases

Salary increases vary by years of service and time period. Annual salary increases are shown below.

Years of Service	Period Ending June 30, 2026	Ultimate Period
0-2	3.05%	4.25%
3	3.20	4.40
4	3.35	4.55
5	3.50	4.70
6	3.65	4.85
7	3.80	5.00
8	3.95	5.15
9	4.10	5.30
10	4.20	5.40
11	4.30	5.50
12-16	4.45	5.65
17	3.70	4.90
18	3.30	4.50
19	3.05	4.25
20	2.85	4.05
21	2.65	3.85
22	2.45	3.65
23	2.25	3.45
24	2.05	3.25
25	1.85	3.05
26	1.75	2.95
27-28	1.65	2.85
29+	1.55	2.75

Salary increases are assumed to occur on October 1.

9. 401(a)(17) Pay Limit

\$280,000 in 2019 increasing 2.75% per annum, compounded annually.

10. Social Security Wage Base

\$132,900 in 2019 increasing 3.25% per annum, compounded annually.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

11. Termination

Termination rates are as follows:

Service	Rates
0	7.00%
1	7.00
2	6.25
3	5.50
4	4.25
5	3.75
6	3.25
7	3.00
8	2.50
9	2.50
10	2.25
11	2.20
12	1.95
13	1.70
14	1.40
15	1.20
16	1.00
17	0.90
18	0.90
19	0.70
20	0.55
21	0.55
22	0.55
23	0.40
24-29	0.30

No termination is assumed after attainment of retirement eligibility.

67% of members with 10 or more years of service at termination are assumed to elect a deferred retirement benefit.

All other members are assumed to receive a refund of Accumulated Deductions with credited interest.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

12. Disability

Disability rates are as follows:

Age	Ordinary Disability	Accidental Disability	Age	Ordinary Disability	Accidental Disability
20	0.005%	0.006%	48	0.170%	0.006%
21	0.005	0.006	49	0.180	0.006
22	0.005	0.006	50	0.200	0.006
23	0.005	0.006	51	0.220	0.006
24	0.005	0.006	52	0.240	0.006
25	0.005	0.006	53	0.260	0.006
26	0.005	0.006	54	0.280	0.006
27	0.005	0.006	55	0.350	0.006
28	0.005	0.006	56	0.420	0.006
29	0.005	0.006	57	0.490	0.006
30	0.005	0.006	58	0.560	0.006
31	0.010	0.006	59	0.630	0.006
32	0.015	0.006	60	0.710	0.006
33	0.020	0.006	61	0.790	0.006
34	0.030	0.006	62	0.870	0.006
35	0.040	0.006	63	0.950	0.006
36	0.050	0.006	64	1.030	0.006
37	0.060	0.006	65	1.120	0.006
38	0.070	0.006	66	1.210	0.006
39	0.080	0.006	67	1.300	0.006
40	0.090	0.006	68	1.390	0.006
41	0.100	0.006	69	1.480	0.006
42	0.110	0.006	70	1.580	0.006
43	0.120	0.006	71	1.680	0.006
44	0.130	0.006	72	1.780	0.006
45	0.140	0.006	73	1.880	0.006
46	0.150	0.006	74	1.980	0.006
47	0.160	0.006			

Accidental disability rates apply at all ages.

Ordinary disability rates apply upon attainment of 10 years of service until the attainment of unreduced retirement eligibility with at least 25 years of service.

Members are assumed to receive the greater of the applicable disability benefit or the early or service retirement benefit, depending on eligibility.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Tier 4 and Tier 5 members are not eligible for the Ordinary or Accidental Disability benefits but the disability rates still apply. Such members terminating under the disability decrement are assumed to separate from service and elect a deferred retirement benefit.

13. Mortality

Pre-Retirement Mortality: The Pub-2010 Teachers Above-Median Income Employee mortality table [*PubT-2010(A) Employee*] as published by the Society of Actuaries with a 93.9% adjustment for males and 85.3% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2020.

All pre-retirement deaths are assumed to be ordinary deaths.

Healthy Retirees and Beneficiaries (Healthy Annuitants): The Pub-2010 Teachers Above-Median Income Healthy Retiree mortality table [*PubT-2010(A) Healthy Retiree*] as published by the Society of Actuaries with a 114.7% adjustment for males and 99.6% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2020.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Non-Safety Disabled Retiree mortality table [*PubNS-2010 Disabled Retiree*] as published by the Society of Actuaries with a 106.3% adjustment for males and 100.3% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2020.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

14. Retirement

Retirement rates for Tier 1-4 members are as follows:

Age	Less Than 25 Years of Service	25 Years of Service	26 or More Years of Service
< 50	N/A	1.5%	1.5%
50	N/A	1.5	1.5
51	N/A	2.0	2.0
52	N/A	3.0	2.5
53	N/A	4.0	3.0
54	N/A	6.0	3.5
55	N/A	10.0	13.0
56	N/A	18.0	17.0
57	N/A	18.0	17.0
58	N/A	20.0	17.0
59	N/A	25.0	17.0
60	4.0	25.0	20.0
61	6.0	25.0	22.0
62	6.0	33.0	27.0
63	8.0	42.0	30.0
64	8.0	42.0	30.0
65	12.0	42.0	30.0
66	18.0	55.0	35.0
67	18.0	55.0	40.0
68	18.0	55.0	30.0
69	18.0	55.0	30.0
70	18.0	55.0	30.0
71	18.0	55.0	30.0
72	18.0	55.0	30.0
73	18.0	55.0	30.0
74	18.0	55.0	30.0
75	100.0	100.0	100.0

Rates apply upon retirement eligibility by tier.

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Retirement rates for Tier 5 members are as follows:

Age	Less Than 25 Years of Service	25 Years of Service	26 to 29 Years of Service	30 Years of Service	31 or More Years of Service
< 50	N/A	N/A	N/A	1.5%	1.5%
50	N/A	N/A	N/A	1.5	1.5
51	N/A	N/A	N/A	2.0	2.0
52	N/A	N/A	N/A	3.0	2.5
53	N/A	N/A	N/A	4.0	3.0
54	N/A	N/A	N/A	6.0	3.5
55	N/A	N/A	N/A	10.0	13.0
56	N/A	N/A	N/A	18.0	17.0
57	N/A	N/A	N/A	18.0	17.0
58	N/A	N/A	N/A	20.0	17.0
59	N/A	N/A	N/A	25.0	17.0
60	N/A	N/A	N/A	25.0	20.0
61	N/A	N/A	N/A	25.0	22.0
62	N/A	N/A	N/A	33.0	27.0
63	N/A	N/A	N/A	42.0	30.0
64	N/A	N/A	N/A	42.0	30.0
65	12.0	42.0	42.0	42.0	30.0
66	18.0	55.0	35.0	35.0	35.0
67	18.0	55.0	40.0	40.0	40.0
68	18.0	55.0	30.0	30.0	30.0
69	18.0	55.0	30.0	30.0	30.0
70	18.0	55.0	30.0	30.0	30.0
71	18.0	55.0	30.0	30.0	30.0
72	18.0	55.0	30.0	30.0	30.0
73	18.0	55.0	30.0	30.0	30.0
74	18.0	55.0	30.0	30.0	30.0
75	100.0	100.0	100.0	100.0	100.0

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

- 15. Family Composition Assumptions**
- For members not currently in receipt, 100% of members are assumed married to spouses of the opposite sex. Males are assumed to be three years older than females.
- For purposes of the optional form of payment death benefit for members currently in receipt, beneficiary status is based on the beneficiary allowance reported. If no beneficiary date of birth is provided, the beneficiary is assumed to be the member's spouse of the opposite sex with males assumed to be three years older than females.
- No additional dependent children or parents are assumed.
- 16. Form of Payment**
- Current actives are assumed to elect the Maximum Option.
- 17. Data**
- Information provided by the prior actuary was relied upon for the purposes of setting the status of and valuing non-contributing records. For non-contributing terminated members, a deferred retirement benefit is estimated, when applicable, based on the last known salary. For non-contributing members with incomplete information, the benefit is based on the Annuity Savings Fund.
- For current beneficiaries with incomplete information, reasonable assumptions were made based on information available in prior years.
- Inactive participants receiving benefits according to the 2018 data but omitted from the 2019 data are assumed to have died without a beneficiary.
- Tier 4 and 5 members on long-term disability appeared on the active data for the first time in 2019. The number of members on long-term disability is immaterial for valuation purposes. Therefore, we valued these members as regular contributing and non-contributing members while we gain clarity on what happens with these members.
- 18. Rationale for Assumptions**
- The demographic and economic assumptions used in this report, except for the investment return assumption, reflect the results of the July 1, 2015 – June 30, 2018 Experience Study, which was approved by the Board of Trustees on February 6, 2020. The investment return assumption was recommended by the State Treasurer. The MP-2020 mortality improvement scale was used to calculate the Total Pension Liability upon direction from the DPB.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

19. Projection Basis

This report includes projections of future assets, benefit payments and contributions for the purpose of determining the GASB 67 discount rate.

The projections are based on the census data as of July 1, 2019 and the financial information as of June 30, 2020. The projections assume continuation of the plan provisions and actuarial assumptions in effect as of July 1, 2019 and do not reflect the impact of any changes in benefits or actuarial assumptions that may be adopted after July 1, 2020 unless otherwise indicated. While the assumptions individually are reasonable for the underlying valuation that supports the projections, specifically for projection purposes, they are also considered reasonable in the aggregate.

The projections assume that all future assumptions are met except where indicated with respect to future investment returns and demographic assumptions.

**20. Changes in Assumptions
Since Last Valuation**

The mortality improvement scale used to calculate the Total Pension Liability was updated from the MP-2019 scale to the MP-2020 scale upon direction from the DPB.

The GASB 67 effective discount rate has been updated in accordance with the method prescribed by GASB Statement No. 67.

The interest crediting rate on Accumulated Deductions was decreased from 7.50% to 7.30% per annum, compounded annually.

In connection with a new policy adopted by the DPB, interest credits are assumed to end upon termination, instead of continuing through retirement.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

The actuarial methods used for determining State contributions are described below.

1. Actuarial Cost Method

The actuarial cost method for funding calculations is the Projected Unit Credit Cost Method. Non-contributory active members only use the Unit Credit Cost Method.

The actuarial liability is calculated as the actuarial present value of the projected benefits linearly allocated to periods prior to the valuation year based on service. Refunds are valued as the Accumulated Deductions with interest as of the valuation date provided by the Division of Pensions and Benefits. The unfunded actuarial liability is the actuarial liability on the valuation date less the actuarial value of assets.

In accordance with Chapter 78, P.L. 2011:

- Beginning with the July 1, 2010 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over an open 30 year period.
- Beginning with the July 1, 2019 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over a closed 30 year period (i.e., for each subsequent actuarial valuation the amortization period shall decrease by one year).
- Beginning with the July 1, 2029 actuarial valuation, when the remaining amortization period reaches 20 years, any increase or decrease in the unfunded accrued liability as a result of actuarial losses or gains for subsequent valuation years shall serve to increase or decrease, respectively, the amortization period for the unfunded accrued liability, unless an increase in the amortization period will cause it to exceed 20 years. If an increase in the amortization period as a result of actuarial losses for a valuation year would exceed 20 years, the accrued liability contribution shall be computed for the valuation year using a 20 year amortization period.

To the extent that the amortization period remains an open period in future years and depending upon the specific circumstances, it should be noted that in the absence of emerging actuarial gains or contributions made in excess of the actuarially determined contribution, any existing unfunded accrued liability may not be fully amortized in the future.

The non-contributory group life insurance benefit is funded separately through a term cost.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

2. Asset Valuation Method

For the purposes of determining contribution rates, an actuarial value of assets is used that dampens the volatility in the market value of assets, resulting in a smoother pattern of contributions.

The actuarial value of assets is adjusted to reflect actual contributions and benefit payments and administrative expenses, and an assumed rate of return on the previous year's assets and current year's cash flow at the prior year's actuarial valuation interest rate, with a further adjustment to reflect 20% of the difference between the resulting value and the actual market value of Fund assets.

3. Contributions

Chapter 83, P.L. 2016 requires the State to make the required pension contributions on a quarterly basis in each fiscal year according to the following schedule: at least 25% by September 30, at least 50% by December 31, at least 75% by March 31, and at least 100% by June 30. As such, contributions are assumed to be made on a quarterly basis with the first contribution 15 months after the associated valuation date.

Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, allows the TPAF to receive 77.78% of the proceeds of the Lottery Enterprise, based upon their members' past or present employment in schools and institutions in the State for a term of 30 years. Revenues from Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, are assumed to be contributed to the trust on a monthly basis. The State's pension contribution is reduced by the product of the allocable percentage for the TPAF, the adjustment percentage, and the special asset value.

Contributions payable in the fiscal year starting on the valuation date are included in the actuarial value of assets as receivable contributions, discounted by the applicable valuation interest rate.

Legislation has provided for additional benefits and/or funding requirements which are included in this valuation and are described as follows.

Early Retirement Incentive Programs

State and Local employers which elected to participate in various early retirement incentive programs authorized by NJ Statute make contributions to cover the cost of these programs over amortization periods elected by the employer to the extent permitted by NJ Statute.

Chapter 133, P.L. 2001

Chapter 133, P.L. 2001 increased the accrual rate from 1/60 to 1/55. In addition, it lowered the age required for a veteran benefit equal to 1/55 of highest 12-month Compensation for each Year of Service from 60 to 55.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Chapter 133, P.L. 2001 established the Benefit Enhancement Fund (BEF) to fund the additional annual employer normal contribution due to the Statute's increased benefits. (Chapter 353, P.L. 2001 extended this coverage to this Statute's additional annual employer normal contribution.) If the assets in the BEF are insufficient to cover the normal contribution for the increased benefits for a valuation period, the State will pay such amount. As of July 1, 2019, there are no assets in the BEF.

4. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate liabilities and project benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

5. Changes Since the Last Valuation

None.

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APPENDIX C –SUMMARY OF PLAN PROVISION

This summary of Plan provisions provides an overview of the major provisions of the TPAF used in the actuarial valuation. It is not intended to replace the more precise language of the NJ State Statutes, Title 18A, Chapter 66, and if there is any difference between the description of the plan herein and the actual language in the NJ State Statutes, the NJ State Statutes will govern.

1. Eligibility for Membership

Employees appointed to positions requiring certification by the New Jersey Department of Education as members of a regular teaching or professional staff of a public school system in New Jersey are required to enroll as a condition of employment. Employees of the Department of Education holding unclassified, professional and certificated titles are eligible for membership. Temporary or substitute employees are not eligible. The eligible employee must be scheduled to work at least 32 hours per week effective May 22, 2010, per Chapter 1, P.L. 2010.

- a) Class B (or Tier 1) Member: Any member hired prior to July 1, 2007.
- b) Class D (or Tier 2) Member: Any member hired on or after July 1, 2007 and before November 2, 2008.
- c) Class E (or Tier 3) Member: Any member hired after November 1, 2008 and before May 22, 2010.
- d) Class F (or Tier 4) Member: Any member hired after May 21, 2010 and before June 28, 2011.
- e) Class G (or Tier 5) Member: Any member hired on or after June 28, 2011.

2. Plan Year

The 12-month period beginning on July 1 and ending on June 30.

3. Years of Service

A year of service for each year an employee is a Member of the Retirement System plus service, if any, covered by a prior service liability. Tier 4 members must be scheduled to work at least 32 hours per week, Tier 3 members must have an annual salary of \$7,500 (indexed for inflation) and other members must have an annual salary of \$500.

APPENDIX C –SUMMARY OF PLAN PROVISION

4. Compensation

Base salary upon which contributions by a Member to the Annuity Savings Fund were based. Chapter 113, P.L. 1997 provides that Compensation cannot exceed the compensation limitation of Section 401(a)(17) of the Internal Revenue Code. Chapter 103, P.L. 2007 provides that for a Tier 2, 3, 4 or 5 Member, Compensation cannot exceed the annual maximum wage contribution base for Social Security, pursuant to the Federal Insurance Contribution Act.

5. Final Compensation

The average annual compensation upon which contributions by a Member are made for the three consecutive years of service immediately preceding retirement, or the highest three fiscal years of service, if greater. Chapter 1, P. L. 1997 provides that for a Tier 4 or Tier 5 Member, Final Compensation is the average annual compensation upon which contributions by a Member are made for the five consecutive years of service immediately preceding retirement, or the highest five fiscal years of service, if greater.

6. Final Year Compensation

The compensation upon which contributions by a Member to the Annuity Savings Fund are based in the last year of service.

7. Accumulated Deductions

The sum of all amounts deducted from the compensation of a Member or contributed by the Member or on the Member's behalf without interest.

8. Interest Credits on Accumulated Deductions

Members receive interest credits while contributing and for the first two years of inactivity. The rate depends on the type of benefit. Prior to July 1, 2018, members received interest credits for the entire period of inactivity until retirement or death.

9. Member Contributions

Each Member contributes a percentage of Compensation. Effective October 1, 2011, Chapter 78, P.L. 2011 set the member contribution rate at 6.5% and increased it by 1/7 of 1% each July thereafter until it attained an ultimate rate of 7.5% on July 1, 2018.

APPENDIX C –SUMMARY OF PLAN PROVISION

10. Benefits

- a) **Service Retirement:** For a Tier 1 or Tier 2 Member, age 60. For a Tier 3 or Tier 4 Member, age 62. For a Tier 5 Member, age 65.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total allowance of:

- (1) For a Tier 1, 2 or 3 Member, 1/55 of Final Compensation for each Year of Service.
- (2) For a Tier 4 or 5 Member, 1/60 of Final Compensation for each Year of Service.

- b) **Early Retirement:** Prior to eligibility for Service Retirement. For a Tier 1, 2, 3 or 4 Member, 25 Years of Service. For a Tier 5 Member, 30 Years of Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total allowance of:

- (1) For a Tier 1 Member, the Service Retirement benefit reduced by 1/4 of one percent for each month the retirement date precedes age 55.
- (2) For a Tier 2 Member, the Service Retirement benefit reduced by 1/12 of one percent for each month the retirement date precedes age 60 through age 55 and by 1/4 of one percent for each month the retirement date precedes age 55.
- (3) For a Tier 3 or 4 Member, the Service Retirement benefit reduced by 1/12 of one percent for each month the retirement date precedes age 62 through age 55 and by 1/4 of one percent for each month the retirement date precedes age 55.
- (4) For a Tier 5 Member, the Service Retirement benefit reduced by 1/4 of one percent for each month the retirement date precedes age 65.

- c) **Veteran Retirement:** Age 55 with 25 Years of Service or Age 60 with 20 Years of Service for a qualified military veteran who retires directly from active service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total allowance of the greater of:

- (1) 54.5% of highest 12-month Compensation, or
- (2) For a member who is at least age 55 with 35 Years of Service, 1/55 of highest 12-month Compensation for each Year of Service.

Veterans may receive a Service Retirement benefit if greater.

APPENDIX C –SUMMARY OF PLAN PROVISION

- d) **Deferred Retirement:** Termination of service prior to eligibility for Service Retirement with 10 Years of Service.

Benefit is either:

- (1) A refund of Accumulated Deductions plus, if the member has completed three years of service, interest accumulated at 2.0% per annum; or
- (2) A deferred life annuity, commencing at age 60 for a Tier 1 or Tier 2 Member, age 62 for a Tier 3 or Tier 4 Member or age 65 for a Tier 5 Member, comprised of a member annuity plus an employer pension which together will provide a total allowance of the Service Retirement benefit based on Final Compensation and Years of Service at date of termination.

For Members who die during the deferral period, the benefit is a return of Accumulated Deductions with credited interest.

- e) **Non-Vested Termination:** Termination of service prior to eligibility for Service Retirement and less than 10 Years of Service.

Benefit is a refund of Accumulated Deductions plus, if the member has completed three Years of Service, interest accumulated at 2.0% per annum.

- f) **Death Benefits**

- (1) **Ordinary Death Before Retirement:** Death of an active contributing Member Benefit is equal to:

- a. Lump sum payment equal to 150% of Final Year Compensation, also known as the non-contributory group life insurance benefit, plus
- b. Accumulated Deductions with credited interest.

- (2) **Accidental Death Before Retirement:** Death of an active Member resulting from injuries received from an accident during performance of duty and not a result of willful negligence. Benefit is equal to:

- a. Lump sum payment equal to 150% of Final Year Compensation, also known as the non-contributory group life insurance benefit, plus
- b. Spouse life annuity of 50% of Final Year Compensation payable until spouse's death or remarriage. If there is no surviving spouse or upon death or remarriage, a total of 20% (35%, 50%) of Final Year Compensation payable to one (two, three or more) dependent child(ren). If there is no surviving spouse or dependent child(ren), 25% (40%) of Final Year Compensation to one (two) dependent parent(s). If there is no surviving spouse, dependent child(ren) or parent(s), the benefit is a refund of Accumulated Deductions with credited interest.

APPENDIX C –SUMMARY OF PLAN PROVISION

- (3) Death After Retirement: Death of a retired Member. Benefit is equal to:
- a. Lump sum payment equal to 3/16 of Final Year Compensation for a Member retired under service, early, veteran or deferred retirement with 10 Years of Service. For a Member receiving a disability benefit, lump sum payment of 150% of Final Year Compensation if death occurs prior to age 60 and 3/16 of Final Compensation if death occurs after age 60. This benefit is also known as the non-contributory group life insurance benefit, plus
 - b. Any survivor benefit due under the Member's optional form of payment election. Previously granted COLAs also apply to life annuities.

Members are also eligible for a voluntary, employee-paid life insurance policy, known as the contributory group life insurance policy. This benefit is not paid through the Fund and is not considered for valuation purposes.

g) **Disability Retirement**

- (1) Ordinary Disability Retirement: 10 Years of Service and totally and permanently incapacitated from the performance of normal or assigned duties. Only available to Tier 1, 2 and 3 Members.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total allowance of:

- a. 1.64% of Final Compensation for each Year of Service; or
- b. 43.6% of Final Compensation.

- (2) Accidental Disability Retirement: Total and permanent incapacitation as a direct result of a traumatic event occurring during and as a result of the performance of regular or assigned duties. Only available to Tier 1, 2 and 3 Members.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total allowance of 72.7% of the Compensation at the date of injury.

The pension portion of the benefit will be offset for any periodic Workers' Compensation benefits.

Tier 4 and Tier 5 Members are eligible for long-term disability coverage. This benefit is not paid through the Fund and is not considered for valuation purposes. Both Member and employer contributions to the Fund continue while on long-term disability, with the policy covering the Member portion. The long-term disability benefit equals 60% of Final Year Compensation and may be offset for other periodic benefits, such as Workers' Compensation, short-term disability or Social Security. The long-term disability benefit may continue through the earlier of age 70 or commencement of a retirement benefit under the Fund.

APPENDIX C –SUMMARY OF PLAN PROVISION

11. Optional Forms of Payment

The member may elect the following forms of payment.

- a) Maximum Option: Single life annuity with a return of the balance of the Accumulated Deductions with credited interest.
- b) Option 1: Single life annuity with a return of the balance of the initial reserve.
- c) Option 2: 100% joint and survivor annuity.
- d) Option 3: 50% joint and survivor annuity.
- e) Option 4: Other percentage joint and survivor annuity.
- f) Option A: 100% pop-up joint and survivor annuity.
- g) Option B: 75% pop-up joint and survivor annuity.
- h) Option C: 50% pop-up joint and survivor annuity.
- i) Option D: 25% pop-up joint and survivor annuity.

12. Cost-of-Living Adjustments

Also known as Pension Adjustments. Provided annually to retirees and survivors after 24 months of retirement prior to July 1, 2011. Chapter 78, P.L. 2011 eliminated future adjustments effective July 1, 2011. Adjustments may be reinstated in the future subject to certain conditions outlined in Chapter 78, P.L. 2011.

13. Changes in Plan Provisions Since Last Valuation

Effective July 1, 2018, the DPB adopted a new policy regarding the crediting of interest on member contributions for the purpose of refund of accumulated deductions. Previously, after termination of employment but prior to retirement or death, interest was credited on member accumulated deductions for the entire period. Effective July 1, 2018, interest is only credited at for the first two years of inactivity prior to retirement or death. Thereafter, no additional interest is credited.

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APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2020

Year	Projected Beginning Fiduciary Net Position (a)	Projected Member Contributions (b)	Projected Employer Contributions (c)	Projected Lottery Contributions (d)	Projected Benefit Payments (e)	Projected Administrative Expenses (f)	Projected Investment Earnings (g)	Projected Ending Fiduciary Net Position (h) = (a) + (b) + (c) + (d) - (e) - (f) + (g)
1	\$ 21,522,756	\$ 812,656	\$ 2,067,548	\$ 845,005	\$ 4,747,615	\$ 13,903	\$ 1,453,629	\$ 21,940,077
2	21,940,077	799,123	2,167,477	854,907	4,850,982	14,203	1,481,785	22,378,185
3	22,378,185	786,152	2,518,577	864,863	4,947,137	14,481	1,518,135	23,104,296
4	23,104,296	772,961	2,621,396	875,357	5,041,288	14,752	1,568,301	23,886,270
5	23,886,270	758,838	2,725,759	886,031	5,135,823	15,025	1,622,378	24,728,428
6	24,728,428	743,185	2,828,656	896,822	5,234,152	15,309	1,680,450	25,628,080
7	25,628,080	732,029	2,929,762	907,789	5,339,230	15,613	1,742,429	26,585,246
8	26,585,246	721,263	3,024,104	918,117	5,448,001	15,928	1,808,124	27,592,926
9	27,592,926	709,079	3,115,864	925,241	5,558,203	16,246	1,877,079	28,645,741
10	28,645,741	695,063	3,207,592	934,591	5,677,156	16,591	1,948,905	29,738,145
11	29,738,145	679,085	3,298,736	944,034	5,801,708	16,952	2,023,229	30,864,569
12	30,864,569	661,144	3,301,928	953,571	5,931,055	17,327	2,097,429	31,930,260
13	31,930,260	641,195	3,300,270	963,204	6,063,444	17,712	2,167,080	32,920,852
14	32,920,852	619,261	3,293,520	972,933	6,199,172	18,106	2,231,164	33,820,452
15	33,820,452	595,277	3,283,260	982,760	6,337,932	18,510	2,288,613	34,613,919
16	34,613,919	569,631	3,270,143	992,685	6,475,449	18,911	2,338,546	35,290,563
17	35,290,563	543,027	3,254,903	1,002,709	6,607,509	19,296	2,380,405	35,844,802
18	35,844,802	516,033	3,238,443	1,012,833	6,731,563	19,658	2,413,927	36,274,817
19	36,274,817	489,099	3,221,335	1,023,058	6,845,024	19,989	2,439,107	36,582,403
20	36,582,403	462,573	3,204,139	1,033,386	6,943,706	20,277	2,456,240	36,774,758
21	36,774,758	436,613	3,187,391	1,043,817	7,027,586	20,522	2,465,850	36,860,321
22	36,860,321	410,333	3,171,413	1,054,352	7,100,101	20,735	2,468,388	36,843,971
23	36,843,971	382,227	3,155,555	1,064,993	7,169,754	20,939	2,463,832	36,719,886
24	36,719,886	351,592	3,138,362	1,075,740	7,239,358	21,145	2,451,615	36,476,692
25	36,476,692	319,080	3,118,956	1,086,595	7,306,012	21,342	2,431,042	36,105,011
26	36,105,011	285,351	3,116,669	1,097,558	7,367,599	21,526	2,402,053	35,617,518
27	35,617,518	250,436	3,119,695	1,108,630	7,426,441	21,701	2,365,150	35,013,286
28	35,013,286	214,923	3,792,406	0	7,481,408	21,866	2,298,993	33,816,335
29	33,816,335	179,149	3,766,166	0	7,532,936	22,020	2,211,511	32,418,204
30	32,418,204	145,649	3,738,084	0	7,567,474	22,125	2,110,563	30,822,900
31	30,822,900	116,712	3,710,545	0	7,572,074	22,141	1,997,017	29,052,959
32	29,052,959	91,974	3,686,126	0	7,540,445	22,050	1,872,723	27,141,287
33	27,141,287	71,314	3,664,577	0	7,494,072	21,915	1,739,232	25,100,423
34	25,100,423	54,397	3,645,984	0	7,423,883	21,709	1,597,726	22,952,938
35	22,952,938	40,770	3,630,307	0	7,330,908	21,435	1,449,733	20,721,404
36	20,721,404	29,972	3,617,384	0	7,216,315	21,097	1,296,773	18,428,120
37	18,428,120	21,583	3,607,001	0	7,081,128	20,698	1,140,352	16,095,231
38	16,095,231	15,226	3,598,923	0	6,927,794	20,244	981,916	13,743,258
39	13,743,258	10,558	3,592,904	0	6,757,635	19,740	822,837	11,392,184
40	11,392,184	7,218	3,588,694	0	6,572,967	19,192	664,416	9,060,353
41	9,060,353	4,890	3,585,964	0	6,375,965	18,608	507,842	6,764,476
42	6,764,476	3,282	3,584,395	0	6,168,663	17,993	354,196	4,519,694
43	4,519,694	2,178	3,583,657	0	5,953,401	17,354	204,441	2,339,216
44	0	0	0	0	5,732,116	16,697	0	0
45	0	0	0	0	5,505,838	16,026	0	0
46	0	0	0	0	5,275,367	15,342	0	0
47	0	0	0	0	5,041,232	14,648	0	0
48	0	0	0	0	4,804,062	13,946	0	0
49	0	0	0	0	4,564,446	13,236	0	0
50	0	0	0	0	4,323,105	12,522	0	0
51	0	0	0	0	4,080,833	11,807	0	0
52	0	0	0	0	3,838,444	11,091	0	0
53	0	0	0	0	3,596,901	10,379	0	0
54	0	0	0	0	3,357,217	9,673	0	0
55	0	0	0	0	3,120,342	8,977	0	0
56	0	0	0	0	2,887,261	8,293	0	0
57	0	0	0	0	2,658,984	7,623	0	0
58	0	0	0	0	2,436,532	6,972	0	0
59	0	0	0	0	2,220,907	6,342	0	0
60	0	0	0	0	2,013,064	5,736	0	0

**TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2020 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2020

Year	Projected Beginning Fiduciary Net Position (a)	Projected Member Contributions (b)	Projected Employer Contributions (c)	Projected Lottery Contributions (d)	Projected Benefit Payments (e)	Projected Administrative Expenses (f)	Projected Investment Earnings (g)	Projected Ending Fiduciary Net Position (h) = (a) + (b) + (c) + (d) - (e) - (f) + (g)
61	0	0	0	0	1,813,897	5,157	0	0
62	0	0	0	0	1,624,196	4,606	0	0
63	0	0	0	0	1,444,664	4,085	0	0
64	0	0	0	0	1,275,886	3,598	0	0
65	0	0	0	0	1,118,323	3,143	0	0
66	0	0	0	0	972,302	2,724	0	0
67	0	0	0	0	838,006	2,339	0	0
68	0	0	0	0	715,493	1,989	0	0
69	0	0	0	0	604,706	1,674	0	0
70	0	0	0	0	505,469	1,393	0	0
71	0	0	0	0	417,502	1,145	0	0
72	0	0	0	0	340,411	928	0	0
73	0	0	0	0	273,694	742	0	0
74	0	0	0	0	216,755	584	0	0
75	0	0	0	0	168,901	452	0	0
76	0	0	0	0	129,341	344	0	0
77	0	0	0	0	97,215	257	0	0
78	0	0	0	0	71,616	188	0	0
79	0	0	0	0	51,632	134	0	0
80	0	0	0	0	36,376	94	0	0
81	0	0	0	0	25,003	64	0	0
82	0	0	0	0	16,739	42	0	0
83	0	0	0	0	10,896	27	0	0
84	0	0	0	0	6,886	17	0	0
85	0	0	0	0	4,220	10	0	0
86	0	0	0	0	2,504	6	0	0
87	0	0	0	0	1,438	3	0	0
88	0	0	0	0	800	2	0	0
89	0	0	0	0	432	1	0	0
90	0	0	0	0	227	1	0	0
91	0	0	0	0	116	0	0	0
92	0	0	0	0	58	0	0	0
93	0	0	0	0	28	0	0	0
94	0	0	0	0	13	0	0	0
95	0	0	0	0	6	0	0	0
96	0	0	0	0	2	0	0	0
97	0	0	0	0	1	0	0	0
98	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0

**TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2020 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments

(In Thousands)

Projections Commence June 30, 2020

* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)

** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (e)

Year	Projected Beginning Fiduciary Net Position*	Projected Benefit Payments for current Plan participants**	"Funded" Portion of Benefit Payments (d) = (c) if (b) >= (c)	"Unfunded" Portion of Benefit Payments (e) = (c) - (d)	Present Value of "Funded" Benefit Payments (f) = (d) / (1+7.00%) ^[(a) - .5]	Present Value of "Unfunded" Benefit Payments (g) = (e) / (1+2.21%) ^[(a) - .5]	Present Value of Benefit Payments Using the Single Discount Rate (h) = (c) / (1+5.40%) ^[(a) - .5]
(a)	(b)	(c)	(d) = (c) if (b) >= (c)	(e) = (c) - (d)	(f) = (d) / (1+7.00%) ^[(a) - .5]	(g) = (e) / (1+2.21%) ^[(a) - .5]	(h) = (c) / (1+5.40%) ^[(a) - .5]
1	\$ 21,522,756	\$ 4,747,615	\$ 4,747,615	\$ 0	\$ 4,589,693	\$ 0	\$ 4,624,441
2	21,940,077	4,850,982	4,850,982	0	4,382,823	0	4,483,127
3	22,378,185	4,947,137	4,947,137	0	4,177,288	0	4,337,834
4	23,104,296	5,041,288	5,041,288	0	3,978,307	0	4,193,998
5	23,886,270	5,135,823	5,135,823	0	3,787,765	0	4,053,818
6	24,728,428	5,234,152	5,234,152	0	3,607,743	0	3,919,838
7	25,628,080	5,339,230	5,339,230	0	3,439,411	0	3,793,745
8	26,585,246	5,448,001	5,448,001	0	3,279,887	0	3,672,774
9	27,592,926	5,558,203	5,558,203	0	3,127,320	0	3,555,159
10	28,645,741	5,677,156	5,677,156	0	2,985,279	0	3,445,269
11	29,738,145	5,801,708	5,801,708	0	2,851,190	0	3,340,533
12	30,864,569	5,931,055	5,931,055	0	2,724,072	0	3,240,108
13	31,930,260	6,063,444	6,063,444	0	2,602,688	0	3,142,784
14	32,920,852	6,199,172	6,199,172	0	2,486,868	0	3,048,572
15	33,820,452	6,337,932	6,337,932	0	2,376,199	0	2,957,181
16	34,613,919	6,475,449	6,475,449	0	2,268,931	0	2,866,605
17	35,290,563	6,607,509	6,607,509	0	2,163,742	0	2,775,258
18	35,844,802	6,731,563	6,731,563	0	2,060,155	0	2,682,558
19	36,274,817	6,845,024	6,845,024	0	1,957,831	0	2,588,069
20	36,582,403	6,943,706	6,943,706	0	1,856,127	0	2,490,920
21	36,774,758	7,027,586	7,027,586	0	1,755,653	0	2,391,895
22	36,860,321	7,100,101	7,100,101	0	1,657,728	0	2,292,810
23	36,843,971	7,169,754	7,169,754	0	1,564,477	0	2,196,724
24	36,719,886	7,239,358	7,239,358	0	1,476,323	0	2,104,451
25	36,476,692	7,306,012	7,306,012	0	1,392,444	0	2,015,055
26	36,105,011	7,367,599	7,367,599	0	1,312,320	0	1,927,969
27	35,617,518	7,426,441	7,426,441	0	1,236,262	0	1,843,837
28	35,013,286	7,481,408	7,481,408	0	1,163,937	0	1,762,352
29	33,816,335	7,532,936	7,532,936	0	1,095,284	0	1,683,609
30	32,418,204	7,567,474	7,567,474	0	1,028,323	0	1,604,706
31	30,822,900	7,572,074	7,572,074	0	961,634	0	1,523,446
32	29,052,959	7,540,445	7,540,445	0	894,969	0	1,439,384
33	27,141,287	7,494,072	7,494,072	0	831,276	0	1,357,267
34	25,100,423	7,423,883	7,423,883	0	769,617	0	1,275,693
35	22,952,938	7,330,908	7,330,908	0	710,260	0	1,195,199
36	20,721,404	7,216,315	7,216,315	0	653,418	0	1,116,261
37	18,428,120	7,081,128	7,081,128	0	599,231	0	1,039,250
38	16,095,231	6,927,794	6,927,794	0	547,903	0	964,674
39	13,743,258	6,757,635	6,757,635	0	499,481	0	892,787
40	11,392,184	6,572,967	6,572,967	0	454,048	0	823,914
41	9,060,353	6,375,965	6,375,965	0	411,626	0	758,288
42	6,764,476	6,168,663	6,168,663	0	372,190	0	696,060
43	4,519,694	5,953,401	4,519,694	1,433,707	254,858	566,228	637,365
44	0	5,732,116	0	5,732,116	0	2,214,892	582,245
45	0	5,505,838	0	5,505,838	0	2,081,458	530,618
46	0	5,275,367	0	5,275,367	0	1,951,208	482,368
47	0	5,041,232	0	5,041,232	0	1,824,291	437,351
48	0	4,804,062	0	4,804,062	0	1,700,876	395,430
49	0	4,564,446	0	4,564,446	0	1,581,098	356,465
50	0	4,323,105	0	4,323,105	0	1,465,119	320,326
51	0	4,080,833	0	4,080,833	0	1,353,109	286,889
52	0	3,838,444	0	3,838,444	0	1,245,219	256,028
53	0	3,596,901	0	3,596,901	0	1,141,631	227,629
54	0	3,357,217	0	3,357,217	0	1,042,517	201,580
55	0	3,120,342	0	3,120,342	0	948,009	177,761
56	0	2,887,261	0	2,887,261	0	858,229	156,059
57	0	2,658,984	0	2,658,984	0	773,284	136,360
58	0	2,436,532	0	2,436,532	0	693,270	118,552
59	0	2,220,907	0	2,220,907	0	618,254	102,526
60	0	2,013,064	0	2,013,064	0	548,278	88,172

**TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2020 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments

(In Thousands)

Projections Commence June 30, 2020

* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)

** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (e)

Year	Projected Beginning Fiduciary Net Position*	Projected Benefit Payments for current Plan participants**	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments (f) = (d) / (1+7.00%) ^[(a) - .5]	Present Value of "Unfunded" Benefit Payments (g) = (e) / (1+2.21%) ^[(a) - .5]	Present Value of Benefit Payments Using the Single Discount Rate (h) = (c) / (1+5.40%) ^[(a) - .5]
(a)	(b)	(c)	(d) = (c) if (b) >= (c)	(e) = (c) - (d)			
61	0	1,813,897	0	1,813,897	0	483,351	75,379
62	0	1,624,196	0	1,624,196	0	423,443	64,039
63	0	1,444,664	0	1,444,664	0	368,494	54,043
64	0	1,275,886	0	1,275,886	0	318,406	45,285
65	0	1,118,323	0	1,118,323	0	273,051	37,660
66	0	972,302	0	972,302	0	232,265	31,066
67	0	838,006	0	838,006	0	195,856	25,403
68	0	715,493	0	715,493	0	163,607	20,579
69	0	604,706	0	604,706	0	135,284	16,502
70	0	505,469	0	505,469	0	110,638	13,087
71	0	417,502	0	417,502	0	89,408	10,256
72	0	340,411	0	340,411	0	71,322	7,934
73	0	273,694	0	273,694	0	56,104	6,052
74	0	216,755	0	216,755	0	43,471	4,548
75	0	168,901	0	168,901	0	33,142	3,362
76	0	129,341	0	129,341	0	24,831	2,443
77	0	97,215	0	97,215	0	18,260	1,742
78	0	71,616	0	71,616	0	13,160	1,218
79	0	51,632	0	51,632	0	9,283	833
80	0	36,376	0	36,376	0	6,399	557
81	0	25,003	0	25,003	0	4,303	363
82	0	16,739	0	16,739	0	2,818	231
83	0	10,896	0	10,896	0	1,795	142
84	0	6,886	0	6,886	0	1,110	85
85	0	4,220	0	4,220	0	665	50
86	0	2,504	0	2,504	0	386	28
87	0	1,438	0	1,438	0	217	15
88	0	800	0	800	0	118	8
89	0	432	0	432	0	62	4
90	0	227	0	227	0	32	2
91	0	116	0	116	0	16	1
92	0	58	0	58	0	8	0
93	0	28	0	28	0	4	0
94	0	13	0	13	0	2	0
95	0	6	0	6	0	1	0
96	0	2	0	2	0	0	0
97	0	1	0	1	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
					\$ 82,346,580	\$ 25,688,284	\$ 108,034,864

APPENDIX E – GLOSSARY OF TERMS

1. Actuarially Determined Contribution

A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

2. Actuarial Valuation Date

The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

3. Entry Age Actuarial Cost Method

The actuarial cost method required for GASB 67 calculations. Under this method, the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Service Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future service costs is called the Total Pension Liability.

4. Measurement Date

The date as of which the Total Pension Liability and Plan Fiduciary Net Position are measured. The Total Pension Liability may be projected from the Actuarial Valuation Date to the Measurement Date. The Measurement Date must be the same as the Reporting Date for the plan.

5. Net Pension Liability

The liability of employers and nonemployer contributing entities for employees for benefits provided through a defined benefit pension plan. It is calculated as the Total Pension Liability less the Plan Fiduciary Net Position.

6. Plan Fiduciary Net Position

The fair or market value of assets.

7. Reporting Date

The last day of the plan or employer's fiscal year.

APPENDIX E – GLOSSARY OF TERMS

8. Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to the current period of employee service in conformity with the requirements of GASB 67. The Service Cost is the normal cost calculated under the entry age actuarial cost method.

9. Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of GASB 67. The Total Pension Liability is the actuarial liability calculated under the entry age actuarial cost method. This measurement generally is not appropriate for estimating the cost to settle the Plan's liabilities.