

# **Police and Firemen's Retirement System of New Jersey**

## **Actuarial Valuation Report as of July 1, 2018**

**Produced by Cheiron**

**April 2019**

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**LETTER OF TRANSMITTAL**

April 25, 2019

Board of Trustees  
Police and Firemen's Retirement System of New Jersey  
State of New Jersey  
Department of the Treasury  
Division of Pension and Benefits, CN 295  
Trenton, NJ 08625-0295

Dear Board Members:

At your request, we have performed the July 1, 2018 Actuarial Valuation of the Police and Firemen's Retirement System of New Jersey (PFRS or System).

In preparing our report, we relied on information (some oral and some written) supplied by the Division of Pensions and Benefits. This information includes, but is not limited to, 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.

The results of this report are only applicable to the System's contribution for Fiscal Year Ending 2020. Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

The actuarial assumptions are the same as those used by the prior actuary. Cheiron has reviewed the assumptions. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study.

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.



Police and Firemen's Retirement System of New Jersey

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This actuarial valuation report was prepared exclusively for the Police and Firemen's Retirement System of New Jersey for the purposes described herein and for 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.

Sincerely,

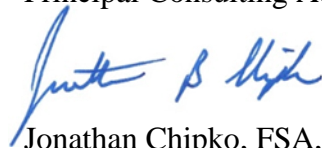
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**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION I – BOARD SUMMARY**

The primary purpose of the actuarial valuation and this report is to disclose the following as of the valuation date:

- The financial condition of the Police and Firemen's Retirement System of New Jersey,
- Past and expected future trends and risks to the System's financial condition, and
- The State's and Local employers' contributions for the Fiscal Year Ending (FYE) 2020.

In this section we present a summary of the principal valuation results. This includes the basis upon which the July 1, 2018 valuation was completed and an examination of the current financial condition of the System. In addition, we present a review of the key historical trends followed by the System's projected financial outlook.

This report does not include calculations under GASB Statements Nos. 67 and 68 which were provided in separate reports.

Results shown in this report for years prior to July 1, 2018 were provided by the prior actuary.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**Valuation Basis**

The July 1, 2018 valuation results are based on the same actuarial methods and assumptions as used in the July 1, 2017 valuation produced by the prior actuary. The demographic assumptions were based on the July 1, 2010 – June 30, 2013 Experience Study prepared by the prior actuary, which was approved by the Board of Trustees on February 9, 2015. The valuation is based on a 7.50% interest rate, annual salary increases that are 0.5% lower than the rates shown in the experience study and a select period for annual salary increases through fiscal year ending 2026, which were recommended by the State Treasurer. Cheiron has reviewed the demographic and economic assumptions. While we consider these assumptions to be generally reasonable, we have not performed our own actuarial experience study.

This report was prepared using census data and financial information as of July 1, 2018 provided by the Division of Pensions and Benefits and does not reflect any subsequent changes in the membership or the assets.

The Appropriations Act of Fiscal Year 2018 reduced the State pension contribution of \$502,917,964 to \$251,158,026. This amount includes revenue of \$11,712,026 from the Lottery Enterprise Contribution Act.

The potential impact of the Appropriations Act of 2019 reduces the State pension contribution for Fiscal Year 2019 from \$529,722,755 to \$317,839,127 (60% of the State Statutory contribution less the Lottery Enterprise Contribution Offset plus expected revenue from the Lottery Enterprise Contribution Act {60% x \$529,722,755 - \$12,445,783 + \$12,451,257}). The \$317,839,127 includes expected State-paid Local contributions of \$134,715,683. This valuation reflects the potential impact of the Appropriations Act of 2019.

Chapter 83, P.L. 2016 requires the State to make the required pension contributions on a quarterly basis: 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, State contributions are assumed to be made on a quarterly basis.

Under Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, the Police and Firemen's Retirement System receives 1.20% of the proceeds of the Lottery Enterprise, based on their members' past or present employment in schools and institutions in the State, for a term of 30 years. As of the July 1, 2018 valuation, 28 years remain. 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 special asset value is the present value of remaining lottery contributions to the retirement systems. Effective with Fiscal Year 2018, the State's pension contribution shall be reduced by the product of the allocable percentage for such retirement system, the adjustment percentage for such retirement system and the special asset adjustment.

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**SECTION I – BOARD SUMMARY**

The valuation excludes assets and liabilities under the Non-Contributory Group Insurance Premium Fund for the State. The Non-Contributory Group Insurance premiums are separately funded on a pay-as-you-go basis. For Local employers, the Non-Contributory Group Insurance Contribution is calculated as the present value of expected benefit payments for the upcoming year based on valuation assumptions.

**Key Results**

Following are Table I-1 and Table I-2 which summarize the key results of the valuation with respect to the System's membership, assets and liabilities, and contributions for State and Local employers. The results are presented and compared for both the current and prior year.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION I – BOARD SUMMARY**

**Table I-1  
Summary of Key Valuation Results  
State**

Valuation Date Fiscal Year Ending (FYE)	July 1, 2018 2020	July 1, 2017 2019	% Change
<b><u>Member Data</u></b>			
Contributing Actives	6,807	6,730	1.1%
Non-Contributing Actives	362	342	5.8%
Deferred Vesteds	6	7	-14.3%
Retirees and Beneficiaries <sup>1</sup>	<u>6,673</u>	<u>6,548</u>	1.9%
Total Members	13,848	13,627	1.6%
Appropriation Payroll <sup>2</sup>	\$ 479,941,514	\$ 481,691,601	-0.4%
Annual Retirement Allowances in Pay	\$ 313,277,156	\$ 305,608,112	2.5%
<b><u>Assets and Liabilities</u></b>			
Actuarial Liability	\$ 4,983,733,970	\$ 4,873,081,731	2.3%
Actuarial Value of Assets (AVA) <sup>3</sup>	<u>1,872,048,766</u>	<u>1,887,486,318</u>	-0.8%
Unfunded Actuarial Liability/(Surplus)	\$ 3,111,685,204	\$ 2,985,595,413	4.2%
Funded Ratio (AVA)	37.6%	38.7%	-1.1%
Actuarial Value of Assets <sup>3</sup> including			
Special Asset Value (SAV)	<u>\$ 2,023,529,750</u>	<u>\$ 2,038,961,264</u>	-0.8%
Unfunded Actuarial Liability/(Surplus)	\$ 2,960,204,220	\$ 2,834,120,467	4.4%
Funded Ratio (AVA + SAV)	40.6%	41.8%	-1.2%
Market Value of Assets (MVA) <sup>5</sup>	<u>\$ 1,683,271,926</u>	<u>\$ 1,680,114,357</u>	0.2%
Unfunded Actuarial Liability/(Surplus)	\$ 3,300,462,044	\$ 3,192,967,374	3.4%
Funded Ratio (MVA)	33.8%	34.5%	-0.7%
<b><u>Contribution Amounts</u></b>			
State Normal Cost at End of Year <sup>4</sup>	\$ 122,009,526	\$ 123,604,394	-1.3%
Amortization Payment of UAL <sup>4</sup>	<u>422,569,740</u>	<u>406,118,361</u>	4.1%
Total Statutory Contribution for FYE	\$ 544,579,266	\$ 529,722,755	2.8%
Percent Appropriated	70.0%	60.0%	10.0%
State Appropriation for Pension	\$ 381,205,486	\$ 317,833,653	19.9%
Lottery Enterprise Contribution Offset	<u>(12,845,413)</u>	<u>(12,445,783)</u>	3.2%
Net State Contribution	\$ 368,360,073	\$ 305,387,870	20.6%

<sup>1</sup> QDRO recipients are excluded from member counts

<sup>2</sup> Limited annual compensation for contributing actives

<sup>3</sup> Includes discounted State receivable contributions and Lottery proceeds as shown in Table II-2

<sup>4</sup> Includes \$227,263,995 for FYE 2020 and \$224,526,138 for FYE 2019 for Local obligations payable by the State in accordance with Chapter 109, P.L. 1979, Chapter 511, P.L. 1991, Chapter 247, P.L. 1993, Chapter 428, P.L. 1999,



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

**Table I-2  
Summary of Key Valuation Results  
Local Employers**

Valuation Date Fiscal Year Ending (FYE)	July 1, 2018 2020	July 1, 2017 2019	% Change
<b><u>Member Data</u></b>			
Contributing Actives	34,013	33,410	1.8%
Non-Contributing Actives	1,113	1,037	7.3%
Deferred Vesteds	36	34	5.9%
Retirees and Beneficiaries <sup>1</sup>	37,894	37,323	1.5%
<b>Total Members</b>	<b>73,056</b>	<b>71,804</b>	<b>1.7%</b>
Appropriation Payroll <sup>2</sup>	\$ 3,390,777,193	\$ 3,321,656,728	2.1%
Annual Retirement Allowances in Pay	\$ 2,177,011,512	\$ 2,100,385,456	3.6%
<b><u>Assets and Liabilities</u></b>			
Actuarial Liability	\$ 35,523,376,524	\$ 34,474,127,537	3.0%
Actuarial Value of Assets (AVA) <sup>3</sup>	26,109,128,660	25,183,776,588	3.7%
Unfunded Actuarial Liability/(Surplus)	\$ 9,414,247,864	\$ 9,290,350,949	1.3%
Funding Ratio (AVA)	73.5%	73.1%	0.4%
Market Value of Assets (MVA) <sup>3</sup>	\$ 25,680,517,916	\$ 24,351,431,023	5.5%
Unfunded Actuarial Liability/(Surplus)	\$ 9,842,858,608	\$ 10,122,696,514	-2.8%
Funding Ratio (MVA)	72.3%	70.6%	1.7%
<b><u>Contribution Amounts</u></b>			
Employer Normal Cost at End of Year <sup>4</sup>	\$ 325,433,661	\$ 307,441,204	5.9%
Amortization Payment of UAL <sup>4</sup>	638,214,381	633,478,119	0.7%
ERI Payments	2,670,679	2,608,104	2.4%
Chapter 19, P.L. 2009 Payments	25,467,677	25,339,869	0.5%
<b>Total Statutory Contribution for FYE</b>	<b>\$ 991,786,398</b>	<b>\$ 968,867,296</b>	<b>2.4%</b>
Non-Contributory Group Insurance Contribution	\$ 46,564,731	\$ 37,183,000	25.2%

<sup>1</sup> QDRO recipients are excluded from member counts

<sup>2</sup> Limited annual compensation for contributing actives

<sup>3</sup> Includes discounted State receivable contributions as shown in Table II-2

<sup>4</sup> Excludes \$227,263,995 for FYE 2020 and \$224,526,138 for FYE 2019 for Local obligations payable by the State in accordance with Chapter 109, P.L. 1979, Chapter 511, P.L. 1991, Chapter 247, P.L. 1993, Chapter 428, P.L. 1999, Chapter 86, P.L. 2001 and Chapter 318, P.L. 2001.

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**SECTION I – BOARD SUMMARY**

The key results of the July 1, 2018 actuarial valuation for the State are as follows:

- The total Statutory contribution, including Local obligations payable by the State, increased from \$529.7 million for fiscal year ending 2019 to \$544.6 million for fiscal year ending 2020 prior to any adjustments for the State phase-in of contributions or the Lottery Enterprise offset.
- The unfunded actuarial liability based on the actuarial asset value plus special asset value increased from \$2.8 billion as of July 1, 2017 to \$3.0 billion as of July 1, 2018. The unfunded actuarial liability used in determining the Statutory contributions (excess of actuarial liability over the actuarial value of assets) increased from \$3.0 billion to \$3.1 billion.
- The funded ratio based on actuarial asset value plus special asset value decreased from 41.8% as of July 1, 2017 to 40.6% as of July 1, 2018. The funded ratio on the actuarial value of assets basis decreased from 38.7% to 37.6%. Based on the market value of assets, the funded ratio also decreased from 34.5% to 33.8%.
- During the year there was a total actuarial experience loss of \$27 million, consisting of an asset loss of \$48 million and a liability gain of \$21 million.

The key results of the July 1, 2018 actuarial valuation for Local employers are as follows:

- The total Statutory contribution, excluding Local obligations payable by the State and including Early Retirement Incentive (ERI) and Chapter 19, P.L. 2009 payments, increased from \$968.9 million for fiscal year ending 2019 to \$991.8 million for fiscal year ending 2020.
- The unfunded actuarial liability increased from \$9.3 billion as of July 1, 2017 to \$9.4 billion as of July 1, 2018 on an actuarial asset value basis.
- The funded ratio, the ratio of actuarial asset value over liabilities, increased from 73.1% as of July 1, 2017 to 73.5% as of July 1, 2018. Based on the market value of assets, the funded ratio also increased from 70.6% to 72.3%.
- During the year there was a total actuarial experience loss of \$139 million, consisting of an asset loss of \$111 million and a liability loss of \$28 million.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION I – BOARD SUMMARY**

**Recent Trends**

Although most of the attention given to the valuation reflects the most recently computed unfunded actuarial liability, funded ratio, and contribution amounts, each valuation is merely a snapshot of the long-term progress of a pension fund. It is important to take a step back from these latest results and view them in the context of the System's recent history. Below, we present a series of graphs which display key factors in the valuations of the last 10 years. Additionally, in Appendix D we provide the numerical values of the historical unfunded actuarial liability, funded ratio, and contribution amounts. Note that the contribution amounts in this section include State-paid Local obligations with Local employers' contribution amounts to illustrate their impact on the Local employers' portion of the unfunded liability. The historical amounts in Appendix D show the State-paid Local obligations with State contributions.

In reviewing the historic trends over the 10 year period, the State's declining funded status coupled with significant negative net cash flow highlights the potential risk of running out of assets to pay benefits unless the State consistently contributes the full amount of the Statutory required contributions.

Assets and Liabilities

The grey bars represent the Actuarial Liability (AL). The green line is the Market Value of Assets (MVA), the gold line is the Actuarial Value of Assets (AVA) and the blue line (which starts in 2016) is the AVA plus the Special Asset Value (SAV). The System's funded ratio (ratio of assets to actuarial liability), on a MVA basis and an AVA or AVA+SAV basis, is shown next to the respective assets lines.

There was a decrease in the liability as of July 1, 2010 due to the benefit reforms of Chapter 1, P.L. 2010 and Chapter 78, P.L. 2011. Since July 1, 2010, the liability has been increasing over time in part due to additional benefit accruals, but also due to decreases in the discount rate.

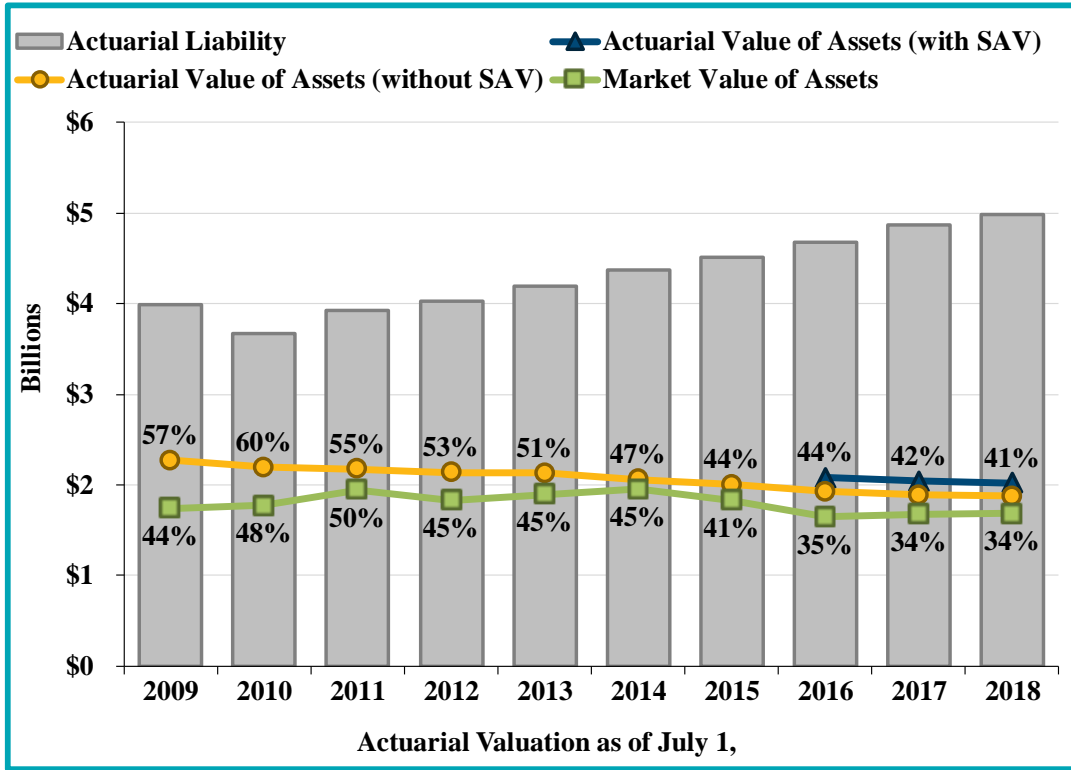
For the State, the funded ratio has been decreasing over time in part due to decreases in the discount rate, recognition of the 2008/2009 market losses reflected in the large gap between the MVA and AVA in 2009 and because the State has not been making the full Statutory contribution for the entire period shown.

For Local employers, the funded ratio has remained relatively level over the period due to decreases in the discount rate and recognition of the 2008/2009 market losses reflected in the large gap between the MVA and AVA in 2009. In addition, while Local employers have been making the full Statutory contribution, the State has not been making the full State-paid Local Statutory contribution for the entire period shown.

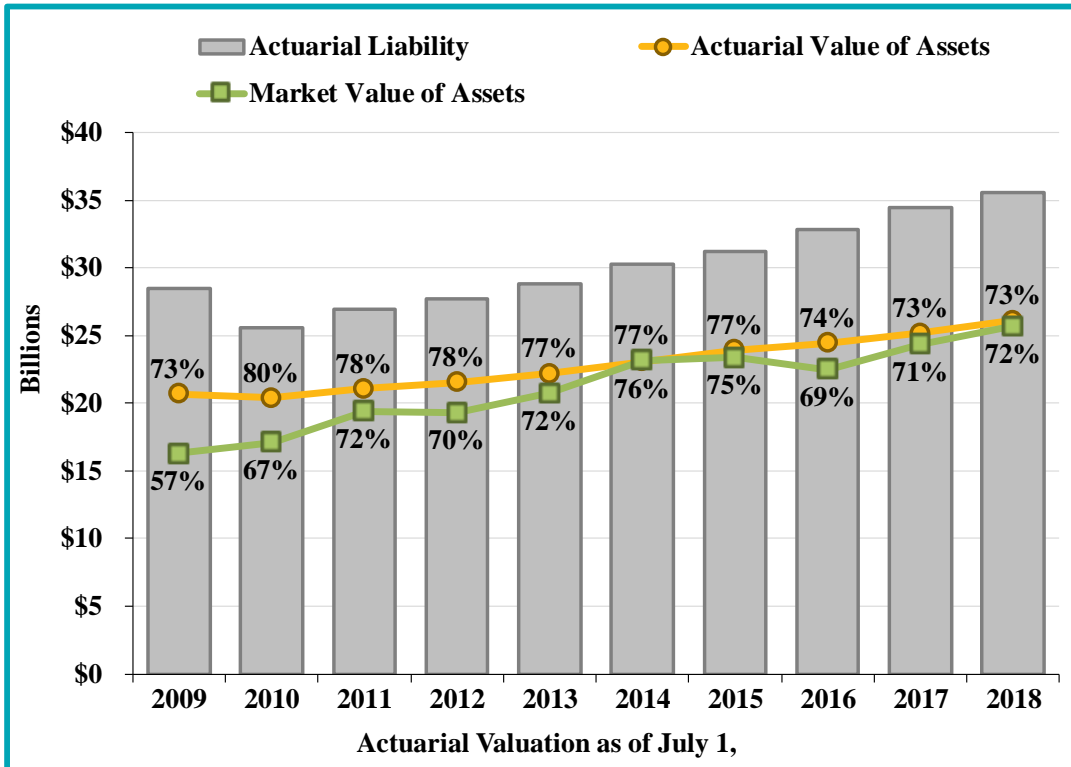
POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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SECTION I – BOARD SUMMARY

State



Local Employers



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**SECTION I – BOARD SUMMARY**

Membership Trends

The following graphs show the membership counts of the System for the last ten valuations. The numbers that appear above each bar represent the ratio of the number of inactive and non-contributing active members to contributing active members at each valuation date, and provide a measure of the maturity of the System. The inactive-to-active ratios for both State and Local employers have increased over the period shown. As more of the liability moves from actives to inactive, the System will experience more volatility in contribution rates when actuarial gains and losses are recognized.

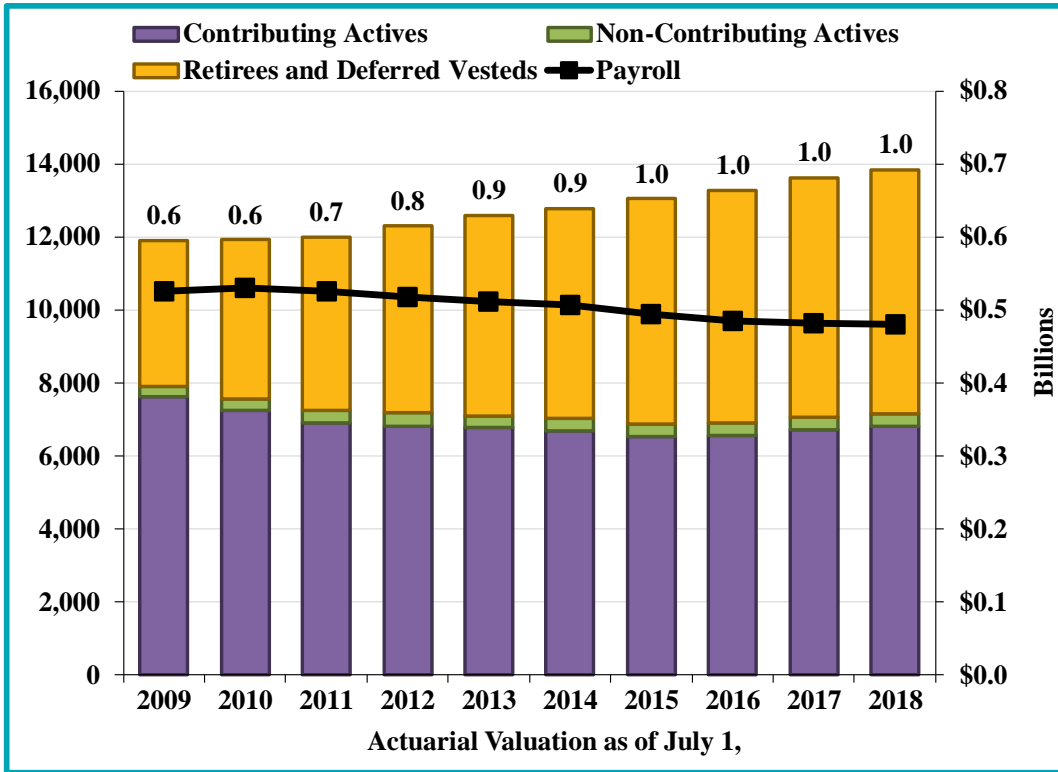
With the current inactive-to-active ratio of around 1.0 to 1.1, there are almost as many active members as inactive members implying that the risk factors for both the State and Local employers are not at a high level relative to other mature pension systems.

The black line represents the appropriation payroll for contributing actives over the period and corresponds with the right-hand scale.

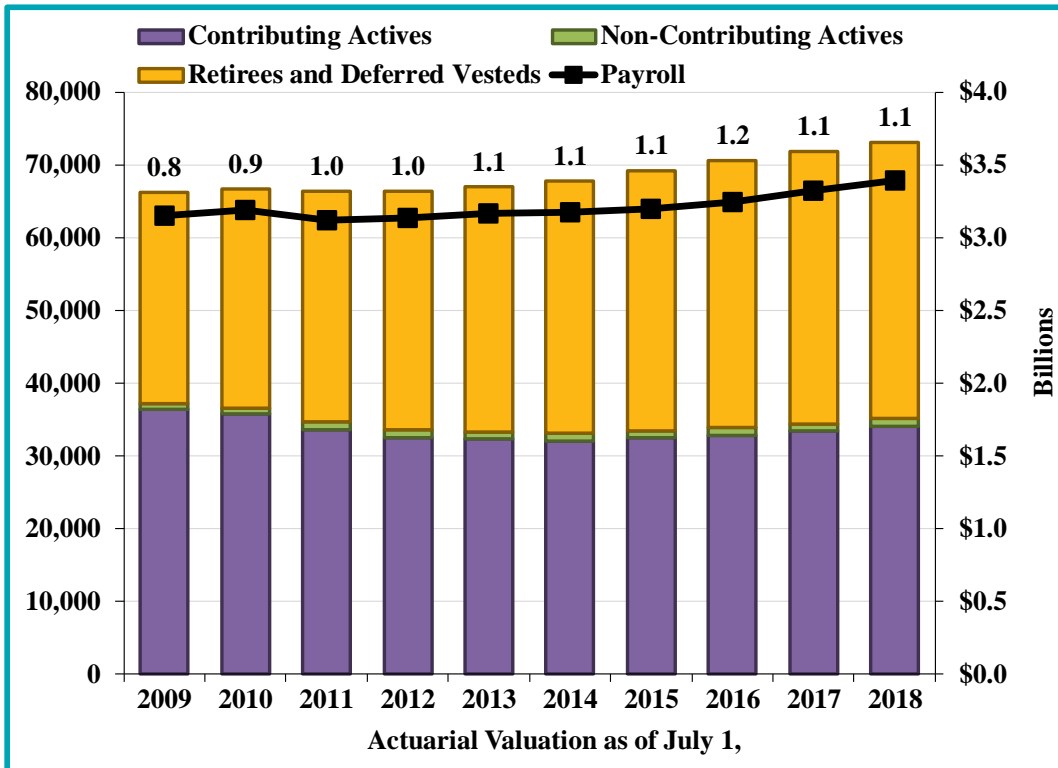
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SECTION I – BOARD SUMMARY

State



Local Employers



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Cash Flows

The following graphs show the System net cash flow (contributions less benefit payments and expenses) at the end of each fiscal year. For the entire period shown, the net cash flow excluding investments has been negative. This illustrates that contributions have not been sufficient to cover benefits and expenses in any years over the past decade. A major implication of a negative cash flow is that the difference each year must be met first from cash generated by investments and then be paid out of the principal assets, representing additional risk for the System if investments need to be sold in a down market to cover benefit payments.

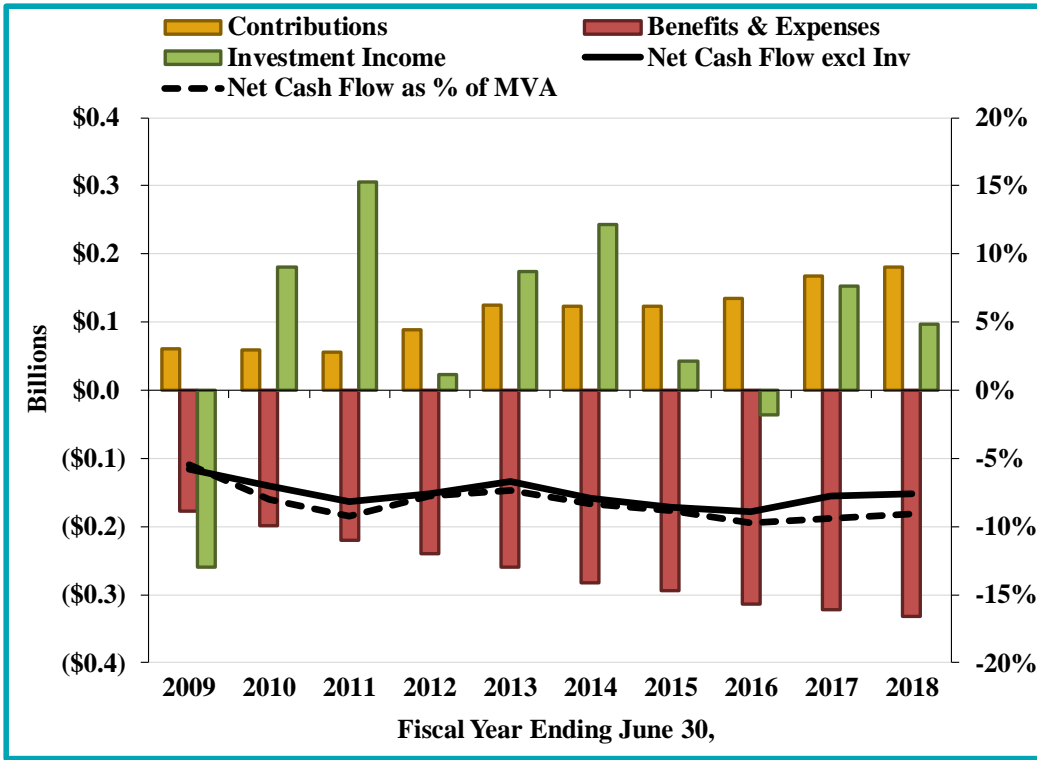
The black dotted line shows the net cash flow as a percent of the market assets and goes with the axis on the right.

The net cash flow for the State has been significantly more negative than the net cash flow for Local employers, and even more disconcerting is that the negative cash flow for the State is greater than the long term investment assumption. By itself this represents a plan that is expected to defund with the risk of insolvency if the contributions do not catch up to cover a higher portion of the benefit payments and expenses.

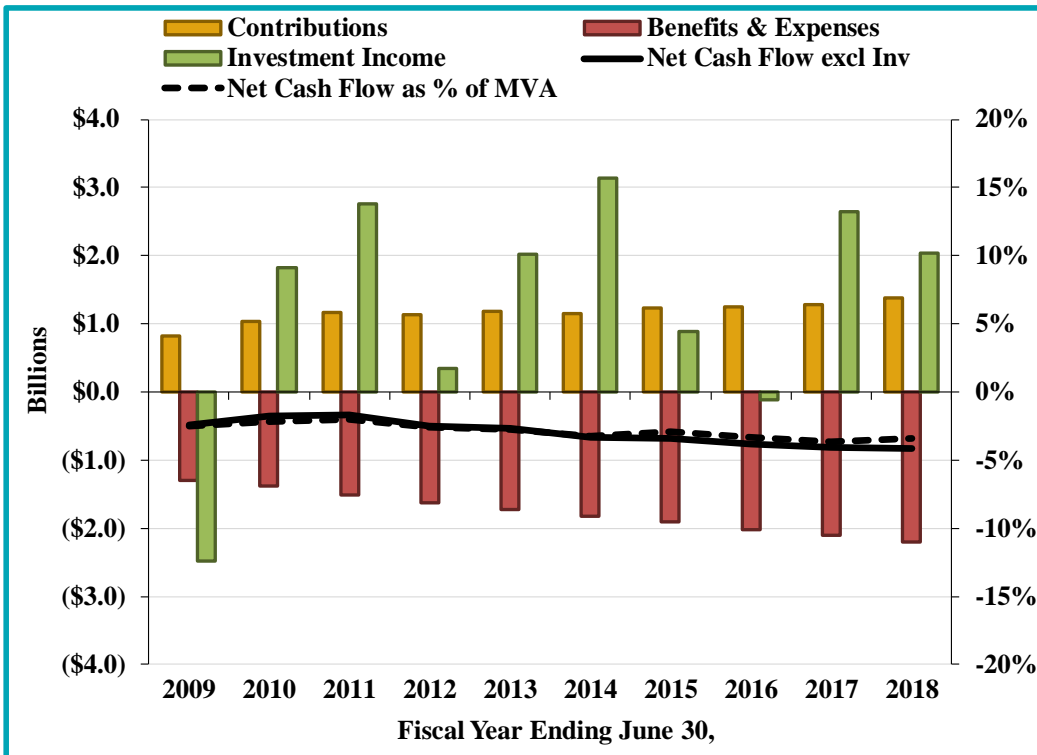
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**State**



**Local Employers**





POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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Contributions

The following graphs show the historical trends for the State and Local employer contributions. The Local employer contributions include the State-paid Local obligations but not Early Retirement Incentive (ERI) or Chapter 19, P.L. 2009 payments. The Statutory contributions are comprised of the normal cost (blue bars) and the amortization of the UAL (gold bars). The green line shows the actual contributions over the period. For FYE 2019 and 2020, the green line has a lighter shade to indicate that these are expected, rather than actual, contributions. The expected contributions are based on the anticipated appropriations shown in Table I-1 and Table I-2.

The red line is the **tread water line**, which is the normal cost plus the interest on the UAL. The tread water line shows the minimum contributions needed to avoid an increase in the UAL from increasing.

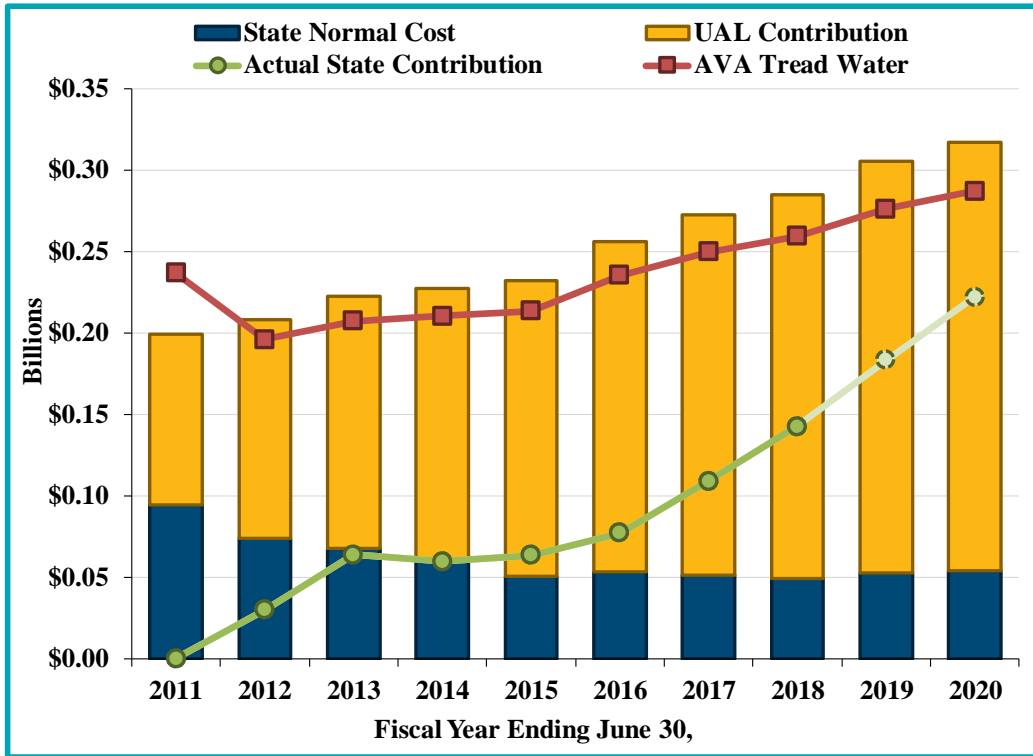
The graph for State shows that not only has the State been making contributions less than required by Statute, but that the State contributions are significantly below the tread water line. When contributions are lower than the normal cost plus interest on the UAL, the unfunded actuarial liability is expected to grow from one year to the next.

The graph for Local employers shows that contributions have been lower than the tread water line for most of the period even though the Local employers have consistently made the Local portion of the Statutory contributions. This was caused by the State contributing less than the full State-paid Local obligations.

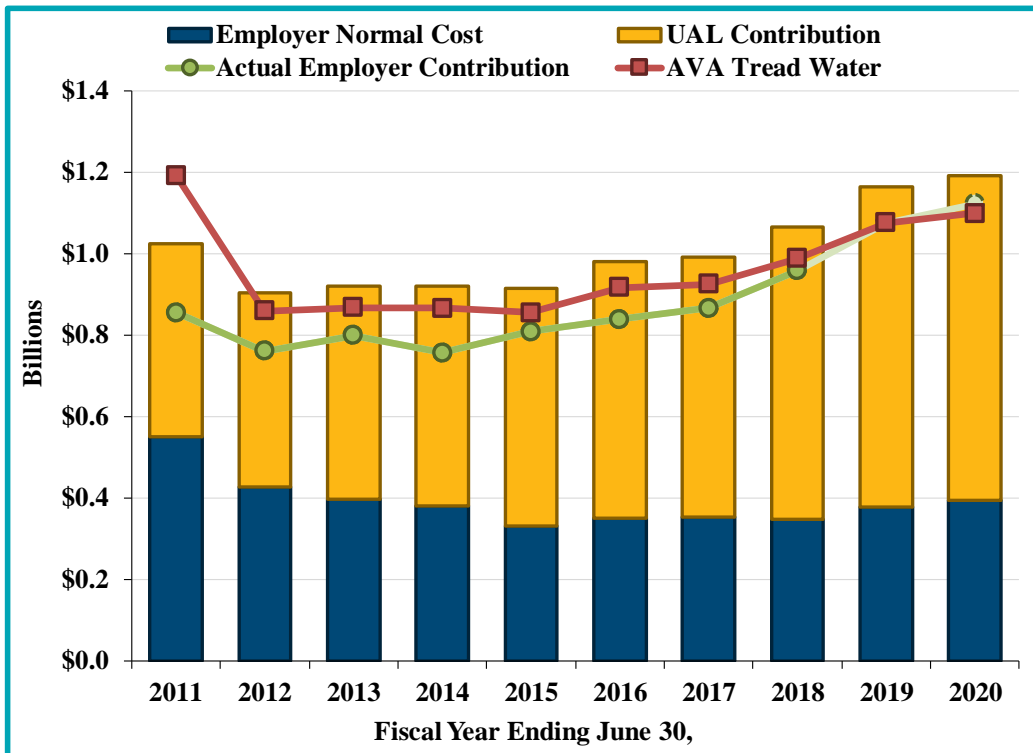
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**State**



**Local Employers**



## SECTION I – BOARD SUMMARY

### Projected Future Outlook

The analysis of projected financial trends is perhaps the most important component of the valuation. This has been recognized by the State Legislature in their adoption of Chapter 277, P. L. 2017 requiring the System to have stress testing performed annually. The charts presented in this section show the expected progress of the System's funded status over the next 30 years, measured in terms of the expected funded ratios and State and Local employer contributions assuming that the System is ongoing.

While experience will not conform exactly to the assumptions every year, the trends reflect reasonable expectations. As a result, in addition to the baseline projection, we provided additional **stress testing** based on varying investment returns in the future. It is our opinion that the stress testing analyses shown in this section meet the requirements of Chapter 277, P. L. 2017.

The projections assume a constant active population. As members retire, terminate and die based on the current valuation assumptions, it is assumed that new members will replace them based on characteristics (age/gender/salary) similar to recent new members.

Additional assumptions used for these projections, including the investment rate of return for each subsequent valuation as recommended by the State Treasurer, as well as the anticipated appropriation percentages, are shown in Appendix B.

#### Baseline Scenario

The baseline projection shows the outcome if all actuarial assumptions, including the ultimate long-term rate of return assumption of 7.00%, as recommended by the State Treasurer, are exactly met. For each scenario we show two graphs.

The top graph compares the Market Value of Assets (green line) and the Actuarial or smoothed Value of Assets (gold line) to the System's Actuarial Liabilities (gray bars). For the State, the graph also shows the Actuarial Value of Assets plus the Special Asset Value (blue line). In addition, at the top of the graph, we show the System's funded ratio on an Actuarial Value of Assets basis (ratio of Actuarial Value of Assets to Actuarial Liabilities). The years shown in the graph signify the valuation date as of July 1 of the labeled year.

The State's funded ratio on an Actuarial Value of Assets basis is projected to drop slightly over the next few years, as the State appropriates less than the Statutory amount and the valuation investment rate of return assumption gradually decreases from 7.50% to 7.00%, before beginning a slow but steady increase to 97% by 2048.

The Local employers' funded ratio on an Actuarial Value of Assets basis is also projected to drop slightly over the next few years, as the State appropriates less than the Statutory State-paid Local obligation and the valuation investment rate of return assumption gradually decreases from 7.50% to 7.00%, before beginning a slow but steady increase to 93% by 2048.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY**  
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The funded ratio for State increases faster than the Local employers' portion and reaches 97% compared to 93% for Local employers by the end of the projection period because of the expected lottery revenue that is contributed each year in excess of the Statutory contributions. This additional revenue helps pay down the UAL sooner for the State portion.

The bottom graph shows the contributions by fiscal year. The member contributions are in purple, the State contributions are in gold, the State-paid Local contributions are in light blue and Local employers' contributions are in green. We also show the contributions in dollar amounts.

The gold and green outlines show the full Statutory contributions for the State and Local employers, respectively, with the shaded portion showing the anticipated appropriated amount.

Lottery revenue is outlined in blue. Lottery revenue amounts shaded gold are offsets to Statutory contributions. Lottery revenue amounts shaded white are additional contributions in excess of the Statutory contributions that pay down the UAL. The lottery revenue through FYE 2022 largely offsets the Statutory contribution while lottery amounts after that are additional payments toward the UAL.

The projection assumes the State appropriates 70% of the Statutory contribution in FYE 2020, and increases the percent by 10% a year, until reaching 100% of the Statutory contribution beginning with FYE 2023. The appropriated State and Local employer contributions and the member contributions are shown in dollar amounts.

The dashed black line in the bottom chart shows the gross normal cost. The difference between the dashed black line and the purple bar is the State and Local employers' portion of the normal cost.

The solid black line is the tread water line based on the Actuarial Value of Assets. Because the tread water metric equals the normal cost plus interest on the UAL, the difference between the solid black line and the dashed black line is the interest on the UAL. When contributions fall below the solid black line, as is the case through FYE 2021 for State, the UAL grows and the funded ratio falls. When the contributions exceed the solid line, as is the case beginning in FYE 2022 for State and in all years for Local employers, the UAL decreases and the funded ratio increases.

The Statutory State contributions increase steadily through FYE 2023 as the State appropriates less than the Statutory amount and the valuation investment rate of return assumption gradually decreases from 7.50% to 7.00%. Thereafter, the Statutory contributions gradually increase. Once the appropriated amount equals the Statutory contribution, beginning in FYE 2023, the contributions reach the level necessary to pay down the UAL and the tread water line begins to decrease relative to the Statutory contribution.

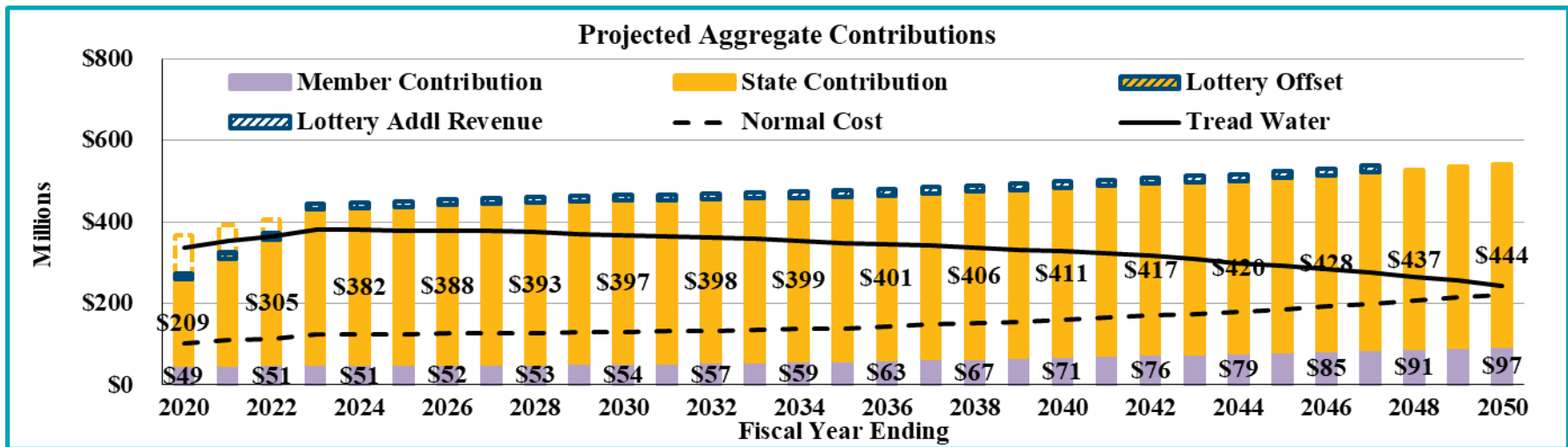
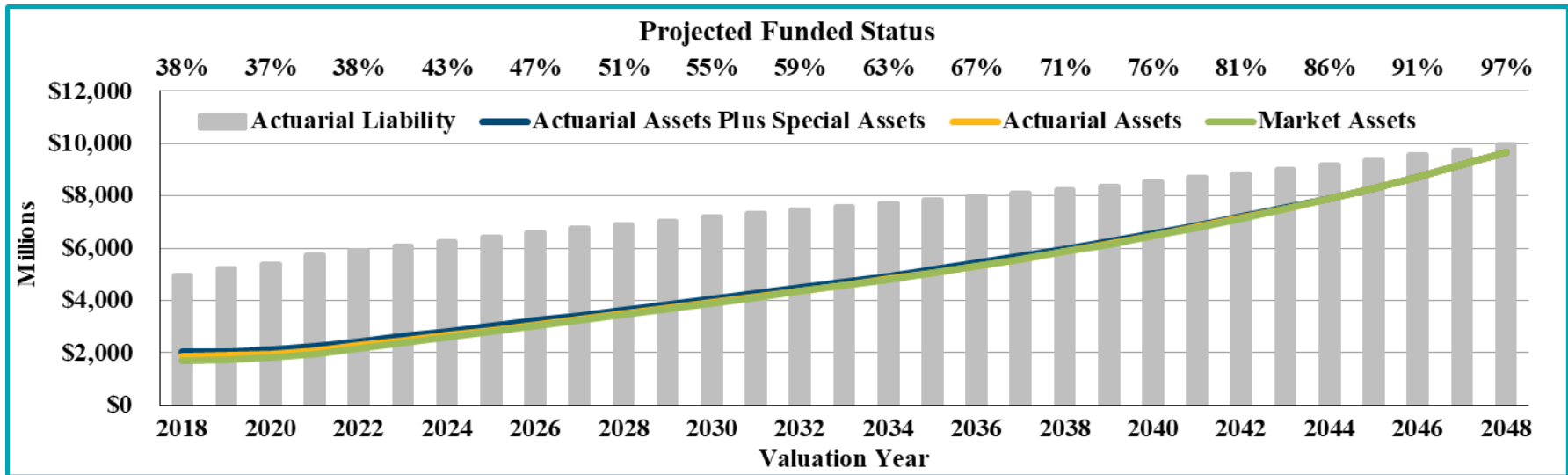
The Local employers' contributions increase steadily through FYE 2023 as the State appropriates less than the Statutory State-paid Local obligation and the valuation investment rate of return assumption gradually decreases from 7.50% to 7.00%. Thereafter, the Local employers' and the State-paid Local contributions gradually increase.

POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

SECTION I – BOARD SUMMARY

Baseline: 7.0% return for all years

State

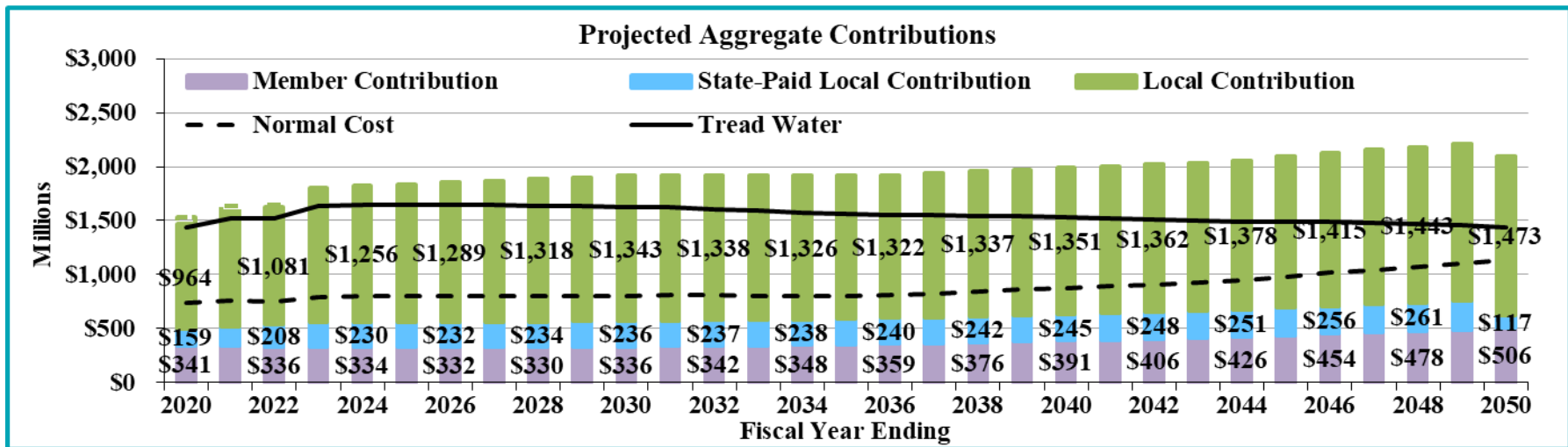
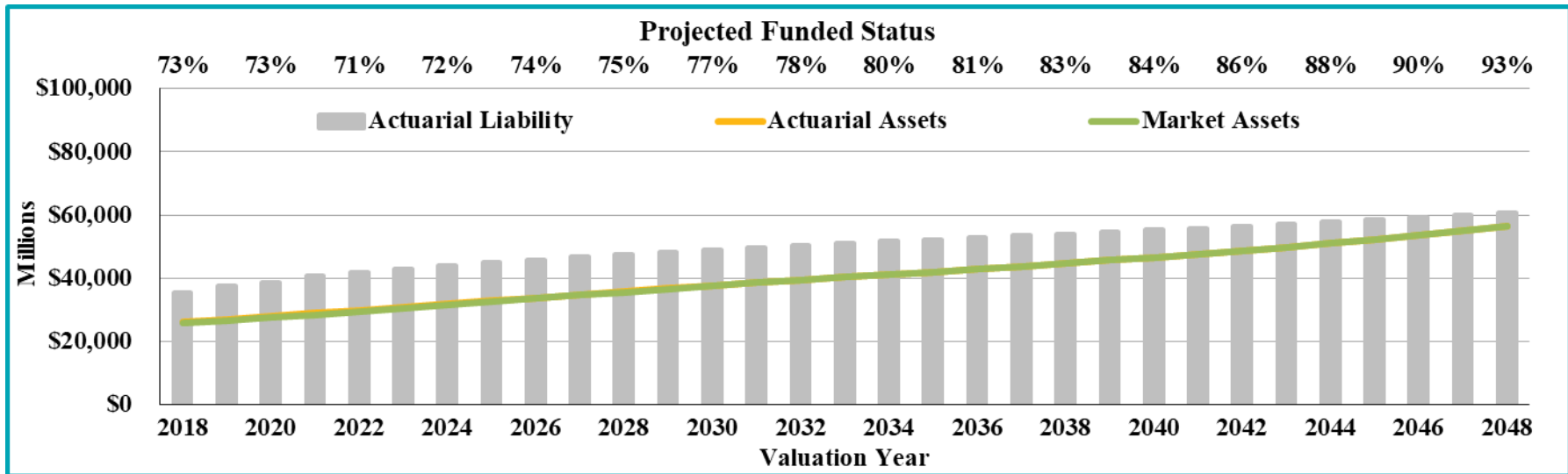


**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION I – BOARD SUMMARY**

**Baseline: 7.0% return for all years**

**Local Employers**



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

Stress Testing

The Baseline projections shown on the previous pages assume all assumptions are met each and every year in the future. We know that will not be the case. We developed six hypothetical scenarios to illustrate the impact actual investment returns may have on future funded status and contribution amounts. The scenarios are balanced between positive and negative scenarios and are based on a lognormal distribution of one and five year expected returns as shown in the table below using the capital market assumptions from the New Jersey Division of Investments (Geometric return of 7.14%, standard deviation of 12.27%).

<b>Distribution of Expected Average Annual Returns</b>		
<b>Percentile</b>	<b>1 Year</b>	<b>5 Year</b>
5%	-11.1%	-1.4%
25%	-0.8%	3.5%
50%	7.1%	7.1%
75%	15.7%	10.9%
95%	29.1%	16.5%

The scenarios include: a one-year shock using the 5th and 95th percentile returns for one year; a 5-year moderate scenario using the 25th and 75th percentile returns for five years; and a 5-year significant scenario using the 5th and 95th percentile returns for five years. The table below summarizes the theoretical scenarios.

<b>FYE</b>	<b>Theoretical Scenarios</b>					
	<b>1-Yr Shock</b>		<b>5-Yr Moderate</b>		<b>5-Yr Significant</b>	
	<b>Neg</b>	<b>Pos</b>	<b>Neg</b>	<b>Pos</b>	<b>Neg</b>	<b>Pos</b>
2019	-11.1%	29.1%	3.5%	10.9%	-1.4%	16.5%
2020	7.0%	7.0%	3.5%	10.9%	-1.4%	16.5%
2021	7.0%	7.0%	3.5%	10.9%	-1.4%	16.5%
2022	7.0%	7.0%	3.5%	10.9%	-1.4%	16.5%
2023	7.0%	7.0%	3.5%	10.9%	-1.4%	16.5%
2024+	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%

In reviewing each of these projections, it is the future trends, not necessarily the actual values that are important to observe in consideration of the risks of the System and the potential volatility of future funded ratios and Statutory contribution levels.

We note that when asset returns are really high, excess assets may be used to offset employer costs. We have not shown the implications of a surplus and assume that the State and Local employers will always contribute the normal cost.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

The graphs on the following pages show the projections under each of these theoretical scenarios. Instead of the tread water line shown for the baseline projection, the contribution graphs include a dashed red line representing the expected contributions under the baseline projections to facilitate the comparison between the particular scenario and the baseline projections assuming all assumptions are met.

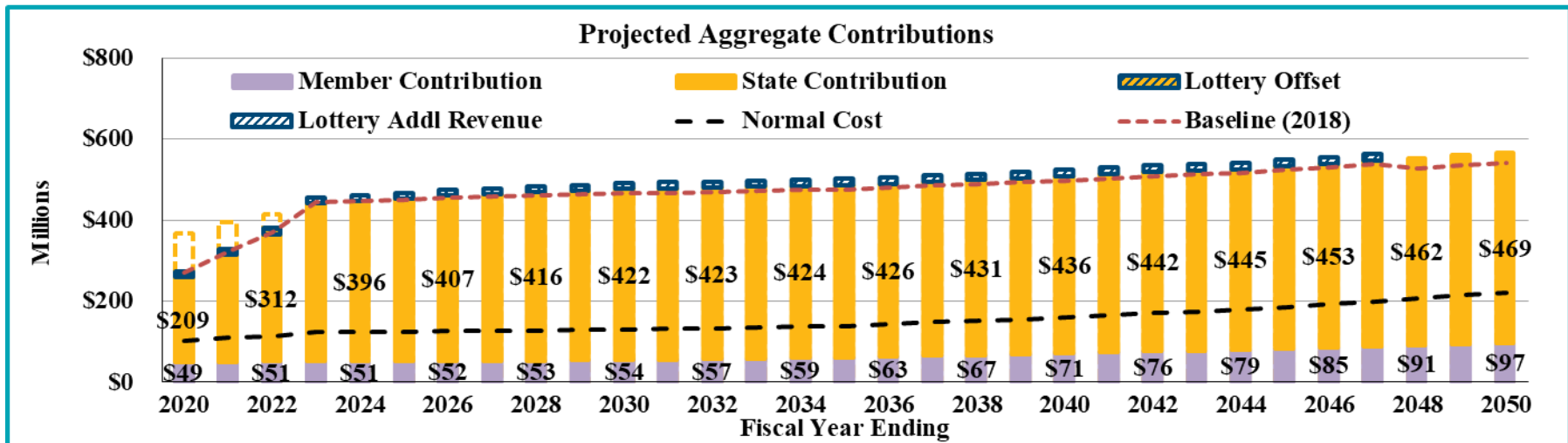
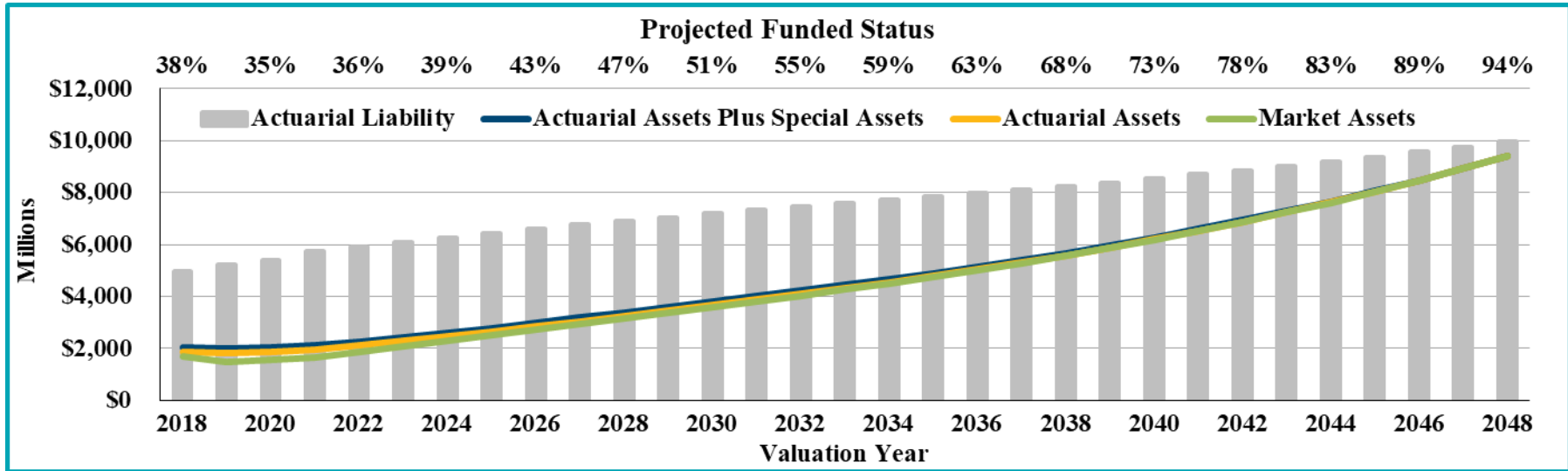
The contributions for Local employers are clearly more sensitive to the investment returns. This is caused by the funded status at the beginning of the projection period. The State is less well funded and, as a result, has less to gain or lose from positive or negative investment experience.



POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

SECTION I – BOARD SUMMARY

One-Year Negative Shock Scenario: -11.1% return FYE 2019, 7.0% after  
 State

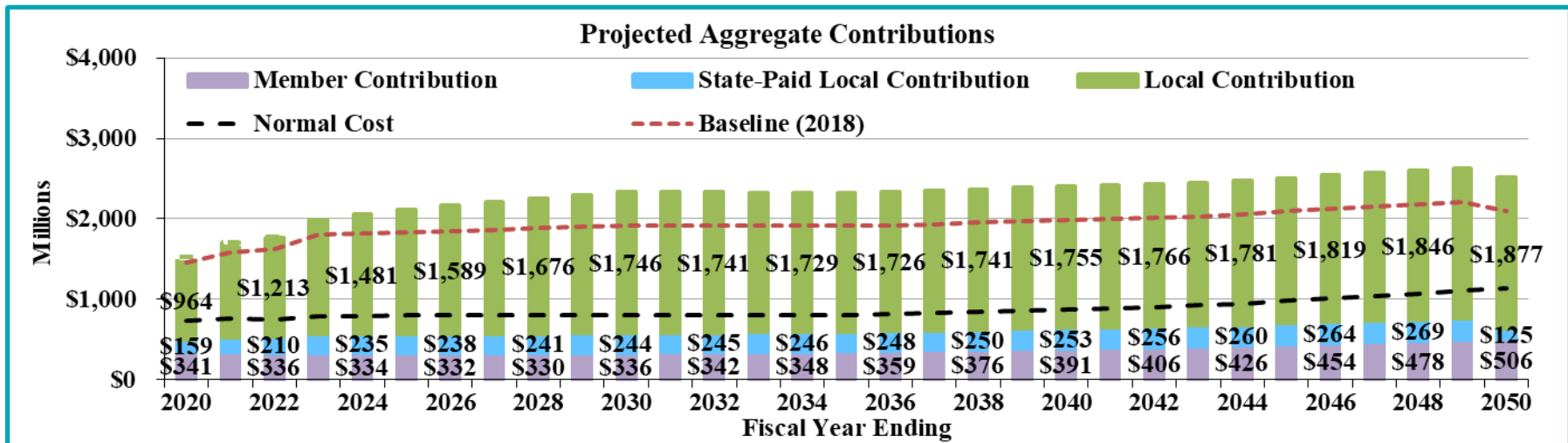
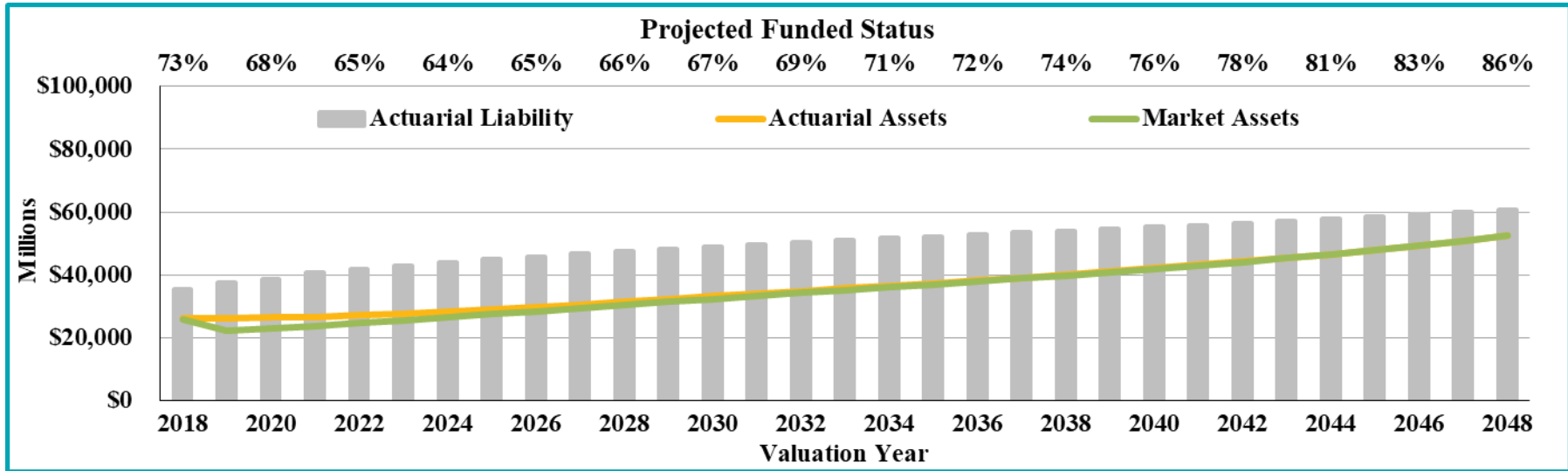


**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION I – BOARD SUMMARY**

**One-Year Negative Shock Scenario: -11.1% return FYE 2019, 7.0% after**

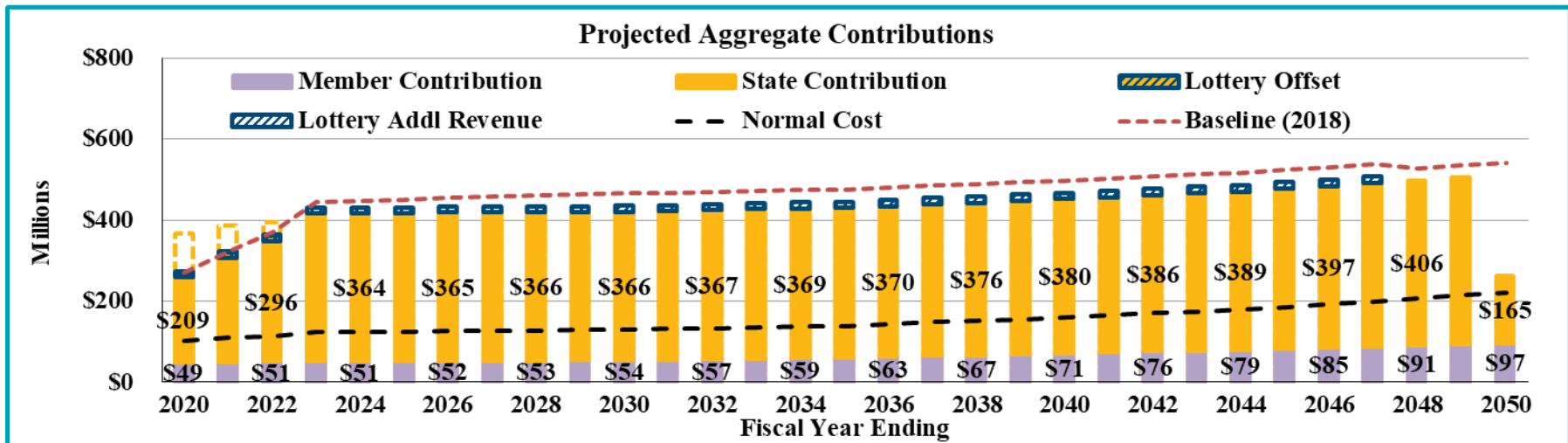
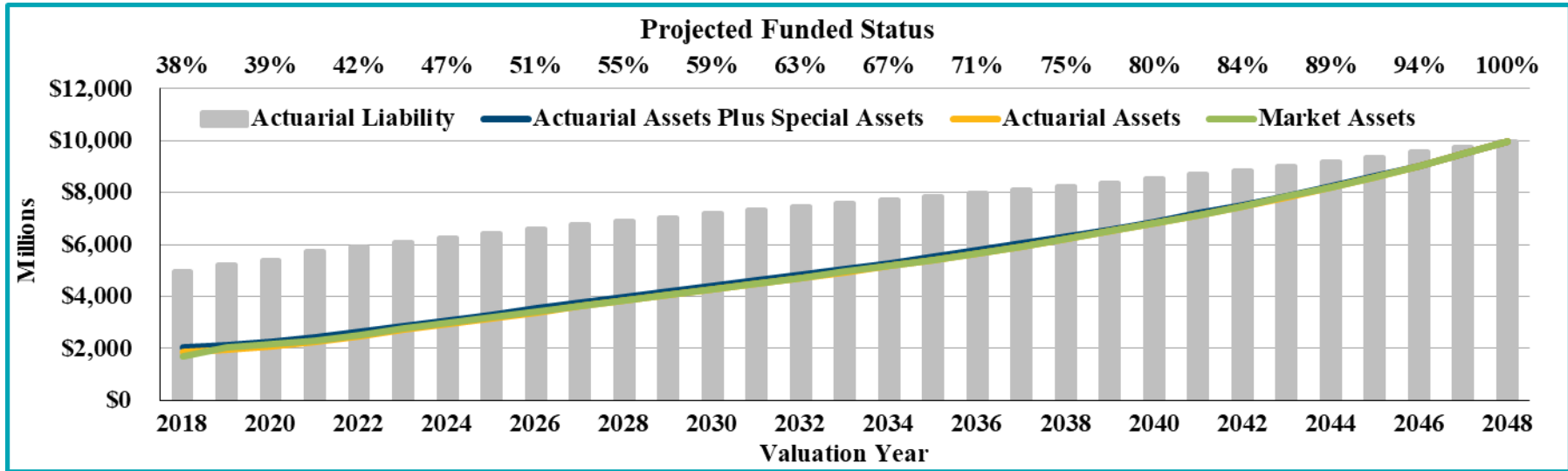
**Local Employers**



POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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SECTION I – BOARD SUMMARY

One-Year Positive Shock Scenario: 29.1% return FYE 2019, 7.0% after  
 State

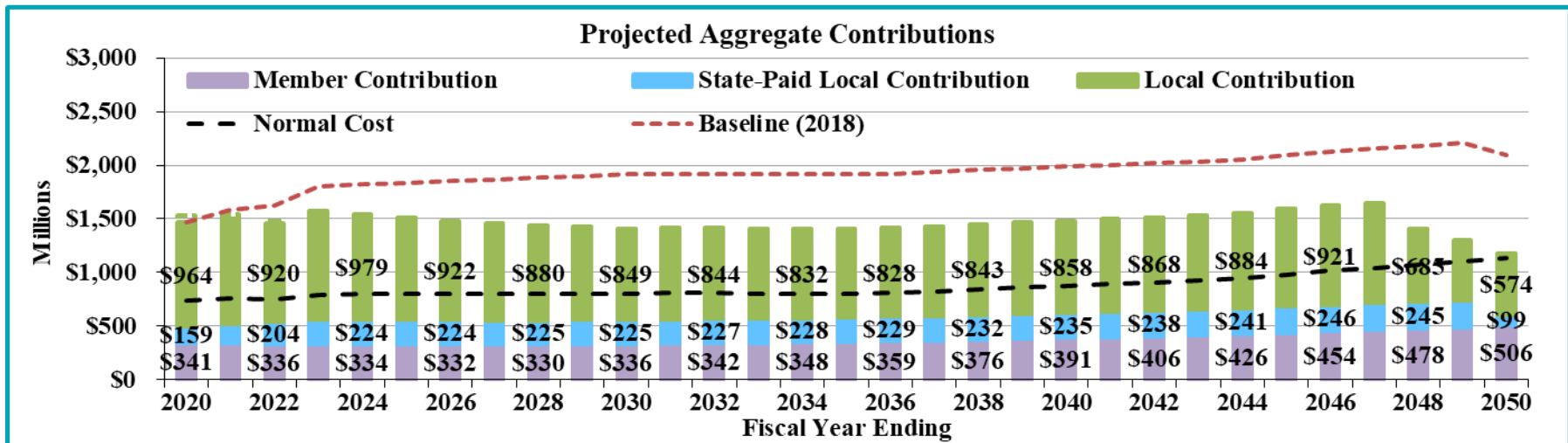
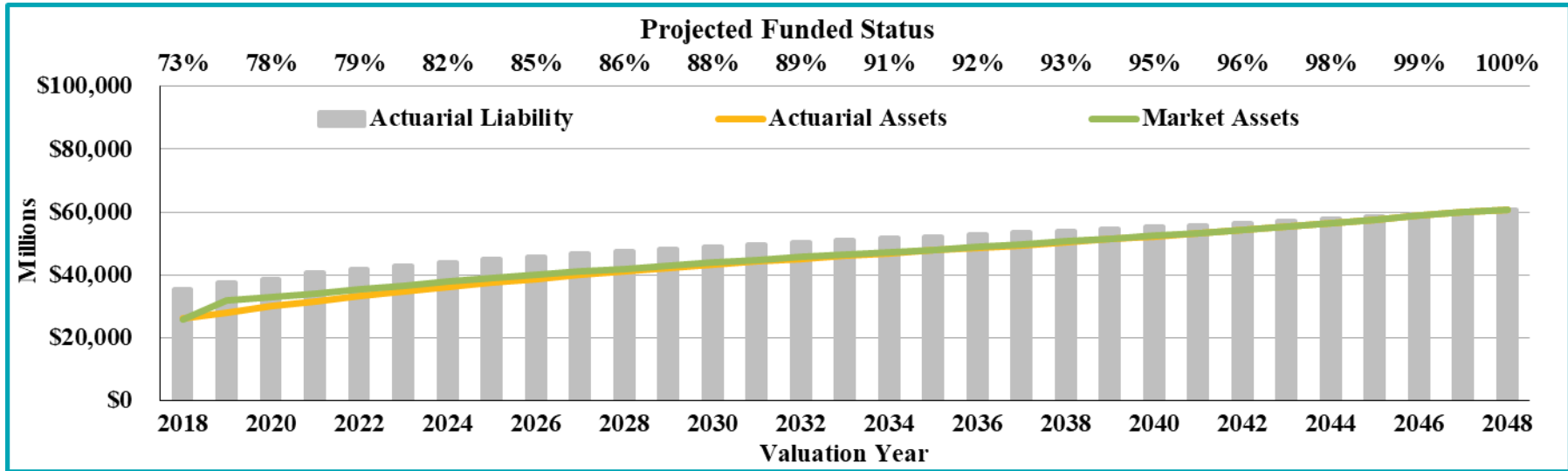


POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

SECTION I – BOARD SUMMARY

One-Year Positive Shock Scenario: 29.1% return FYE 2019, 7.0% after

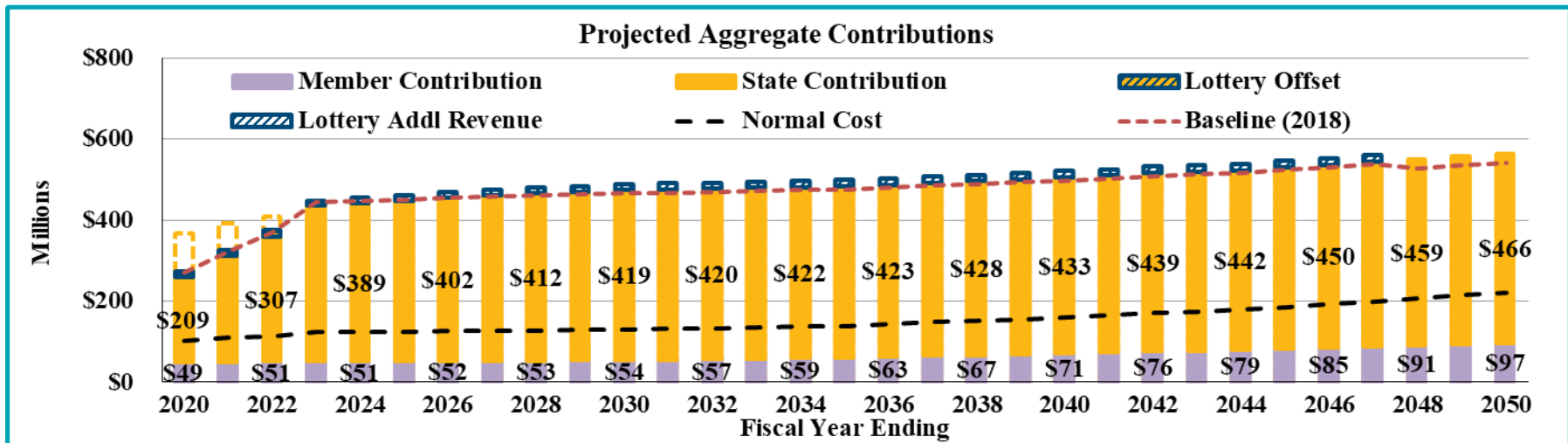
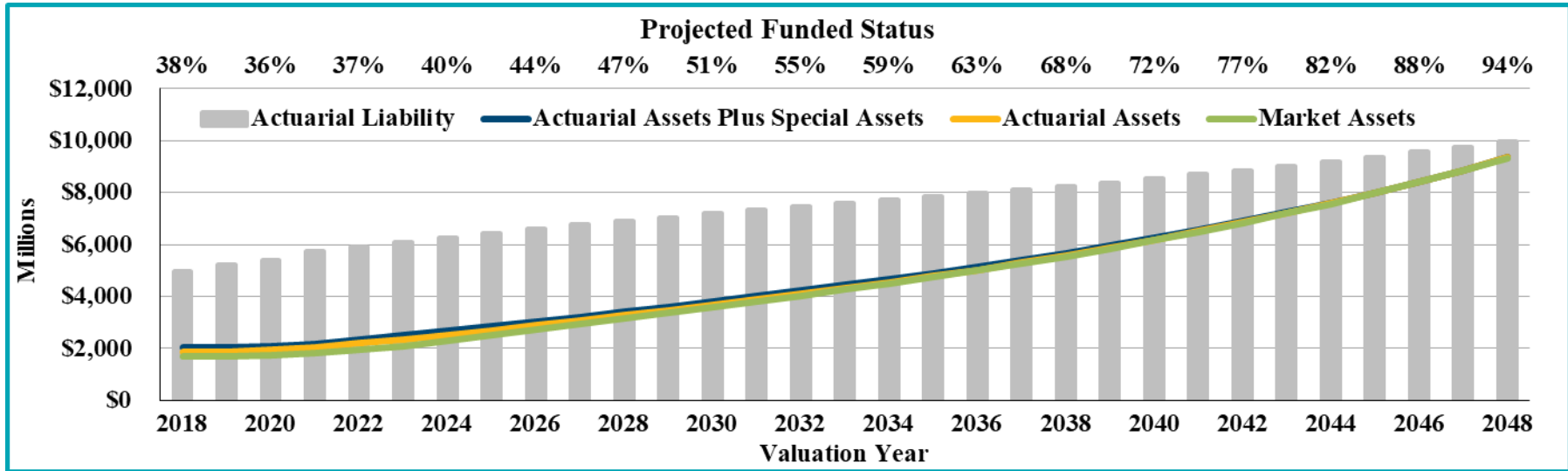
Local Employers



POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

SECTION I – BOARD SUMMARY

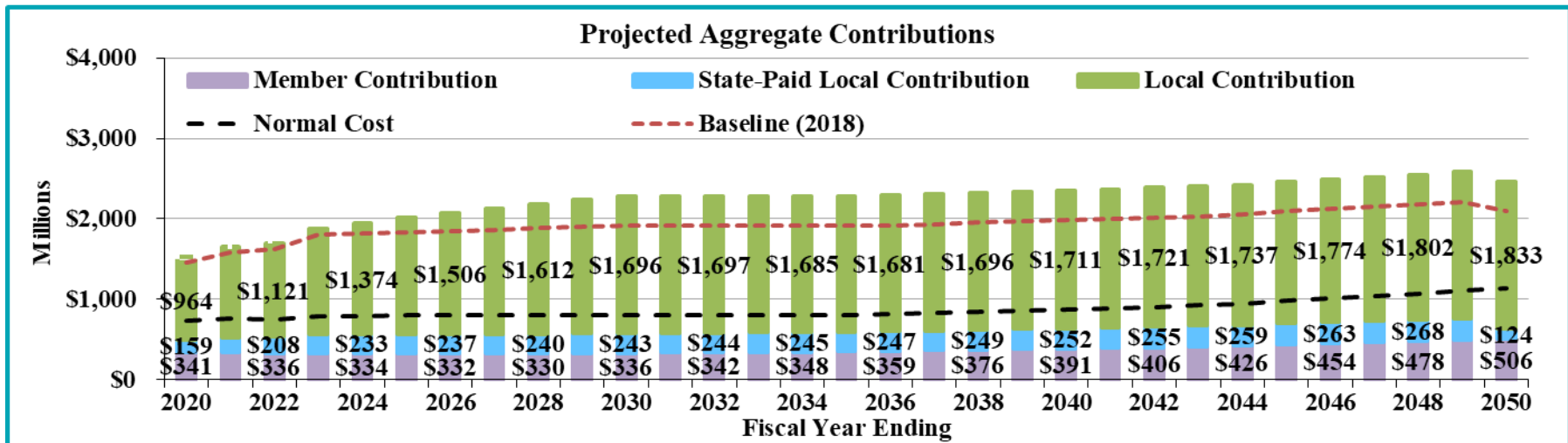
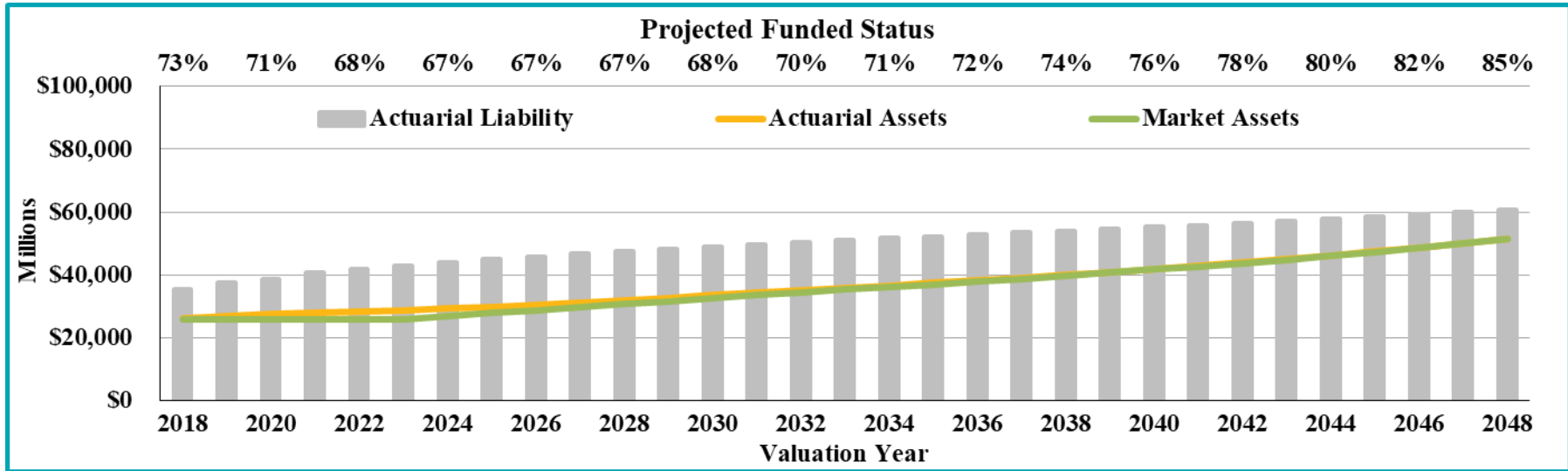
Five-Year Moderate Negative Scenario: 3.5% return FYE 2019-2023, 7.0% after  
 State



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

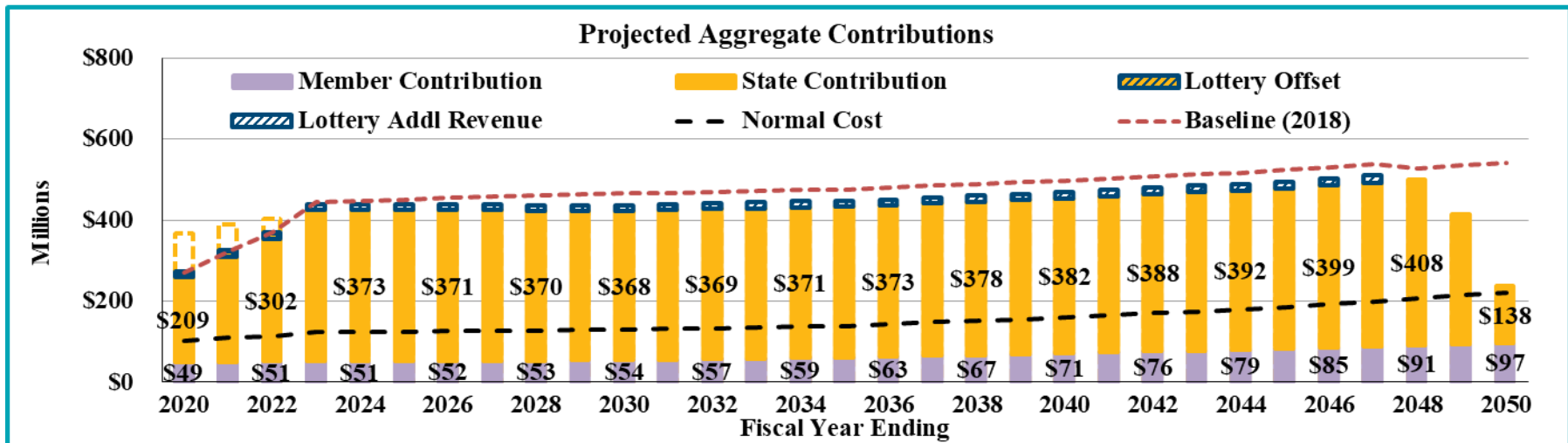
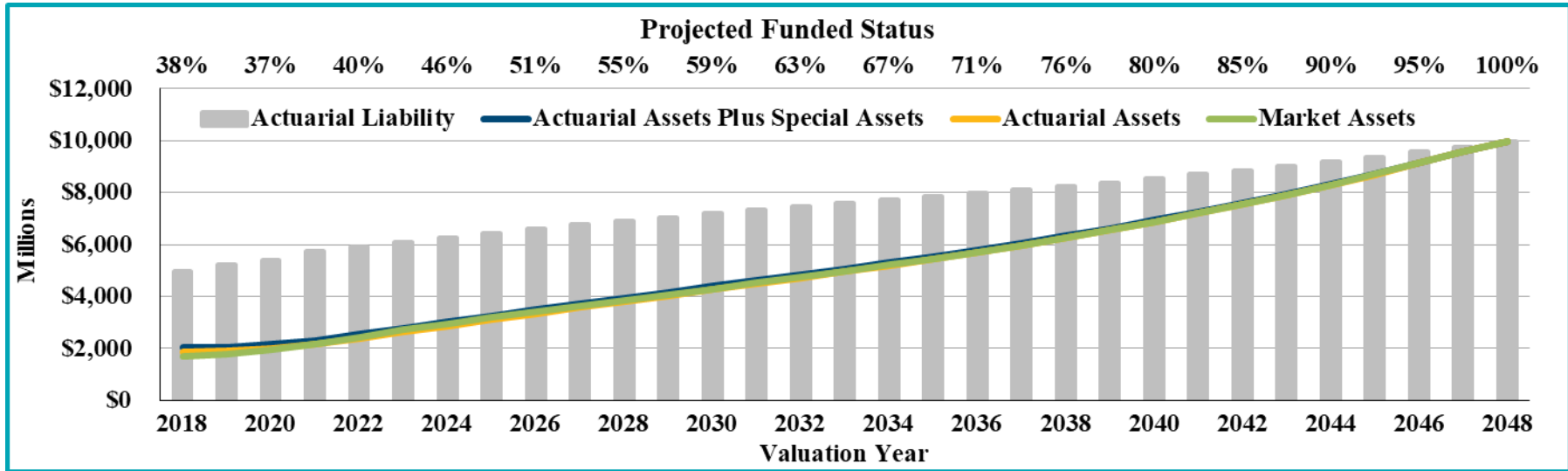
**Five-Year Moderate Negative Scenario: 3.5% return FYE 2019-2023, 7.0% after  
Local Employers**



POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

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Five-Year Moderate Positive Scenario: 10.9% return FYE 2019-2023, 7.0% after  
 State

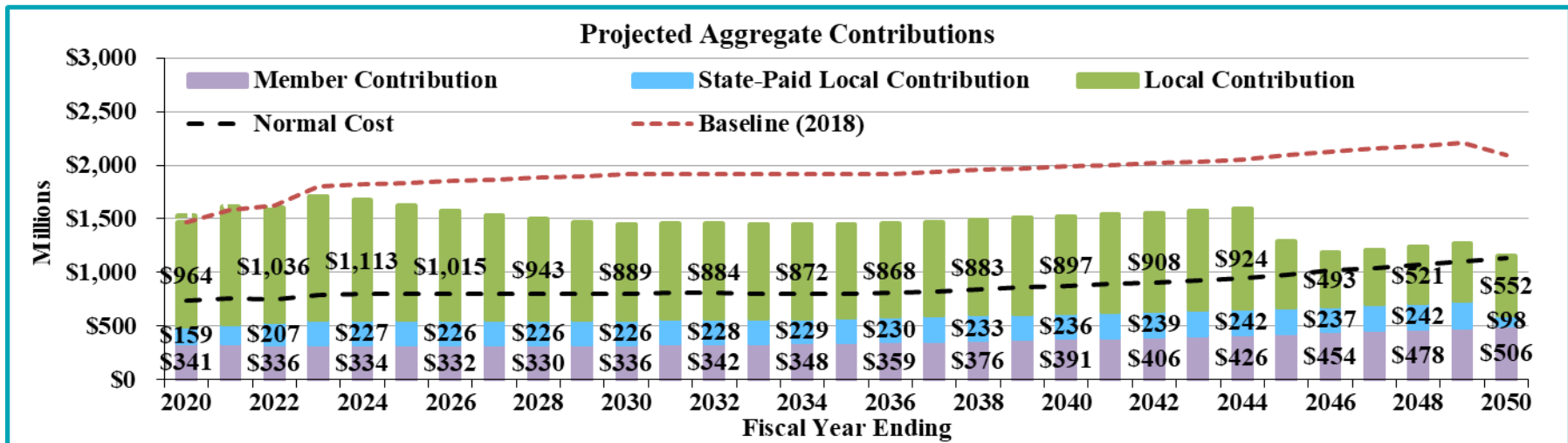
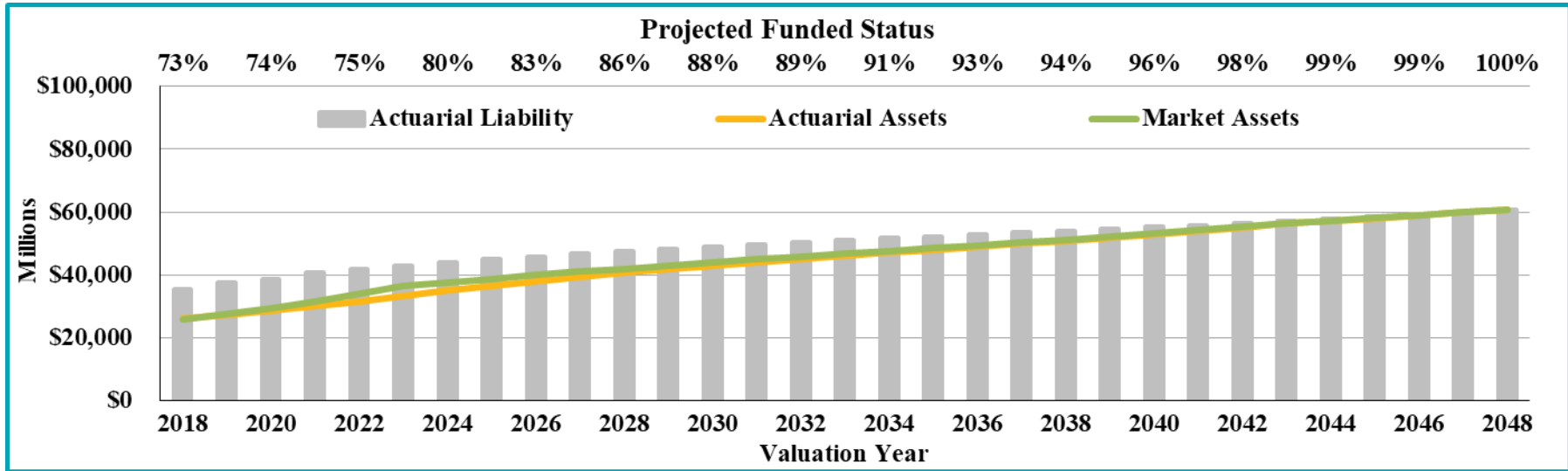




**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

**Five-Year Moderate Positive Scenario: 10.9% return FYE 2019-2023, 7.0% after  
Local Employers**

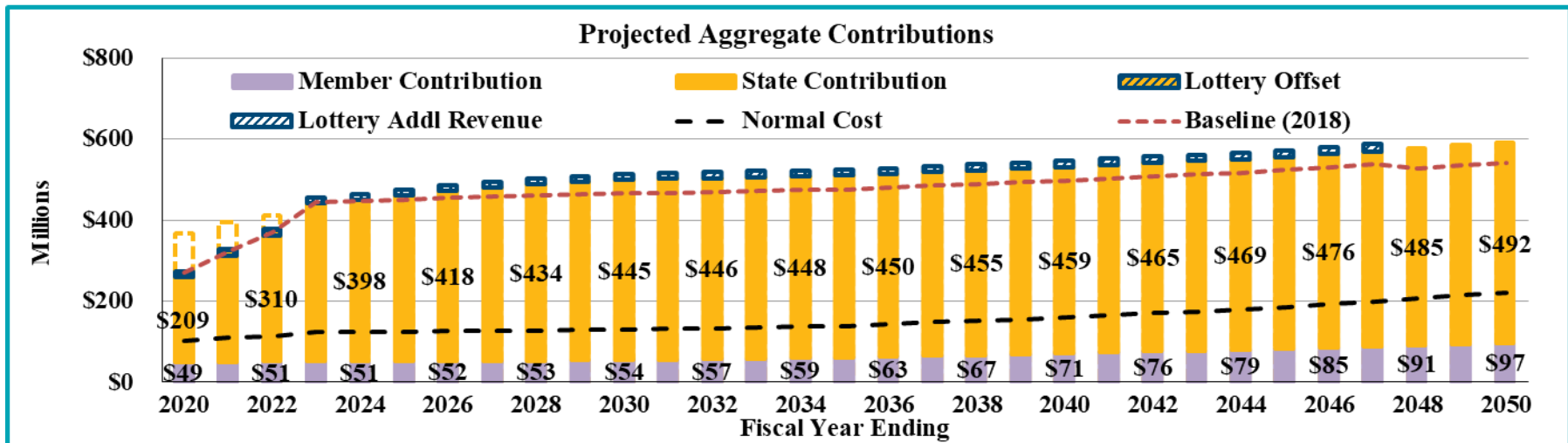
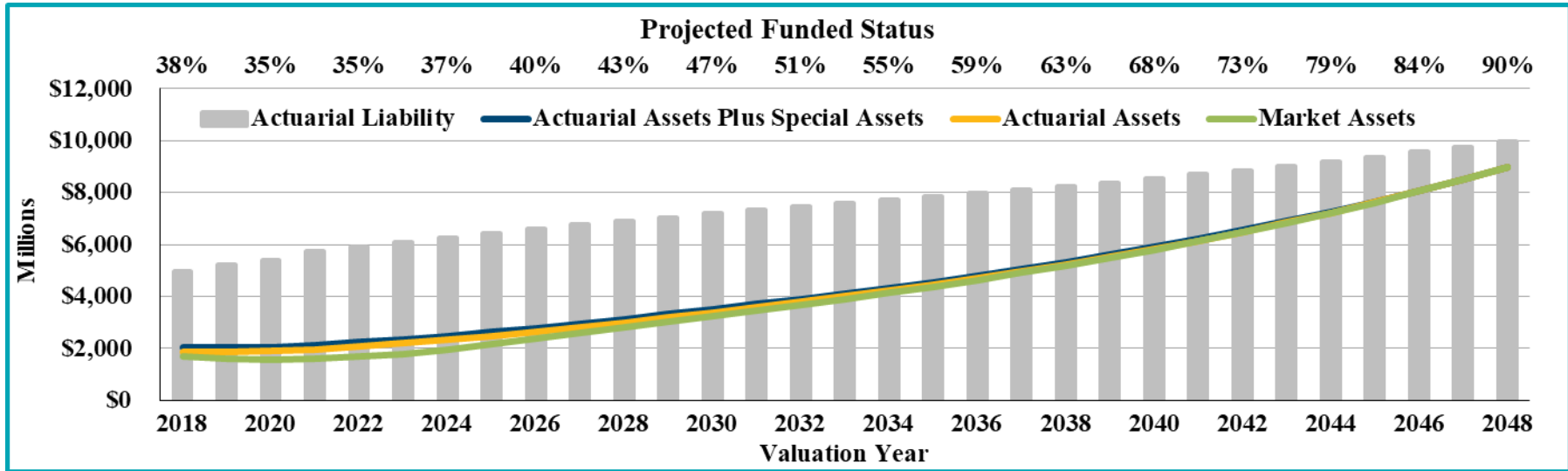




**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

**Five-Year Significant Negative Scenario: -1.4% return FYE 2019-2023, 7.0% after  
State**

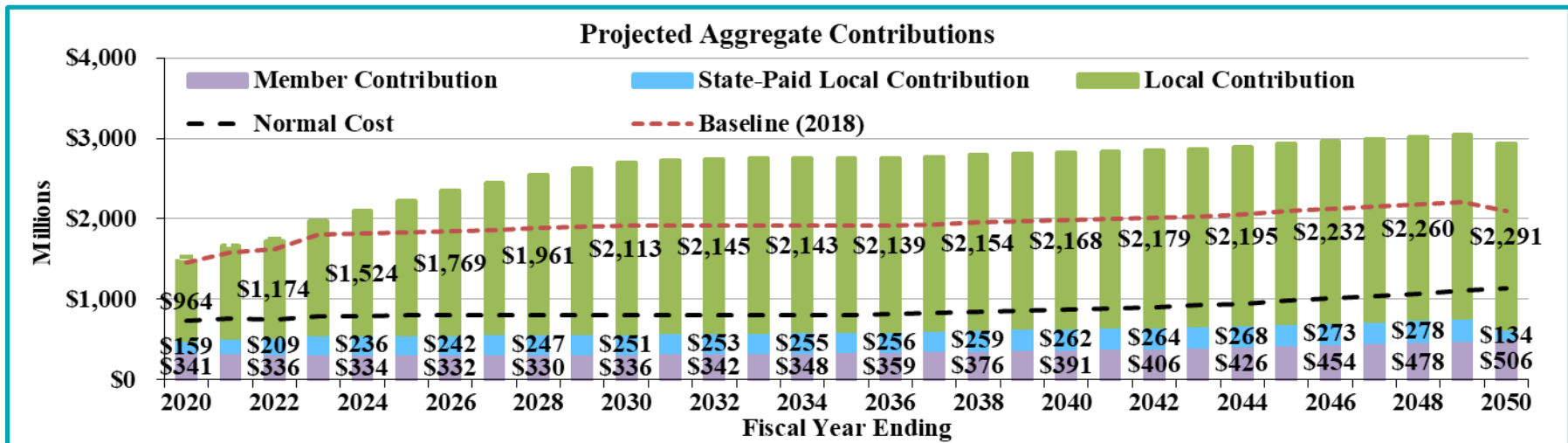
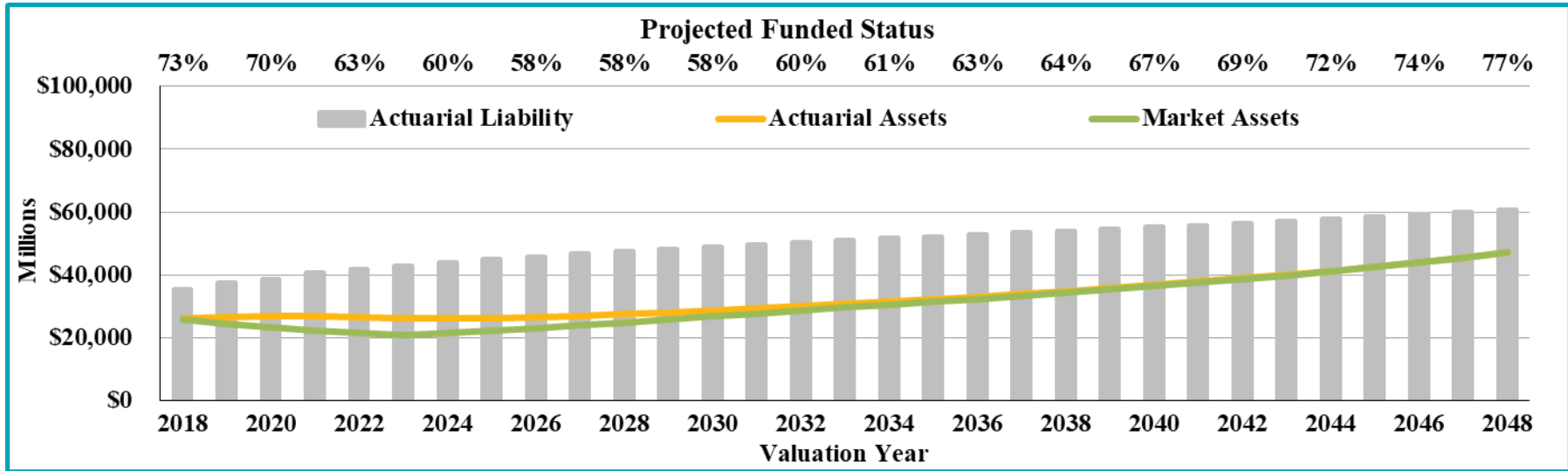


**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION I – BOARD SUMMARY**

**Five-Year Significant Negative Scenario: -1.4% return FYE 2019-2023, 7.0% after**

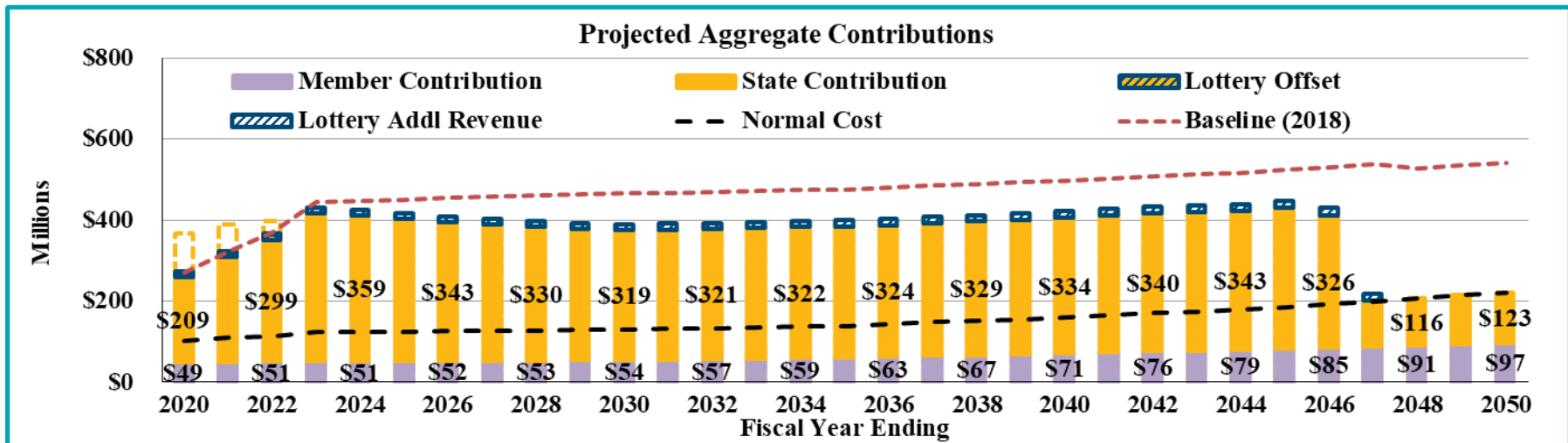
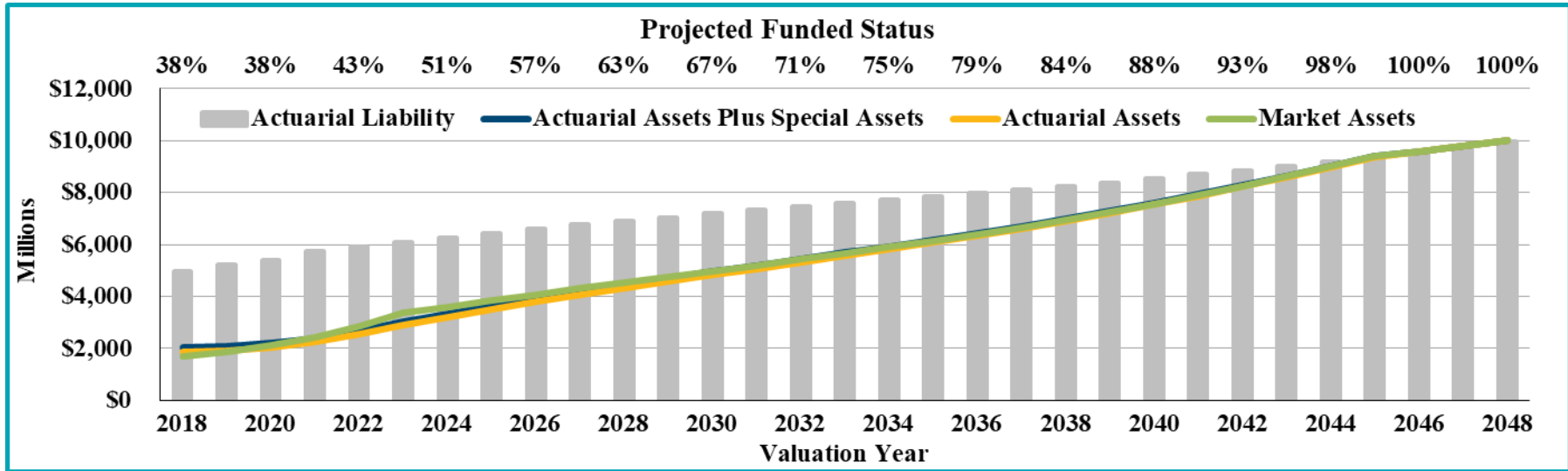
**Local Employers**



POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
 JULY 1, 2018 ACTUARIAL VALUATION

SECTION I – BOARD SUMMARY

Five-Year Significant Positive Scenario: 16.5% return FYE 2019-2023, 7.0% after  
 State

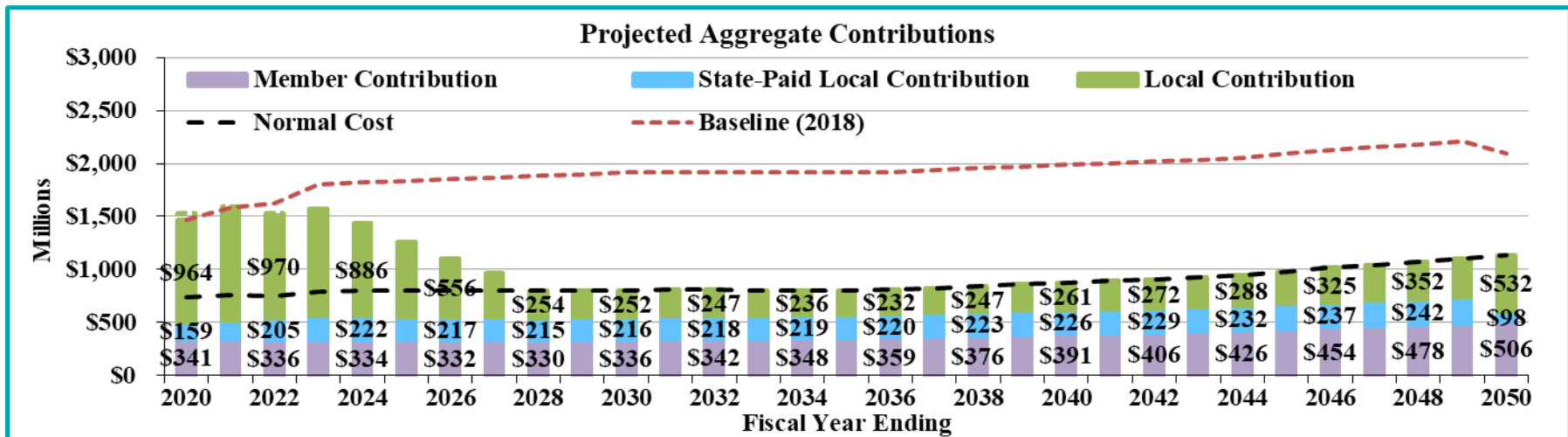
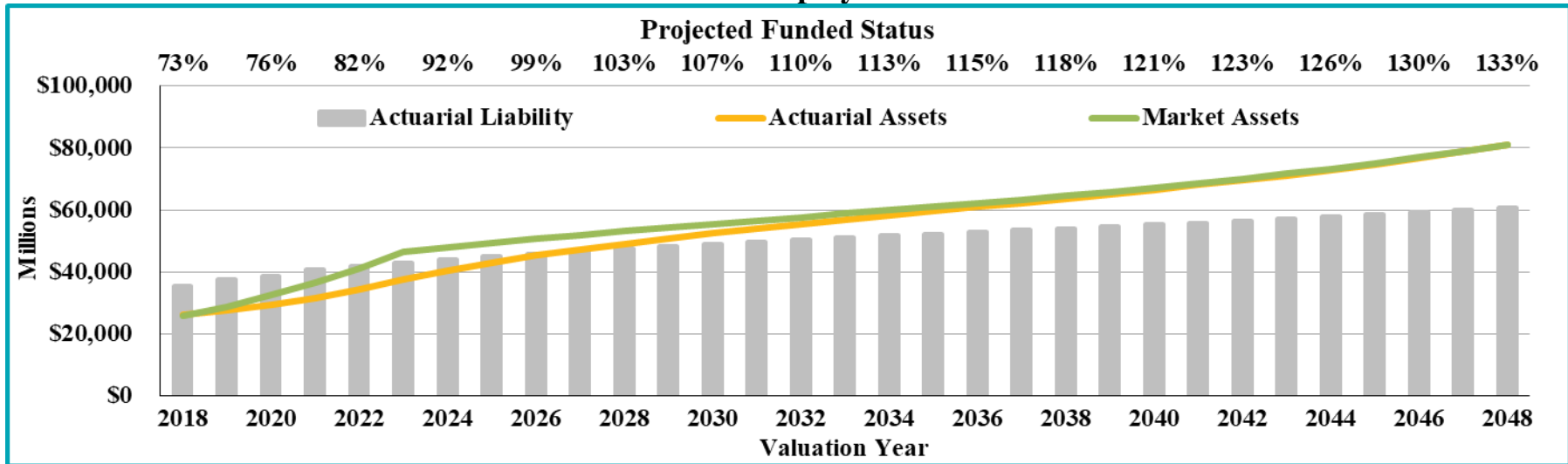


POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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Five-Year Significant Positive Scenario: 16.5% return FYE 2019-2023, 7.0% after

Local Employers



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION II – ASSETS**

The System uses and discloses two different asset measurements for funding, both of which are presented in this section of the report: market value and actuarial value of assets. The market value represents the value of the assets if they were liquidated on the valuation date. The actuarial value of assets is a value that smooths annual investment returns to reduce investment volatility and is used in determining contribution levels. In compliance with New Jersey Statute, the method used to calculate the actuarial value of assets recognizes 20% of the difference between the market value of assets and the expected actuarial value of assets each year.

Actuarial Standards of Practice (ASOP) No. 44 states that the asset valuation method should produce an actuarial value of assets that falls within a reasonable range of market value, recognizes the difference between the market value and actuarial value of assets within a reasonably short period of time, and is likely to produce actuarial value of assets that are sometimes greater than and sometimes less than the corresponding market values. The asset method required under N. J. Statute does not meet the requirements of ASOP No. 44 because this method has produced actuarial value of assets which have consistently been greater than the market value of assets and recognizes investment losses slowly over time. Additionally, the method may produce an actuarial value of assets that falls outside of a reasonable range of the market value.

On the following pages, we present detailed information on the System's assets:

- Disclosure of assets at July 1, 2017 and July 1, 2018,
- Statement of cash flows during the year,
- Development of the actuarial value of assets,
- Disclosure of investment performance for the year,
- Development of the Special Asset Value (SAV), and
- Development of the Actuarial Balance Sheet.

**Disclosure**

The market value of assets represents a “snap-shot” value as of the last day of the fiscal year that provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the value of the investments. Because these fluctuations would cause volatility in employer contributions, an actuarial value of assets is developed. Table II-1 on the following page presents the market value as of June 30, 2017 and June 30, 2018. Table II-2 presents the System's net cash flows from June 30, 2017 to June 30, 2018. Table II-3 presents the development of the Actuarial Value of Assets as of July 1, 2018.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION II – ASSETS**

Table II-1 Statement of Assets at Market Value		
	June 30, 2018	June 30, 2017
<b>Assets</b>		
Cash	\$ 205,366,800	\$ 196,682,671
Investment Holdings	24,504,008,331	23,300,044,539
Employers' Contributions Receivable - Chapter 19	102,125,815	116,220,660
Employers' Contributions Receivable - NCGI State	402,917	175,516
Employers' Contributions Receivable - NCGI Local Employers	37,169,598	35,809,000
Employers' Contributions Receivable - Common L	996,000	0
Employers' Contributions Receivable - Local Employers	941,418,361	866,023,765
Employers' Contributions Receivable - Local Employers ERI	9,867,107	11,404,276
Employers' Contributions Receivable - Retroactive Contributions	2,931,470	2,416,025
Employers' Contributions Receivable - Delayed Enrollments	81,498	138,968
Employers' Contributions Receivable - Delayed Appropriations	451,667	685,273
Members' Contributions Receivable	51,866,967	51,842,902
Accrued Interest on Investments	3,874,133	4,201,001
Accounts Receivable - Other	9,387,201	7,178,418
New Jersey Mortgage Receivable	1,180,450,049	1,158,968,103
Loans Receivable	264,425,125	299,529,474
Interest Receivable on Loans	3,765,857	3,788,168
Securities Lending Collateral	267,551,678	295,395,064
<b>Total Assets</b>	<b>\$ 27,586,140,574</b>	<b>\$ 26,350,503,823</b>
<b>Liabilities</b>		
Pension Payroll Payable	\$ (165,093,868)	\$ (153,979,191)
Pension Adjustment Payroll Payable	(16,359,011)	(16,875,609)
Withholdings Payable	(26,951,157)	(25,884,831)
Death Benefits Payable	(4,499,140)	(3,288,170)
Securities Lending Collateral & Rebates Payable	(267,544,086)	(295,307,869)
Administrative Expenses Payable	(437,834)	(1,460,768)
Accounts Payable - Other	(6,699,378)	(5,988,986)
<b>Total Liabilities</b>	<b>\$ (487,584,474)</b>	<b>\$ (502,785,424)</b>
<b>Preliminary Market Value of Assets</b>	<b>\$ 27,098,556,100</b>	<b>\$ 25,847,718,399</b>
<b>Discounted Receivables</b>		
Expected Lottery Revenue	\$ 12,009,059	\$ 11,585,133
State Appropriations	291,951,169	228,911,867
<b>Adjustments to June 30, 2018 Financial Report</b>		
Discounting of Local Employers Appropriations Receivable	(49,659,239)	(44,840,077)
Discounting of Local Employers ERI Contributions Receivable	(41,249)	(1,537,169)
True-up of Present Value of Chapter 19, P.L. 2009		
Contributions Receivable	49,646,687	24,366,507
Exclusion of Reserve for Non-Contributory Group Insurance	(38,672,685)	(34,659,280)
<b>Market Value of Assets</b>	<b>\$ 27,363,789,842</b>	<b>\$ 26,031,545,380</b>

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION II – ASSETS**

**System Cash Flows as of June 30, 2018**

Table II-2 Changes in Market Values for FYE June 30, 2018			
	State	Local Employers	Total
<b>Additions</b>			
Contributions			
Member Contributions	\$ 49,052,970	\$ 346,551,913	\$ 395,604,883
Member Transfer Contributions	1,040,386	2,196,724	3,237,110
State and Local Appropriations	130,589,000	940,592,142	1,071,181,142
State Contributions on Behalf of Locals	0	108,857,000	108,857,000
State Lottery	11,712,026	0	11,712,026
NCGI Contributions	7,566,578	37,157,368	44,723,946
Transfers from Other Systems	78,557	289,805	368,362
Other Contributions - Delayed Enrollments	7,921	83,012	90,933
Other Contributions - Delayed Appropriations	2,902	447,342	450,244
Other Contributions - Retroactive	292,238	2,828,002	3,120,240
Other Contributions - Additional	0	173,554	173,554
Other - NCGI Adjustment	0	(12,230)	(12,230)
Total Contributions	<u>\$ 200,342,578</u>	<u>\$ 1,439,164,632</u>	<u>\$ 1,639,507,210</u>
Net Investment Income	96,669,231	2,042,811,995	2,139,481,226
<b>Total Additions</b>	<b>\$ 297,011,809</b>	<b>\$ 3,481,976,627</b>	<b>\$ 3,778,988,436</b>
<b>Deductions</b>			
Withdrawal of Member Contributions	\$ 1,962,850	\$ 7,048,164	\$ 9,011,014
Withdrawal of Member Transfer Contributions	98,090	67,155	165,245
Adjustment for Member Loans	1,044,918	0	1,044,918
Withdrawal of Transfer Contributions	17,339	0	17,339
Retirement Allowances	297,025,786	1,976,221,481	2,273,247,267
Pension Adjustment Benefits	24,207,508	172,641,772	196,849,280
Death Benefit Claims	7,566,578	35,743,409	43,309,987
Administrative Expenses	673,553	3,832,132	4,505,685
<b>Total Deductions</b>	<b>\$ 332,596,622</b>	<b>\$ 2,195,554,113</b>	<b>\$ 2,528,150,735</b>
<b>Net Increase/(Decrease)</b>	<b>\$ (35,584,813)</b>	<b>\$ 1,286,422,514</b>	<b>\$ 1,250,837,701</b>
<b>Preliminary Market Value of Assets Beginning of Year</b>	<b>\$ 1,543,684,865</b>	<b>\$ 24,304,033,534</b>	<b>\$ 25,847,718,399</b>
<b>Preliminary Market Value of Assets End of Year</b>	<b>\$ 1,508,100,052</b>	<b>\$ 25,590,456,048</b>	<b>\$ 27,098,556,100</b>
<b>Discounted Receivables</b>			
Expected Lottery Revenue	\$ 12,009,059	\$ 0	\$ 12,009,059
State Appropriations	163,162,815	128,788,354	291,951,169
<b>Adjustments to June 30, 2018 Financial Report</b>			
Discounting of Local Employers Appropriations Receivable	0	(49,659,239)	(49,659,239)
Discounting of Local Employers ERI Contributions Receivable	0	(41,249)	(41,249)
True-up of Present Value of Chapter 19, P.L. 2009 Contributions Receivable	0	49,646,687	49,646,687
Exclusion of Reserve for Non-Contributory Group Insurance	<u>0</u>	<u>(38,672,685)</u>	<u>(38,672,685)</u>
<b>Market Value of Assets End of Year</b>	<b>\$ 1,683,271,926</b>	<b>\$ 25,680,517,916</b>	<b>\$ 27,363,789,842</b>
<b>Approximate Return</b>	<b>6.61%</b>	<b>8.97%</b>	<b>8.83%</b>



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION II – ASSETS**

**Actuarial Value of Assets (AVA)**

To determine on-going funding requirements, most pension systems utilize an actuarial value of assets that differs from the market value of assets. The actuarial value of assets represents an asset value based on averaging or smoothing year-to-year market value returns for purposes of reducing contribution volatility. Each year, 20% of the difference between the market value of assets and the expected actuarial value of assets is added to the expected actuarial value of assets.

Table II-3 Development of Actuarial Value of Assets for July 1, 2018			
	State	Local Employers	Total
1. Preliminary Actuarial Value of Assets as of July 1, 2017 <sup>1</sup>	\$ 1,751,056,826	\$ 25,008,754,163	\$ 26,759,810,989
2. Net Cash Flow excluding Investment Income <sup>2</sup>	(132,254,044)	(720,442,470)	(852,696,514)
3. Expected Investment Income <sup>3</sup>	<u>125,268,320</u>	<u>1,761,080,590</u>	<u>1,886,348,910</u>
4. Expected Actuarial Value of Assets as of July 1, 2018: [1 + 2 + 3]	\$ 1,744,071,102	\$ 26,049,392,283	\$ 27,793,463,385
5. Preliminary Market Value of Assets as of June 30, 2018 <sup>4</sup>	\$ 1,508,100,052	\$ 25,513,628,853	\$ 27,021,728,905
6. 20% of Difference from MVA [20% * (5 - 4)]	\$ (47,194,210)	\$ (107,152,686)	\$ (154,346,896)
7. Preliminary Actuarial Value of Assets as of July 1, 2018: [4 + 6]	\$ 1,696,876,892	\$ 25,942,239,597	\$ 27,639,116,489
8. Discounted Receivables			
State Appropriations	\$ 163,162,815	\$ 128,788,354	\$ 291,951,169
Expected Lottery Revenue	12,009,059	0	12,009,059
Chapter 19, P.L. 2009 Contributions for FYE 2020 and Later	<u>0</u>	<u>127,770,470</u>	<u>127,770,470</u>
Total	175,171,874	\$ 256,558,824	\$ 431,730,698
9. Adjustments			
Discounting of Local Employers Appropriations Receivable	\$ 0	\$ (49,659,239)	\$ (49,659,239)
Discounting of Chapter 19, P.L. 2009 Contributions for FYE 2019	0	(1,337,837)	(1,337,837)
Exclusion of Reserve for Non-Contributory Group Insurance	<u>0</u>	<u>(38,672,685)</u>	<u>(38,672,685)</u>
Total	\$ 0	\$ (89,669,761)	\$ (89,669,761)
10. Actuarial Value of Assets as of July 1, 2018: [7 + 8 + 9]	\$ 1,872,048,766	\$ 26,109,128,660	\$ 27,981,177,426
11. Rate of Return on Actuarial Value of Assets	4.68%	7.04%	6.89%

<sup>1</sup>Excludes discounted State appropriations receivable, present value of Chapter 19, P.L. 2009 and ERI contributions and other adjustments

<sup>2</sup>Amount for Local employers includes Chapter 19, P.L. 2009 contribution receivable for FYE 2019 of 25,339,869 and one-time increase for present value contributions receivable of \$10,607,142.

<sup>3</sup>Refer to Appendix B, Actuarial Methods, for details on the assumed timing of contributions

<sup>4</sup>Amount for Local employers includes adjustments to June 30, 2018 Financial Report for discounting of Local employers ERI contributions receivable of true-up of Chapter 19, P.L. 2009 contributions for FYE 2019 of \$(76,785,946).



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION II – ASSETS**

**Investment Performance**

In reviewing the investment performance for the System's assets in aggregate, the market value of assets rate of return was 8.83% for the year ending June 30, 2018. This is compared to an assumed return of 7.50% for the same period. On an actuarial value of assets basis, the return for FYE 2018 was 6.89%.

The calculated returns for State and Local employers' portions separately differ due to the size of cash flows relative to the beginning of year asset value and the timing of contributions. For the year ending June 30, 2018 the market value of assets rate of return was 6.61% and 8.97% for the State and Local employers' portions, respectively. On an actuarial value of assets basis, the return for FYE 2018 was 4.68% and 7.04% for the State and Local employers' portions, respectively.

In Table II-4 below we show the historical returns on the actuarial value of asset basis for the last ten years for the System in aggregate.

<b>Table II-4 Historical Rates of Return Total System</b>		
<b>Year Ended June 30</b>	<b>Investment Return Assumption</b>	<b>Actuarial Asset Value</b>
2009	8.25%	2.11%
2010	8.25%	3.44%
2011	8.25%	5.55%
2012	7.95%	4.71%
2013	7.90%	5.67%
2014	7.90%	7.48%
2015	7.90%	6.74%
2016	7.90%	5.35%
2017	7.65%	6.30%
2018	7.50%	6.89%

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION II – ASSETS**

**Development of Special Asset Value (SAV)**

Under Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, PFRS receives 1.20% of the proceeds of the Lottery Enterprise for a term of 30 years. The value of the Lottery Enterprise is classified as a special asset. The special asset value is the present value of remaining lottery contributions to the retirement systems.

Table II-5 shows the development of the special asset value as of July 1, 2018.

<b>Table II-5 Development of Special Asset Value as of July 1, 2018</b>		
1.	Lottery Enterprise Value as of Appraisal Date of June 30, 2017 <sup>1</sup>	\$ 13,535,103,380
2.	Depreciated Value as of end of Valuation Year at June 30, 2019 <sup>1</sup>	\$ 13,570,171,451
3.	Discounted Value as of July 1, 2018 at 7.50%	\$ 12,623,415,303
4.	Allocation to PFRS	1.20%
5.	Special Asset Value as of July 1, 2018	\$ 151,480,984

<sup>1</sup> Provided by the Division of Pensions and Benefits

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION II – ASSETS**

**Actuarial Balance Sheet**

Table II-6 Actuarial Balance Sheet as of July 1, 2018			
	State	Local Employers	Total
<b>Assets</b>			
<u>Retirement Fund Reserve (RFR)</u>			
Credited to Fund with Distribution of Income	\$ 3,290,723,616	\$ 23,180,245,951	\$ 26,470,969,567
Add/(Deduct) reserve transferable from/(to) ECR <sup>1</sup>	191,681,410	105,197,854	296,879,264
Adjusted RFR <sup>2</sup>	<u>\$ 3,482,405,026</u>	<u>\$ 23,285,443,805</u> <sup>3</sup>	<u>\$ 26,767,848,831</u>
Members' Contributions Reserve (MCR) <sup>2</sup>	\$ 446,091,351	\$ 3,441,270,256	\$ 3,887,361,607
<u>Employers' Contributions Reserve (ECR)</u>			
Credited to Fund with Distribution of Income	\$ (1,864,766,201)	\$ (512,387,547)	\$ (2,377,153,748)
Add/(Deduct) reserve transferable from/(to) RFR	(191,681,410)	(105,197,854)	(296,879,264)
Adjusted ECR <sup>2</sup>	<u>\$ (2,056,447,611)</u>	<u>\$ (617,585,401)</u>	<u>\$ (2,674,033,012)</u>
Special Asset Value as of July 1, 2018	\$ 151,480,984	\$ 0	\$ 151,480,984
Present Value of Prospective Contributions by State and Local Employers to ECR	<u>2,960,204,220</u>	<u>9,414,247,864</u>	<u>12,374,452,084</u>
<b>Total Assets</b>	<b>\$ 4,983,733,970</b>	<b>\$ 35,523,376,524</b>	<b>\$ 40,507,110,494</b>
<b>Liabilities</b>			
<u>Payable from RFR</u>			
Retirees, Disableds, and Beneficiaries currently receiving benefits	\$ 3,482,405,026	\$ 23,285,443,805 <sup>3</sup>	\$ 26,767,848,831
<u>Payable from MCR and ECR</u>			
Active and Terminated Vested Members due a future benefit	\$ 1,501,328,944	\$ 12,237,932,719	\$ 13,739,261,663
<b>Total Liabilities</b>	<b>\$ 4,983,733,970</b>	<b>\$ 35,523,376,524</b>	<b>\$ 40,507,110,494</b>

<sup>1</sup> It is recommended that the RFR be put into balance each year by transferring assets from the ECR to the RFR so that the RFR will contain sufficient assets to cover the retiree and beneficiary liability

<sup>2</sup> Actuarial Value of Assets equals RFR + MCR + ECR.

<sup>3</sup> Includes the present value of ERI payments of \$8,136,735

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION III – LIABILITIES**

In this section, we present detailed information on the liabilities of the System, including:

- Disclosure of liabilities at July 1, 2017 and July 1, 2018,
- Active liabilities broken down by Tier, and
- The development of the actuarial gain and loss.

**Disclosure**

The Actuarial Liability is used for determining employer contributions. For PFRS, the funding method employed is the Projected Unit Credit (PUC) Actuarial Cost Method. Under this funding method, the actuarial liability is calculated as the actuarial present value of the projected benefits allocated to periods prior to the valuation year.

This liability is determined for funding purposes and is not appropriate for measuring the cost of settling plan liabilities by purchasing annuities or paying lump sums.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

Table III-1 shows the actuarial liability as of July 1, 2018 for the System. The unfunded actuarial liability (UAL) shown in the table is based on the actuarial value of assets plus the special asset value and is different from the UAL used in determining Statutory contributions.

Table III-1 Disclosure of Liabilities			
	State	Local Employers	Total
<b>Actuarial Liability</b>			
Contributing Actives	\$ 1,449,604,704	\$ 12,017,008,280	\$ 13,466,612,984
Non-Contributing Actives	50,842,836	214,127,421	264,970,257
Deferred Vested	881,404	6,797,018	7,678,422
Retirees	2,805,703,534	19,061,217,792	21,866,921,326
Disabled	422,778,513	2,378,424,303	2,801,202,816
Beneficiaries	253,922,979	1,845,801,710	2,099,724,689
<b>Total</b>	<b>\$ 4,983,733,970</b>	<b>\$ 35,523,376,524</b> <sup>1</sup>	<b>\$ 40,507,110,494</b>
Actuarial Value of Assets + Special Asset Value	\$ 2,023,529,750	\$ 26,109,128,660	\$ 28,132,658,410
Unfunded Actuarial Liability/(Surplus)	\$ 2,960,204,220	\$ 9,414,247,864	\$ 12,374,452,084
Funded Ratio	40.60%	73.50%	69.45%

<sup>1</sup> Includes the present value of ERI payments of \$8,136,735

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

Table III-2 and Table III-3 show the Actuarial Liability by Tier of contributing and non-contributing active members, respectively, for State and Local employers as of July 1, 2018.

<b>Table III-2 Contributing Active Liabilities by Tier</b>				
	<b>Number of Members</b>	<b>Appropriation Payroll<sup>1</sup></b>	<b>Actuarial Liability</b>	<b>Gross Normal Cost</b>
<b>State</b>				
Tier 1	4,327	\$ 356,943,257	\$ 1,364,472,157	\$ 73,569,942
Tier 2	232	14,911,997	19,798,105	2,563,347
Tier 3	2,248	108,086,260	65,334,442	19,355,625
<b>Total</b>	<b>6,807</b>	<b>\$ 479,941,514</b>	<b>\$ 1,449,604,704</b>	<b>\$ 95,488,914</b>
<b>Local Employers</b>				
Tier 1	23,484	\$ 2,722,102,422	\$ 11,513,261,851	\$ 565,376,220
Tier 2	504	44,376,652	62,134,393	7,744,571
Tier 3	10,025	624,298,119	441,612,036	110,590,472
<b>Total</b>	<b>34,013</b>	<b>\$ 3,390,777,193</b>	<b>\$ 12,017,008,280</b>	<b>\$ 683,711,263</b>

<sup>1</sup> Excludes pay for members who attain the mandatory retirement age of 65 prior to midyear. Tier 1 members limited to the 401(a)(17) pay limit. Tier 2 and 3 members limited to the Social Security Wage Base.

<b>Table III-3 Non-Contributing Active Liabilities by Tier</b>				
	<b>Number of Members</b>	<b>Last Reported Payroll</b>	<b>Actuarial Liability</b>	<b>Gross Normal Cost</b>
<b>State</b>				
Tier 1	234	\$ 16,692,846	\$ 47,649,143	\$ 0
Tier 2	7	452,669	562,629	0
Tier 3	121	5,463,160	2,631,064	0
<b>Total</b>	<b>362</b>	<b>\$ 22,608,675</b>	<b>\$ 50,842,836</b>	<b>\$ 0</b>
<b>Local Employers</b>				
Tier 1	770	\$ 66,403,425	\$ 205,158,692	\$ 0
Tier 2	15	1,128,035	1,293,258	0
Tier 3	328	16,301,994	7,675,471	0
<b>Total</b>	<b>1,113</b>	<b>\$ 83,833,454</b>	<b>\$ 214,127,421</b>	<b>\$ 0</b>

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

Tables III-4 and III-5 present the change in the actuarial liabilities, actuarial assets, and unfunded actuarial liability during the plan year for State and Local employers. In general, the unfunded actuarial liability (UAL) of any retirement system is expected to change at each subsequent valuation for a variety of reasons. In each valuation, we report on those elements of change in the UAL which are of particular significance, potentially affecting the long-term financial outlook of the System.

For this purpose, we focus on the UAL without considering the SAV because this UAL is used to determine the Statutory contribution. The UAL is also prior to any adjustments for State-paid Local obligations.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

<b>Table III-4 Development of 2018 Experience (Gain)/Loss State</b>			
	<b>Actuarial Liability</b>	<b>Actuarial Value of Assets</b>	<b>Unfunded Actuarial Liability/(Surplus)</b>
1. Value as of July 1, 2017	\$ 4,873,081,731	\$ (1,887,486,318)	\$ 2,985,595,413
2. Additions			
Normal Cost	\$ 95,392,324	\$ 0	\$ 95,392,324
Statutory State Contributions	0	(305,196,617)	(305,196,617)
Expected Member Contributions	<u>0</u>	<u>(48,380,164)</u>	<u>(48,380,164)</u>
Total Additions	\$ 95,392,324	\$ (353,576,781)	\$ (258,184,457)
3. Deductions			
Benefit Payments	\$ (324,241,062)	\$ 324,241,062	\$ 0
Expected Administrative Expenses	<u>0</u>	<u>0</u>	<u>0</u>
Total Deductions	\$ (324,241,062)	\$ 324,241,062	\$ 0
4. Net Transfers from Other Systems			
State Contributions	\$ 61,218	\$ (61,218)	\$ 0
Member Contributions	<u>942,296</u>	<u>(942,296)</u>	<u>0</u>
Total Net Transfers	\$ 1,003,514	\$ (1,003,514)	\$ 0
5. Expected Interest	\$ 360,733,279	\$ (131,440,657)	\$ 229,292,622
6. Expected Value as of July 1, 2018: [1 + 2 + 3 + 4 + 5]	\$ 5,005,969,786	\$ (2,049,266,208)	\$ 2,956,703,578
7. Other Changes			
Appropriation Adjustment	\$ 0	\$ 122,079,849	\$ 122,079,849
Contribution Timing	0	7,951,570	7,951,570
Actual Lottery Revenue	0	305,257	305,257
Other Employer Contributions	0	(314,220)	(314,220)
Actual Member Contributions	0	(697,580)	(697,580)
Conversion from Prior Actuary	(918,724)	0	(918,724)
Change in Methods/Assumptions	0	0	0
Change in Benefits	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Changes	\$ (918,724)	\$ 129,324,876	\$ 128,406,152
8. Expected value after changes: [6 + 7]	\$ 5,005,051,062	\$ (1,919,941,332)	\$ 3,085,109,730
9. Actual Value as of July 1, 2018	\$ 4,983,733,970	\$ (1,872,048,766)	\$ 3,111,685,204
10. Actuarial (Gain)/Loss: [9 - 8]	\$ (21,317,092)	\$ 47,892,566	\$ 26,575,474



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

Table III-5 Development of 2018 Experience Gain/(Loss) Local Employers			
	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability/(Surplus)
1. Value as of July 1, 2017	\$ 34,474,127,537	\$ (25,183,776,588)	\$ 9,290,350,949
2. Additions			
Normal Cost	\$ 670,827,584	\$ 0	\$ 670,827,584
Statutory Contributions	0	(1,165,445,461)	(1,165,445,461)
Expected Member Contributions	<u>0</u>	<u>(330,316,253)</u>	<u>(330,316,253)</u>
Total Additions	\$ 670,827,584	\$ (1,495,761,714)	\$ (824,934,130)
3. Deductions			
Benefit Payments	\$ (2,155,911,417)	\$ 2,155,911,417	\$ 0
Expected Administrative Expenses	<u>0</u>	<u>0</u>	<u>0</u>
Total Deductions	\$ (2,155,911,417)	\$ 2,155,911,417	\$ 0
4. Net Transfers from Other Systems			
Employer Contributions	\$ 289,805	\$ (289,805)	\$ 0
Member Contributions	<u>2,129,569</u>	<u>(2,129,569)</u>	<u>0</u>
Total Net Transfers	\$ 2,419,374	\$ (2,419,374)	\$ 0
5. Expected Interest	\$ 2,556,575,604	\$ (1,821,650,142)	\$ 734,925,462
6. Expected Value as of July 1, 2018: [1 + 2 + 3 + 4 + 5]	\$ 35,548,038,682	\$ (26,347,696,401)	\$ 9,200,342,281
7. Other Changes			
Appropriation Adjustment	\$ 0	\$ 90,137,728	\$ 90,137,728
Contribution Timing	0	55,586,568	55,586,568
Other Employer Contributions	0	(3,649,282)	(3,649,282)
Actual Member Contributions	0	(16,833,491)	(16,833,491)
ERI and Ch. 19 Receivables	0	(1,148,207)	(1,148,207)
Interest on NCGI Cash Flows	0	3,348,500	3,348,500
Conversion from Prior Actuary	(52,999,153)	0	(52,999,153)
Change in Methods/Assumptions	0	0	0
Change in Benefits	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Changes	\$ (52,999,153)	\$ 127,441,816	\$ 74,442,663
8. Expected value after changes: [6 + 7]	\$ 35,495,039,529	\$ (26,220,254,585)	\$ 9,274,784,944
9. Actual Value as of July 1, 2018	\$ 35,523,376,524	\$ (26,109,128,660)	\$ 9,414,247,864
10. Actuarial (Gain)/Loss: [9 - 8]	\$ 28,336,995	\$ 111,125,925	\$ 139,462,920

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**SECTION III – LIABILITIES**

Table III-6 shows the components of the Actuarial (gain)/loss for the State.

<b>Table III-6 Actuarial (Gain)/Loss Analysis State</b>	
<b>Components</b>	<b>July 1, 2018</b>
<b>Actuarial Value of Assets</b>	
Investment Return	\$ 47,194,210
Administrative Expenses	698,356
Total	<u>\$ 47,892,566</u>
<b>Actuarial Liability</b>	
Salary Increases	\$ (43,987,686)
New Entrants	4,253,897
Demographic Experience and Census Data Updates	
Contributing and Non-Contributing Actives	6,600,725
Inactives	12,856,437
Sub-Total	<u>\$ (20,276,627)</u>
Impact of Net Transfers from Other Systems	(1,040,465)
Total	<u>\$ (21,317,092)</u>
<b>Actuarial (Gain)/Loss</b>	<b>\$ 26,575,474</b>

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION III – LIABILITIES**

Table III-7 shows the components of the Actuarial (gain)/loss for Local employers.

<b>Table III-7</b>	
<b>Actuarial (Gain)/Loss Analysis</b>	
<b>Local Employers</b>	
<b>Components</b>	<b>July 1, 2018</b>
<b>Actuarial Value of Assets</b>	
Investment Return	\$ 107,152,686
Administrative Expenses	3,973,239
Total	<u>\$ 111,125,925</u>
<b>Actuarial Liability</b>	
Salary Increases	\$ 40,248,379
New Entrants	22,171,860
Demographic Experience and Census Data Updates	
Contributing and Non-Contributing Actives	(12,531,355)
Inactives	<u>(19,043,429)</u>
Sub-Total	\$ 30,845,455
Impact of Net Transfers from Other Systems	<u>(2,508,460)</u>
Total	\$ 28,336,995
<b>Actuarial (Gain)/Loss</b>	<b>\$ 139,462,920</b>

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the Plan. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

Under the current funding policy, the State and Local employer funding requirements contains two components: the employer normal cost and an amortization of the unfunded actuarial liability (UAL). The UAL for this purpose does not include the special asset value. The funding methodology prescribed by NJ State Statute does not include a cost component for administrative expenses, and therefore administrative expenses are implicitly covered by the investment rate of return assumption. Because the investment rate of return assumption is recommended by the State Treasurer, we provide no opinion on the reasonableness of the assumption and are unable to evaluate whether the investment rate of return assumption includes an appropriate adjustment for administrative expenses.

For PFRS, the funding method employed is the Projected Unit Credit (PUC) Actuarial Cost Method. Under this funding method, the actuarial liability is calculated as the actuarial present value of the projected benefits allocated to periods prior to the valuation year. 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 July 1, 2018 the unfunded actuarial liability is amortized over a closed 30 year period as a level dollar amount.

Under Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, PFRS receives 1.20% of the proceeds of the Lottery Enterprise for a term of 30 years. As of July 1, 2018 there are 28 years remaining. The State's pension contribution shall be reduced by the product of the allocable percentage for such retirement system, the adjustment percentage for such retirement system and the special asset adjustment.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

Table IV-1 shows the development of the Lottery Enterprise contribution offset. Per N.J. Statute the methodology for determining the adjustment percentage varies depending on the applicable fiscal year. The following table shows both calculations to illustrate how the adjustment percentage may change over time.

<b>Table IV-1</b>	
<b>Development of Lottery Enterprise Contribution Offset for Fiscal Year 2020</b>	
<b><u>For Fiscal Years Through 2022</u></b>	
1. Special Asset Adjustment for FY 2020 <sup>1</sup>	\$ 1,070,451,102
2. Allocable Percentage to PFRS for Fiscal Years through 2022	1.20%
3. Adjustment Percentage	100.00%
4. Lottery Enterprise Contribution Offset as of June 30, 2019 [1 x 2 x 3]	12,845,413
<b><u>For Fiscal Years Beginning 2023</u></b>	
5. Special Asset Value Allocated to PFRS as of July 1, 2018	\$ 151,480,984
6. 28-Year Level Dollar Amortization payable June 30, 2019	13,088,745
7. Initial Special Asset Value Allocated to PFRS as of July 1, 2016	150,878,997
8. Maximum Special Asset Adjustment: 30-Year Level Dollar Amortization at 7.65%	12,962,136
9. Special Asset Adjustment as of June 30, 2019 [lesser of 6 and 8]	12,962,136
10. Adjustment Percentage	0.00%
11. Funded Ratio for Total System based on Actuarial Value + Special Asset Value	69.45%
12. Applicable Adjustment Percentage [if 11 < 50%, 10 - 7 x (50% - 11), otherwise 11]	0.00%

<sup>1</sup> This adjustment will be \$1,084,354,841 for FY 2021 and \$1,095,871,137 for FY 2022.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

Tables IV-2 through IV-5 show the development of the Statutory pension contributions for State and Local employers.

Table IV-2 Development of Unfunded Actuarial Liability						
	July 1, 2018			July 1, 2017		
	State	Local Employers <sup>1</sup>	Total	State	Local Employers <sup>1</sup>	Total
<b>1. Actuarial Liability</b>	\$ 4,983,733,970	\$ 35,523,376,524	\$ 40,507,110,494	\$ 4,873,081,731	\$ 34,474,127,537	\$ 39,347,209,268
<b>2. Actuarial Value of Assets<sup>2</sup></b>	\$ 1,872,048,766	\$ 26,109,128,660	\$ 27,981,177,426	\$ 1,887,486,318	\$ 25,183,776,588	\$ 27,071,262,906
<b>3. Unfunded Actuarial Liability</b>						
a. Basic	\$ 2,973,978,440	\$ 7,530,101,123	\$ 10,504,079,563	\$ 2,853,234,813	\$ 7,474,164,043	\$ 10,327,398,856
b. Chapter 204, P.L. 1989	613,645	5,360,164	5,973,809	609,362	5,573,559	6,182,921
c. Chapter 247, P.L. 1993	0	127,299,156	127,299,156	0	130,681,986	130,681,986
d. Chapter 428, P.L. 1999 <sup>3</sup>	137,093,119	746,575,606	883,668,725	131,751,238	719,700,162	851,451,400
e. Chapter 109, P.L. 1979	0	650,382,330	650,382,330	0	619,676,423	619,676,423
f. Chapter 511, P.L. 1991	0	354,529,485	354,529,485	0	340,554,776	340,554,776
g. Total	\$ 3,111,685,204	\$ 9,414,247,864	\$ 12,525,933,068	\$ 2,985,595,413	\$ 9,290,350,949	\$ 12,275,946,362
<b>4. Adjustment to Unfunded Actuarial Liability for Phase-In of State-Paid Local Obligations</b>						
a. Chapter 247, P.L. 1993	\$ 115,099,730	\$ (115,099,730)	\$ 0	\$ 111,693,853	\$ (111,693,853)	\$ 0
b. Chapter 428, P.L. 1999 <sup>3</sup>	592,541,714	(592,541,714)	0	566,664,942	(566,664,942)	0
c. Chapter 109, P.L. 1979	650,382,330	(650,382,330)	0	619,676,423	(619,676,423)	0
d. Chapter 511, P.L. 1991	354,529,485	(354,529,485)	0	340,554,776	(340,554,776)	0
e. Total	\$ 1,712,553,259	\$ (1,712,553,259)	\$ 0	\$ 1,638,589,994	\$ (1,638,589,994)	\$ 0
<b>5. Net Unfunded Actuarial Liability [3 + 4]</b>	<b>\$ 4,824,238,463</b>	<b>\$ 7,701,694,605</b>	<b>\$ 12,525,933,068</b>	<b>\$ 4,624,185,407</b>	<b>\$ 7,651,760,955</b>	<b>\$ 12,275,946,362</b>

<sup>1</sup> Excludes UAL amounts due to Local Employer ERI programs and Chapter 19, P.L. 2009 Local Employer deferrals because receivables for these amounts are included in the AVA

<sup>2</sup> AVA without Special Asset Value used to calculate the Statutory Contributions

<sup>3</sup> Includes UAL amounts for Chapter 86, P.L. 2001 and Chapter 318, P.L. 2001. Based on established methodology, the Chapter 428, P.L. 1999 UAL is assumed to be a level percentage of the total UAL excluding amounts attributable to Chapter 86, P.L. 2001, Chapter 318, P.L. 2001, Chapter 109, P.L. 1979 and Chapter 511, P.L. 1991 as well as amounts attributable to the phase-in of State-paid Local obligations associated with Chapter 247, P.L. 1993 and Chapter 428, P.L. 1999. The percentage is 4% for State and 2% for Local.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

**Table IV-3  
Development of Unfunded Actuarial Liability Contribution**

	July 1, 2018 Valuation			July 1, 2017 Valuation		
	Fiscal Year Ending 2020 Payment			Fiscal Year Ending 2019 Payment		
	State	Local Employers <sup>1</sup>	Total	State	Local Employers <sup>1</sup>	Total
<b>1. Amortization of UAL</b>						
a. Basic	\$ 234,242,260	\$ 593,100,435	\$ 827,342,695	\$ 224,732,016	\$ 588,694,610	\$ 813,426,626
b. Chapter 204, P.L. 1989	67,242	587,360	654,602	64,217	587,361	651,578
c. Chapter 247, P.L. 1993	0	10,026,583	10,026,583	0	10,293,028	10,293,028
d. Chapter 428, P.L. 1999 <sup>2</sup>	10,797,994	58,803,237	69,601,231	10,377,247	56,686,421	67,063,668
e. Chapter 109, P.L. 1979	0	51,226,675	51,226,675	0	48,808,157	48,808,157
f. Chapter 511, P.L. 1991	0	27,924,139	27,924,139	0	26,823,436	26,823,436
g. Total	<u>\$ 245,107,496</u>	<u>\$ 741,668,429</u>	<u>\$ 986,775,925</u>	<u>\$ 235,173,480</u>	<u>\$ 731,893,013</u>	<u>\$ 967,066,493</u>
<b>2. Adjustment to UAL Contribution for State-Paid Local Obligations</b>						
a. Chapter 247, P.L. 1993	\$ 10,026,583	\$ (10,026,583)	\$ 0	\$ 10,293,028	\$ (10,293,028)	\$ 0
b. Chapter 428, P.L. 1999 <sup>2</sup>	58,803,237	(58,803,237)	0	56,686,421	(56,686,421)	0
c. Chapter 109, P.L. 1979	51,226,675	(51,226,675)	0	48,808,157	(48,808,157)	0
d. Chapter 511, P.L. 1991	27,924,139	(27,924,139)	0	26,823,436	(26,823,436)	0
e. Total	<u>\$ 147,980,634</u>	<u>\$ (147,980,634)</u>	<u>\$ 0</u>	<u>\$ 142,611,042</u>	<u>\$ (142,611,042)</u>	<u>\$ 0</u>
<b>3. UAL Contribution as of Valuation Date [1 + 2]</b>	\$ 393,088,130	\$ 593,687,795	\$ 986,775,925	\$ 377,784,522	\$ 589,281,971	\$ 967,066,493
<b>4. Interest to Beginning of Fiscal Year</b>	\$ 29,481,610	\$ 44,526,586	\$ 74,008,196	\$ 28,333,839	\$ 44,196,148	\$ 72,529,987
<b>5. UAL Contribution as of Beginning of Fiscal Year [3 + 4]</b>	<b>\$ 422,569,740</b>	<b>\$ 638,214,381</b>	<b>\$ 1,060,784,121</b>	<b>\$ 406,118,361</b>	<b>\$ 633,478,119</b>	<b>\$ 1,039,596,480</b>

<sup>1</sup> Excludes UAL amounts due to Local Employer ERI programs and Chapter 19, P.L. 2009 Local Employer deferrals because receivables for these amounts are included in the AVA

<sup>2</sup> Includes UAL amounts for Chapter 86, P.L. 2001 and Chapter 318, P.L. 2001

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

**Table IV-4  
Development of Normal Cost**

	July 1, 2018 Valuation			July 1, 2017 Valuation		
	Fiscal Year Ending 2020 Payment			Fiscal Year Ending 2019 Payment		
	State	Local Employers	Total	State	Local Employers	Total
<b>1. Gross Normal Cost, excluding NCGI Premium</b>						
a. Basic	\$ 86,280,668	\$ 620,283,531	\$ 706,564,199	\$ 85,674,762	\$ 604,577,109	\$ 690,251,871
b. Chapter 247, P.L. 1993	0	111,263	111,263	0	139,744	139,744
c. Chapter 428, P.L. 1999	2,018,584	12,107,115	14,125,699	2,568,954	16,237,121	18,806,075
d. Chapter 109, P.L. 1979 <sup>1</sup>	5,279,357	37,298,549	42,577,906	5,298,608	36,538,224	41,836,832
e. Chapter 511, P.L. 1991	1,910,305	13,910,805	15,821,110	1,850,000	13,335,386	15,185,386
f. Total	\$ 95,488,914	\$ 683,711,263	\$ 779,200,177	\$ 95,392,324	\$ 670,827,584	\$ 766,219,908
<b>2. Expected Member Contributions</b>	\$ (45,419,412)	\$ (317,554,544)	\$ (362,973,956)	\$ (46,661,974)	\$ (318,585,284)	\$ (365,247,258)
<b>3. Employer Normal Cost [1 + 2]</b>	\$ 50,069,502	\$ 366,156,719	\$ 416,226,221	\$ 48,730,350	\$ 352,242,300	\$ 400,972,650
<b>4. Portion of Local Normal Cost Payable by State</b>						
a. Chapter 247, P.L. 1993	\$ 111,263	\$ (111,263)	\$ 0	\$ 139,751	\$ (139,751)	\$ 0
b. Chapter 428, P.L. 1999	12,107,115	(12,107,115)	0	16,237,121	(16,237,121)	0
c. Chapter 109, P.L. 1979	37,298,549	(37,298,549)	0	36,538,224	(36,538,224)	0
d. Chapter 511, P.L. 1991	13,910,805	(13,910,805)	0	13,335,386	(13,335,386)	0
e. Total	\$ 63,427,732	\$ (63,427,732)	\$ 0	\$ 66,250,482	\$ (66,250,482)	\$ 0
<b>5. Normal Cost Contribution as of Valuation Date [3 + 4]</b>	\$ 113,497,234	\$ 302,728,987	\$ 416,226,221	\$ 114,980,832	\$ 285,991,818	\$ 400,972,650
<b>6. Interest to Beginning of Fiscal Year</b>	\$ 8,512,292	\$ 22,704,674	\$ 31,216,966	\$ 8,623,562	\$ 21,449,386	\$ 30,072,948
<b>7. Normal Cost Contribution as of Beginning of Fiscal Year [5 + 6]</b>	\$ 122,009,526	\$ 325,433,661	\$ 447,443,187	\$ 123,604,394	\$ 307,441,204	\$ 431,045,598
<b>8. Non-Contributory Group Insurance Premium of Beginning of Fiscal Year (one-year term cost)</b>	N/A	\$ 46,564,731	\$ 46,564,731	N/A	\$ 37,183,000	\$ 37,183,000

<sup>1</sup> Per statute, 1.1% of appropriation payroll



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

**Table IV-5  
Development of Statutory Pension Contributions**

As of Beginning of Fiscal Year	July 1, 2018 Valuation Fiscal Year Ending 2020 Payment			July 1, 2017 Valuation Fiscal Year Ending 2019 Payment		
	State	Local Employers	Total	State	Local Employers	Total
<b>1. Normal Cost Contribution<sup>1</sup></b>						
a. Basic	\$ 43,925,850	\$ 325,433,661	\$ 369,359,511	\$ 41,940,139	\$ 307,441,204	\$ 349,381,343
b. Chapter 247, P.L. 1993	119,608	0	119,608	150,232	0	150,232
c. Chapter 428, P.L. 1999	15,185,126	0	15,185,126	20,216,531	0	20,216,531
d. Chapter 109, P.L. 1979	45,771,249	0	45,771,249	44,974,594	0	44,974,594
e. Chapter 511, P.L. 1991	17,007,693	0	17,007,693	16,322,898	0	16,322,898
f. Total	\$ 122,009,526	\$ 325,433,661	\$ 447,443,187	\$ 123,604,394	\$ 307,441,204	\$ 431,045,598
<b>2. UAL Contribution<sup>1,2</sup></b>						
a. Basic	\$ 251,810,430	\$ 637,582,968	\$ 889,393,398	\$ 241,586,918	\$ 632,846,706	\$ 874,433,624
b. Chapter 204, P.L. 1989	72,285	631,413	703,698	69,033	631,413	700,446
c. Chapter 247, P.L. 1993	10,778,577	0	10,778,577	11,065,005	0	11,065,005
d. Chapter 428, P.L. 1999	74,821,323	0	74,821,323	72,093,442	0	72,093,442
e. Chapter 109, P.L. 1979	55,068,676	0	55,068,676	52,468,769	0	52,468,769
f. Chapter 511, P.L. 1991	30,018,449	0	30,018,449	28,835,194	0	28,835,194
g. Total	\$ 422,569,740	\$ 638,214,381	\$ 1,060,784,121	\$ 406,118,361	\$ 633,478,119	\$ 1,039,596,480
<b>3. Total Statutory Pension Contribution: [1 + 2]</b>	\$ 544,579,266	\$ 963,648,042	\$ 1,508,227,308	\$ 529,722,755	\$ 940,919,323	\$ 1,470,642,078
<b>4. Lottery Enterprise Contribution Offset</b>	\$ (12,845,413)	\$ 0	\$ (12,845,413)	\$ (12,445,783)	\$ 0	\$ (12,445,783)
<b>5. Net Pension Contribution: [3 + 4]</b>	\$ 531,733,853	\$ 963,648,042	\$ 1,495,381,895	\$ 517,276,972	\$ 940,919,323	\$ 1,458,196,295
<b>6. Non-Contributory Group Insurance Premium</b>	N/A	\$ 46,564,731	\$ 46,564,731	N/A	\$ 37,183,000	\$ 37,183,000

<sup>1</sup> State amounts for Chapter 247, P.L. 1993, Chapter 428, P.L. 1999, Chapter 109, P.L. 1979 and Chapter 511, P.L. 1991 include contributions toward State-paid Local obligations, both amounts attributable to the current fiscal year and amounts that were not contributed in prior years due to the phase-in of contributions. The total State-paid Local obligations are \$227,263,995 and \$224,526,138 for the July 1, 2018 and July 1, 2017 valuations, respectively.

<sup>2</sup> Excludes UAL amounts due to Local Employer ERI programs and Chapter 19, P.L. 2009 Local Employer deferrals because receivables for these amounts are included in the AVA. Refer to Appendices E and F for additional information regarding these payments.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

Table IV-6 shows the State and Local employers' contributions as a percentage of appropriation payroll for FYE 2020 compared to FYE 2019.

<b>Table IV-6 Statutory Pension Contributions as a Percent of Appropriation Payroll</b>				
	<b>July 1, 2018 Valuation</b>		<b>July 1, 2017 Valuation</b>	
	<b>Fiscal Year Ending 2020 Payment</b>		<b>Fiscal Year Ending 2019 Payment</b>	
	<b>State</b>	<b>Local Employers</b>	<b>State</b>	<b>Local Employers</b>
<b>1. Normal Cost Contribution Rate<sup>1</sup></b>				
Basic Allowances	9.152%	9.596%	8.707%	9.249%
Chapter 247, P.L. 1993				
PERS Local normal rate for individuals without past service	N/A	12.988%	N/A	13.520%
PERS Local normal rate for individuals with past service	N/A	1.267%	N/A	1.771%
Portion of Municipalities & Local Groups costs payable by the State	0.025%	N/A	0.031%	N/A
Chapter 428, P.L. 1999	3.164%	N/A	4.197%	N/A
Chapter 109, P.L. 1979	9.537%	N/A	9.337%	N/A
Chapter 511, P.L. 1991	3.544%	N/A	3.389%	N/A
<b>2. UAL Contribution Rate<sup>1,2</sup></b>				
Basic Allowances	52.467%	18.834%	50.154%	19.100%
Chapter 204, P.L. 1989 <sup>3</sup>	-	-	-	-
Chapter 247, P.L. 1993	2.246%	N/A	2.297%	N/A
Chapter 428, P.L. 1999 <sup>4</sup>	15.590%	N/A	14.967%	N/A
Chapter 109, P.L. 1979	11.474%	N/A	10.893%	N/A
Chapter 511, P.L. 1991	6.255%	N/A	5.986%	N/A
<b>3. Non-Contributory Group Insurance Premium Rate</b>				
	N/A	1.373%	N/A	1.119%

<sup>1</sup> State rates for Chapter 247, P.L. 1993, Chapter 428, P.L. 1999, Chapter 109, P.L. 1979 and Chapter 511, P.L. 1991 include contributions toward State-paid Local obligations, both amounts attributable to the current fiscal year and amounts that were not contributed in prior years due to the phase-in of contributions.

<sup>2</sup> Excludes UAL contributions due to Local Employer ERI programs and Chapter 19, P.L. 2009 Local Employer deferrals because receivables for these amounts are included in the AVA.

<sup>3</sup> Refer to Table IV-7 for employer-specific costs under Chapter 204.

<sup>4</sup> Includes UAL contribution rates for Chapter 86, P.L. 2001 and Chapter 318, P.L. 2001.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

Table IV-7 determines the recommended FYE 2020 payment under Chapter 204, P.L. 1989 for applicable locations. Chapter 204 allowed employees who were previously excluded on the basis of their titles from PFRS membership to enter the System. Employers of such employees are required to make additional contributions to fund these benefits.

Table IV-7 Chapter 204, P.L. 1989 Payment Schedule					
Location Number	Location Name	July 1, 2018 Valuation Fiscal Year Ending 2020		July 1, 2017 Valuation Fiscal Year Ending 2019	
		Payment as of Beginning of Fiscal Year	Years Remaining	Payment as of Beginning of Fiscal Year	Years Remaining
<b>State Locations</b>					
00053	Juvenile Justice Comm/Community Prog.	\$ 2,078	14	\$ 1,984	15
00323	Dept. Div. Of Human Resources	66,718	14	63,716	15
00498	Rutgers Biomedical	3,489	14	3,333	15
	<b>Total</b>	<u>\$ 72,285</u>		<u>\$ 69,033</u>	
<b>Municipalities and Local Groups</b>					
21202	Camden City	\$ 91,919	14	\$ 91,919	15
39300	Belmar Borough	12,296	14	12,296	15
46800	Roxbury Township	23,271	14	23,270	15
49700	West Windsor Township	34,516	14	34,516	15
57700	Sea Isle City	6,245	14	6,245	15
62400	NJ Institute of Technology	99,580	14	99,580	15
62500	Brookdale Community College	108,207	14	108,207	15
62700	Essex County College	32,519	14	32,519	15
75000	Lakewood Twp Fire District #1	17,269	14	17,269	15
75700	Middlesex County College	120,277	14	120,278	15
76200	Lower Camden Co Reg HS Dist #1	2,597	14	2,597	15
77500	Hopewell Twp Fire District #1	10,702	14	10,702	15
78600	South Jersey Transit Authority	52,526	14	52,526	15
78700	Washington Twp Bd of Fire Comm	18,373	14	18,373	15
79600	Upper Freehold Township	1,116	14	1,116	15
	<b>Total</b>	<u>\$ 631,413</u>		<u>\$ 631,413</u>	

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**SECTION IV – CONTRIBUTIONS**

Table IV-8 determines the FYE 2020 pension contribution for certain State colleges.

Table IV-8 Fiscal Year Ending 2020 Pension Contributions for State College Locations							
Location	Location Name	Number of Members	2018 Appropriation Payroll	Normal Cost Contribution	UAL Contribution	Lottery Enterprise Offset <sup>1</sup>	Net FYE 2020 Pension Contribution
00410	Rowan University	26	\$ 1,885,202	\$ 479,251	\$ 1,659,563	\$ (842,672)	\$ 1,296,142
00412	Kean University	12	880,872	223,933	775,441	(393,744)	605,630
00413	William Paterson University of NJ	19	1,294,095	328,982	1,139,205	(578,451)	889,736
00414	Montclair State University	32	2,499,106	635,316	2,199,989	(1,117,083)	1,718,222
00415	The College of New Jersey	11	705,702	179,402	621,237	(315,444)	485,195
00421	Stockton University	16	1,047,035	266,175	921,716	(468,017)	719,874
00498	Rutgers University	132	10,115,511	2,571,540	8,908,277	(4,521,563)	6,958,254
62400	NJ Institute of Technology	29	2,295,008	583,431	2,119,899	(1,025,853)	1,677,477
<b>Total</b>		<b>277</b>	<b>\$ 20,722,531</b>	<b>\$ 5,268,030</b>	<b>\$ 18,345,327</b>	<b>\$ (9,262,827)</b>	<b>\$ 14,350,530</b>

<sup>1</sup> 72.11% of the total Lottery Enterprise contribution offset for FYE 2020 is allocated to each State college location based on the location's 2018 appropriation payroll. The percentage allocation to State colleges was determined using 2018 contributing active, non-contributing active and retiree headcounts for locations deemed to be eligible for funding under the Lottery Enterprise.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

The data for this valuation was provided by the New Jersey Division of Pensions and Benefits as of July 1, 2018. Cheiron did not audit any of the data. However, we did perform an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23. The following is a list of data tables contained in this section:

- A-1 to A-3: Contributing Active Member Data by Tier
- A-4 to A-6: Non-Contributing Active Member Data by Tier
- A-7: Inactive Member Data by Status
- A-8: Reconciliation of Plan Membership
- A-9 to A-12: Contributing Active Member Data by Age and Service
- A-13 to A-16: Inactive Member Data by Age and Status

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-1 Contributing Active Member Data by Tier State</b>			
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>
<b><u>Tier 1</u></b>			
Count	4,327	4,485	-3.5%
Average Age	44.31	43.54	1.8%
Average Service	17.05	16.26	4.9%
Total Annual Salary	\$ 356,943,257	\$ 370,160,432	-3.6%
Average Salary	\$ 82,492	\$ 82,533	0.0%
<b><u>Tier 2</u></b>			
Count	232	231	0.4%
Average Age	34.74	33.79	2.8%
Average Service	7.44	6.43	15.7%
Total Annual Salary	\$ 14,911,997	\$ 14,900,184	0.1%
Average Salary	\$ 64,276	\$ 64,503	-0.4%
<b><u>Tier 3</u></b>			
Count	2,248	2,014	11.6%
Average Age	29.86	29.25	2.1%
Average Service	3.12	2.65	17.7%
Total Annual Salary	\$ 108,086,260	\$ 96,630,985	11.9%
Average Salary	\$ 48,081	\$ 47,980	0.2%
<b><u>Total</u></b>			
Count	6,807	6,730	1.1%
Average Age	39.21	38.93	0.7%
Average Service	12.12	11.85	2.3%
Total Annual Salary	\$ 479,941,514	\$ 481,691,601	-0.4%
Average Salary	\$ 70,507	\$ 71,574	-1.5%

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-2</b>			
<b>Contributing Active Member Data by Tier</b>			
<b>Local Employers</b>			
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>
<b><u>Tier 1</u></b>			
Count	23,484	24,830	-5.4%
Average Age	44.33	43.71	1.4%
Average Service	17.95	17.35	3.5%
Total Annual Salary	\$ 2,722,102,422	\$ 2,800,300,011	-2.8%
Average Salary	\$ 115,913	\$ 112,779	2.8%
<b><u>Tier 2</u></b>			
Count	504	503	0.2%
Average Age	34.10	33.18	2.8%
Average Service	7.51	6.50	15.5%
Total Annual Salary	\$ 44,376,652	\$ 40,829,651	8.7%
Average Salary	\$ 88,049	\$ 81,172	8.5%
<b><u>Tier 3</u></b>			
Count	10,025	8,077	24.1%
Average Age	30.40	30.15	0.8%
Average Service	3.28	2.86	14.7%
Total Annual Salary	\$ 624,298,119	\$ 480,527,066	29.9%
Average Salary	\$ 62,274	\$ 59,493	4.7%
<b><u>Total</u></b>			
Count	34,013	33,410	1.8%
Average Age	40.07	40.27	-0.5%
Average Service	13.47	13.68	-1.6%
Total Annual Salary	\$ 3,390,777,193	\$ 3,321,656,728	2.1%
Average Salary	\$ 99,691	\$ 99,421	0.3%

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-3</b>			
<b>Contributing Active Member Data by Tier</b>			
<b>Total</b>			
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>
<b><u>Tier 1</u></b>			
Count	27,811	29,315	-5.1%
Average Age	44.33	43.69	1.5%
Average Service	17.81	17.19	3.6%
Total Annual Salary	\$ 3,079,045,679	\$ 3,170,460,443	-2.9%
Average Salary	\$ 110,713	\$ 108,151	2.4%
<b><u>Tier 2</u></b>			
Count	736	734	0.3%
Average Age	34.30	33.37	2.8%
Average Service	7.49	6.48	15.6%
Total Annual Salary	\$ 59,288,649	\$ 55,729,835	6.4%
Average Salary	\$ 80,555	\$ 75,926	6.1%
<b><u>Tier 3</u></b>			
Count	12,273	10,091	21.6%
Average Age	30.30	29.97	1.1%
Average Service	3.25	2.82	15.3%
Total Annual Salary	\$ 732,384,379	\$ 577,158,051	26.9%
Average Salary	\$ 59,674	\$ 57,195	4.3%
<b><u>Total</u></b>			
Count	40,820	40,140	1.7%
Average Age	39.93	40.05	-0.3%
Average Service	13.25	13.38	-1.0%
Total Annual Salary	\$ 3,870,718,707	\$ 3,803,348,329	1.8%
Average Salary	\$ 94,824	\$ 94,752	0.1%



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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<b>Table A-4</b>			
<b>Non-Contributing Active Member Data by Tier State</b>			
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>
<b><u>Tier 1</u></b>			
Count	234	251	-6.8%
Average Age	48.21	47.21	2.1%
Average Service	20.22	19.14	5.6%
Total Last Reported Pay	\$ 16,692,846	\$ 18,010,395	-7.3%
Average Last Reported Pay	\$ 71,337	\$ 71,755	-0.6%
<b><u>Tier 2</u></b>			
Count	7	8	-12.5%
Average Age	33.00	33.69	-2.0%
Average Service	7.55	6.44	17.3%
Total Last Reported Pay	\$ 452,669	\$ 514,581	-12.0%
Average Last Reported Pay	\$ 64,667	\$ 64,323	0.5%
<b><u>Tier 3</u></b>			
Count	121	83	45.8%
Average Age	30.64	29.15	5.1%
Average Service	3.36	2.83	18.6%
Total Last Reported Pay	\$ 5,463,160	\$ 3,642,428	50.0%
Average Last Reported Pay	\$ 45,150	\$ 43,885	2.9%
<b><u>Total</u></b>			
Count	362	342	5.8%
Average Age	42.04	42.51	-1.1%
Average Service	14.34	14.89	-3.7%
Total Last Reported Pay	\$ 22,608,675	\$ 22,167,404	2.0%
Average Last Reported Pay	\$ 62,455	\$ 64,817	-3.6%

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-5</b>				
<b>Non-Contributing Active Member Data by Tier</b>				
<b>Local Employers</b>				
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>	
<b><u>Tier 1</u></b>				
Count	770	758	1.6%	
Average Age	47.39	46.92	1.0%	
Average Service	21.02	20.47	2.7%	
Total Last Reported Pay	\$ 66,403,425	\$ 62,856,032	5.6%	
Average Last Reported Pay	\$ 86,238	\$ 82,924	4.0%	
<b><u>Tier 2</u></b>				
Count	15	18	-16.7%	
Average Age	35.33	33.15	6.6%	
Average Service	7.44	6.47	15.0%	
Total Last Reported Pay	\$ 1,128,035	\$ 1,198,123	-5.8%	
Average Last Reported Pay	\$ 75,202	\$ 66,562	13.0%	
<b><u>Tier 3</u></b>				
Count	328	261	25.7%	
Average Age	30.15	29.56	2.0%	
Average Service	3.21	2.67	20.2%	
Total Last Reported Pay	\$ 16,301,994	\$ 12,035,719	35.4%	
Average Last Reported Pay	\$ 49,701	\$ 46,114	7.8%	
<b><u>Total</u></b>				
Count	1,113	1,037	7.3%	
Average Age	42.15	42.31	-0.4%	
Average Service	15.59	15.75	-1.0%	
Total Last Reported Pay	\$ 83,833,454	\$ 76,089,874	10.2%	
Average Last Reported Pay	\$ 75,322	\$ 73,375	2.7%	

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-6</b>				
<b>Non-Contributing Active Member Data by Tier</b>				
<b>Total</b>				
	<b>July 1, 2018</b>	<b>July 1, 2017</b>	<b>% Change</b>	
<b><u>Tier 1</u></b>				
Count	1,004	1,009	-0.5%	
Average Age	47.58	46.99	1.3%	
Average Service	20.83	20.14	3.4%	
Total Last Reported Pay	\$ 83,096,271	\$ 80,866,427	2.8%	
Average Last Reported Pay	\$ 82,765	\$ 80,145	3.3%	
<b><u>Tier 2</u></b>				
Count	22	26	-15.4%	
Average Age	34.59	33.32	3.8%	
Average Service	7.48	6.46	15.7%	
Total Last Reported Pay	\$ 1,580,704	\$ 1,712,704	-7.7%	
Average Last Reported Pay	\$ 71,850	\$ 65,873	9.1%	
<b><u>Tier 3</u></b>				
Count	449	344	30.5%	
Average Age	30.28	29.46	2.8%	
Average Service	3.25	2.71	20.0%	
Total Last Reported Pay	\$ 21,765,154	\$ 15,678,147	38.8%	
Average Last Reported Pay	\$ 48,475	\$ 45,576	6.4%	
<b><u>Total</u></b>				
Count	1,475	1,379	7.0%	
Average Age	42.12	42.36	-0.6%	
Average Service	15.28	15.53	-1.6%	
Total Last Reported Pay	\$ 106,442,129	\$ 98,257,278	8.3%	
Average Last Reported Pay	\$ 72,164	\$ 71,253	1.3%	

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-7 Inactive Member Data by Status</b>						
	<b>July 1, 2018</b>			<b>July 1, 2017</b>		
	<b>State</b>	<b>Local Employers</b>	<b>Total</b>	<b>State</b>	<b>Local Employers</b>	<b>Total</b>
<b>Retirees</b>						
Count	4,733	26,494	31,227	4,640	26,018	30,658
Annual Retirement Allowances	\$ 249,573,316	\$ 1,756,246,563	\$ 2,005,819,879	\$ 243,779,017	\$ 1,692,897,884	\$ 1,936,676,901
Average Retirement Allowance	\$ 52,730	\$ 66,288	\$ 64,234	\$ 52,539	\$ 65,066	\$ 63,170
<b>Beneficiaries</b>						
Count	847	6,589	7,436	818	6,556	7,374
Annual Retirement Allowances	\$ 26,921,871	\$ 217,121,737	\$ 244,043,608	\$ 25,489,718	\$ 210,306,296	\$ 235,796,014
Average Retirement Allowance	\$ 31,785	\$ 32,952	\$ 32,819	\$ 31,161	\$ 32,078	\$ 31,977
<b>Ordinary Disability</b>						
Count	728	2,212	2,940	735	2,203	2,938
Annual Retirement Allowances	\$ 20,150,423	\$ 66,327,842	\$ 86,478,265	\$ 20,328,284	\$ 65,327,095	\$ 85,655,379
Average Retirement Allowance	\$ 27,679	\$ 29,985	\$ 29,414	\$ 27,658	\$ 29,654	\$ 29,154
<b>Accidental Disability</b>						
Count	365	2,599	2,964	355	2,546	2,901
Annual Retirement Allowances	\$ 16,631,546	\$ 137,315,370	\$ 153,946,916	\$ 16,011,093	\$ 131,854,181	\$ 147,865,274
Average Retirement Allowance	\$ 45,566	\$ 52,834	\$ 51,939	\$ 45,102	\$ 51,789	\$ 50,970
<b>In-Pay Total</b>						
<b>Count</b>	<b>6,673</b>	<b>37,894</b>	<b>44,567</b>	<b>6,548</b>	<b>37,323</b>	<b>43,871</b>
<b>Annual Retirement Allowances</b>	<b>\$ 313,277,156</b>	<b>\$ 2,177,011,512</b>	<b>\$ 2,490,288,668</b>	<b>\$ 305,608,112</b>	<b>\$ 2,100,385,456</b>	<b>\$ 2,405,993,568</b>
<b>Average Retirement Allowance</b>	<b>\$ 46,947</b>	<b>\$ 57,450</b>	<b>\$ 55,877</b>	<b>\$ 46,672</b>	<b>\$ 56,276</b>	<b>\$ 54,842</b>
<b>Deferred Vested Members</b>						
Count	6	36	42	7	34	41
Annual Retirement Allowances	\$ 103,452	\$ 667,188	\$ 770,640	\$ 130,092	\$ 684,360	\$ 814,452
Average Retirement Allowance	\$ 17,242	\$ 18,533	\$ 18,349	\$ 18,585	\$ 20,128	\$ 19,865

QDRO benefits included with member records for valuation purposes.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

**Table A-8**

**Reconciliation of Plan Membership from July 1, 2017 to July 1, 2018**

	Contributing Actives	Non-Contrib. Actives	Deferred Vested	Retired	Disabled	Beneficiaries	Total
1. July 1, 2017	<b>40,140</b>	<b>1,379</b>	<b>41</b>	<b>30,658</b>	<b>5,839</b>	<b>7,374</b>	<b>85,431</b>
2. Additions							
a. New entrants	2,500	42					2,542
b. New dependents						105	105
c. Data corrections				4	4		8
d. Total	<u>2,500</u>	<u>42</u>	<u>0</u>	<u>4</u>	<u>4</u>	<u>105</u>	<u>2,655</u>
3. Reductions							
a. Withdrawals	(131)	(171)					(302)
b. Died without beneficiary				(310)	(68)	(416)	(794)
c. Data corrections		(2)	(2)	(28)	(13)	(41)	(86)
d. Total	<u>(131)</u>	<u>(173)</u>	<u>(2)</u>	<u>(338)</u>	<u>(81)</u>	<u>(457)</u>	<u>(1,182)</u>
4. Changes in Status							
a. Contributing Actives	201	(200)	(1)				0
b. Non-Contributing Actives	(548)	548					0
c. Deferred Vested		(5)	5				0
e. Retired	(1,210)	(37)	(1)	1,248			0
f. Disabled	(112)	(75)		(1)	188		0
g. Died with beneficiary	(20)	(4)		(344)	(46)	414	0
h. Total	<u>(1,689)</u>	<u>227</u>	<u>3</u>	<u>903</u>	<u>142</u>	<u>414</u>	<u>0</u>
5. July 1, 2018	<b>40,820</b>	<b>1,475</b>	<b>42</b>	<b>31,227</b>	<b>5,904</b>	<b>7,436</b>	<b>86,904</b>

QDRO benefits included with member records for valuation purposes.



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

Table A-9 Age / Service Distribution of Contributing Active Members State									
Attained Age	Years of Service								Total No.
	Under 1 No.	1 to 4 No.	5 to 9 No.	10 to 14 No.	15 to 19 No.	20 to 24 No.	25 to 29 No.	30 & up No.	
Under 30	296	795	172	1	0	0	0	0	1,264
30 to 34	98	325	476	206	4	0	0	0	1,109
35 to 39	18	122	268	523	217	8	0	0	1,156
40 to 44	0	15	114	352	579	202	2	0	1,264
45 to 49	0	0	12	177	478	519	44	0	1,230
50 to 54	0	0	0	16	201	306	60	6	589
55 & up	0	0	0	0	6	130	35	24	195
Total	412	1,257	1,042	1,275	1,485	1,165	141	30	6,807

Table A-10 Age / Service Distribution of Contributing Active Members State									
Attained Age	Years of Service								Total Comp.
	Under 1 Comp.	1 to 4 Comp.	5 to 9 Comp.	10 to 14 Comp.	15 to 19 Comp.	20 to 24 Comp.	25 to 29 Comp.	30 & up Comp.	
Under 30	\$ 40,727	\$ 45,810	\$ 55,861	\$ 64,667	\$ 0	\$ 0	\$ 0	\$ 0	\$ 46,002
30 to 34	40,964	48,191	60,886	69,778	61,663	0	0	0	57,060
35 to 39	42,752	47,200	62,766	73,885	82,506	86,526	0	0	69,712
40 to 44	0	49,728	63,670	76,815	85,390	90,402	77,982	0	81,409
45 to 49	0	0	69,144	76,736	84,598	91,310	89,428	0	86,321
50 to 54	0	0	0	77,749	85,581	88,774	90,067	85,546	87,484
55 & up	0	0	0	0	88,961	87,225	90,374	95,369	88,846
Total	\$ 40,872	\$ 46,607	\$ 60,940	\$ 74,468	\$ 84,690	\$ 89,998	\$ 89,772	\$ 93,405	\$ 70,507

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-11</b>									
<b>Age / Service Distribution of Contributing Active Members</b>									
<b>Local Employers</b>									
<b>Attained Age</b>	<b>Years of Service</b>								<b>Total</b>
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & up	
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Under 30	992	3,529	755	11	0	0	0	0	5,287
30 to 34	228	1,818	2,337	1,402	39	1	0	0	5,825
35 to 39	41	635	1,026	2,954	1,385	22	0	0	6,063
40 to 44	1	111	348	1,437	2,665	1,099	12	0	5,673
45 to 49	0	1	43	744	1,752	3,145	609	12	6,306
50 to 54	0	1	1	51	594	1,579	863	246	3,335
55 & up	0	0	2	4	54	631	351	482	1,524
<b>Total</b>	<b>1,262</b>	<b>6,095</b>	<b>4,512</b>	<b>6,603</b>	<b>6,489</b>	<b>6,477</b>	<b>1,835</b>	<b>740</b>	<b>34,013</b>

<b>Table A-12</b>									
<b>Age / Service Distribution of Contributing Active Members</b>									
<b>Local Employers</b>									
<b>Attained Age</b>	<b>Years of Service</b>								<b>Total</b>
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & up	
	Comp.	Comp.	Comp.	Comp.	Comp.	Comp.	Comp.	Comp.	Comp.
Under 30	\$ 44,463	\$ 57,300	\$ 73,607	\$ 70,280	\$ 0	\$ 0	\$ 0	\$ 0	\$ 57,247
30 to 34	43,861	61,359	84,285	98,037	108,706	83,124	0	0	79,021
35 to 39	44,567	62,864	86,998	105,287	113,421	118,628	0	0	99,245
40 to 44	48,486	69,250	89,960	105,566	116,484	126,547	126,316	0	113,126
45 to 49	0	66,292	96,249	103,527	114,119	126,538	136,381	156,356	121,164
50 to 54	0	43,424	110,060	107,912	112,534	122,879	137,050	149,971	126,445
55 & up	0	0	110,242	130,278	112,952	117,404	129,047	150,125	130,301
<b>Total</b>	<b>\$ 44,361</b>	<b>\$ 59,307</b>	<b>\$ 83,684</b>	<b>\$ 103,587</b>	<b>\$ 114,754</b>	<b>\$ 124,724</b>	<b>\$ 135,227</b>	<b>\$ 150,175</b>	<b>\$ 99,691</b>

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

**Table A-13  
Counts by Age and Status of Inactive Members  
State**

Attained Age	Status				Total
	Retiree	Beneficiary	Ordinary Disability	Accidental Disability	
Under 45	12	105	71	80	268
45 to 49	241	31	98	78	448
50 to 54	847	41	123	76	1,087
55 to 59	1,055	70	110	49	1,284
60 to 64	938	108	116	41	1,203
65 to 69	712	120	99	21	952
70 to 74	478	120	67	11	676
75 to 79	271	98	35	4	408
80 to 84	113	83	7	4	207
85 & up	66	71	2	1	140
<b>Total</b>	<b>4,733</b>	<b>847</b>	<b>728</b>	<b>365</b>	<b>6,673</b>

**Table A-14  
Average Retirement Allowances by Age and Status of Inactive Members  
State**

Attained Age	Status				Total
	Retiree	Beneficiary	Ordinary Disability	Accidental Disability	
Under 45	\$ 47,870	\$ 19,410	\$ 27,405	\$ 45,921	\$ 30,716
45 to 49	56,993	36,380	28,811	47,775	47,797
50 to 54	57,907	35,711	28,726	47,609	53,048
55 to 59	55,262	36,696	27,087	45,417	51,461
60 to 64	53,740	37,735	29,405	43,114	49,594
65 to 69	52,174	36,133	26,199	41,449	47,214
70 to 74	47,442	33,885	26,777	42,615	42,909
75 to 79	41,287	30,607	24,622	34,715	37,228
80 to 84	39,370	28,880	25,760	30,786	34,538
85 & up	30,963	26,045	13,732	18,804	28,136
<b>Total</b>	<b>\$ 52,730</b>	<b>\$ 31,785</b>	<b>\$ 27,679</b>	<b>\$ 45,566</b>	<b>\$ 46,947</b>

QDRO benefits included with member records for valuation purposes.



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Table A-15 Counts by Age and Status of Inactive Members Local Employers</b>					
<b>Attained Age</b>	<b>Status</b>				<b>Total</b>
	<b>Retiree</b>	<b>Beneficiary</b>	<b>Ordinary Disability</b>	<b>Accidental Disability</b>	
Under 45	64	249	265	432	1,010
45 to 49	1,110	138	334	523	2,105
50 to 54	3,638	215	415	516	4,784
55 to 59	4,272	321	333	344	5,270
60 to 64	4,565	568	272	238	5,643
65 to 69	4,107	711	238	197	5,253
70 to 74	3,717	947	183	170	5,017
75 to 79	2,599	1,014	110	90	3,813
80 to 84	1,358	965	41	51	2,415
85 & up	1,064	1,461	21	38	2,584
<b>Total</b>	<b>26,494</b>	<b>6,589</b>	<b>2,212</b>	<b>2,599</b>	<b>37,894</b>

<b>Table A-16 Average Retirement Allowances by Age and Status of Inactive Members Local Employers</b>					
<b>Attained Age</b>	<b>Status</b>				<b>Total</b>
	<b>Retiree</b>	<b>Beneficiary</b>	<b>Ordinary Disability</b>	<b>Accidental Disability</b>	
Under 45	\$ 58,149	\$ 24,305	\$ 34,303	\$ 61,353	\$ 44,919
45 to 49	72,936	45,668	32,917	60,315	61,663
50 to 54	76,789	44,500	33,566	59,471	69,721
55 to 59	74,894	41,994	33,099	56,163	69,026
60 to 64	72,163	41,501	30,336	46,822	65,992
65 to 69	67,255	38,434	26,835	41,456	60,555
70 to 74	59,366	35,091	20,652	31,560	52,430
75 to 79	53,632	33,354	17,106	28,317	46,588
80 to 84	47,972	28,553	17,228	23,141	39,166
85 & up	38,930	24,788	13,614	22,498	30,487
<b>Total</b>	<b>\$ 66,288</b>	<b>\$ 32,952</b>	<b>\$ 29,985</b>	<b>\$ 52,834</b>	<b>\$ 57,450</b>

QDRO benefits included with member records for valuation purposes.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**A. Actuarial Assumptions**

- 1. Investment Rate of Return** 7.50% per annum, compounded annually.
- 2. Administrative Expenses** No explicit assumption is made for administrative expenses for funding purposes per the funding methodology prescribed by N. J. Statute.
- 3. Cost-of-Living Adjustments (COLAs)** No future COLAs are assumed. Previously granted COLAs are included in the data.
- 4. Salary Increases** Salary increases vary by age and time period. Representative salary increase rates are shown below.

Age	Prior to FYE 2026	FYE 2026 and thereafter
25	8.98%	9.98%
30	5.97	6.97
35	4.17	5.17
40	3.33	4.43
45	2.90	3.90
50	2.75	3.75
55	2.60	3.60
60	2.35	3.35
64	2.10	3.10

Salary increases are assumed to occur on July 1.

- 5. 401(a)(17) Pay Limit** \$275,000 in 2018 increasing 3.00% per annum, compounded annually.
- 6. Social Security Wage Base** \$128,400 in 2018 increasing 4.00% per annum, compounded annually.
- 7. Termination** Representative termination rates are as follows:

Age	Years of Service					
	0 - 1	2	3	4	5 - 9	10+
25	6.90%	2.03%	1.18%	0.60%	0.35%	0.00%
30	9.30	2.75	1.76	1.31	0.60	0.24
35	9.80	3.17	1.76	1.57	0.77	0.24
40	13.70	2.25	1.85	1.74	0.67	0.27
45	3.50	2.25	1.85	2.32	1.35	0.28
50	0.00	2.25	1.85	2.00	1.60	0.30
55	0.00	0.00	0.00	0.00	0.00	0.00

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

No termination is assumed after attainment of retirement eligibility. All members with 10 or more years of service at termination are assumed to elect a deferred retirement benefit.

**8. Disability**

Representative disability rates are as follows:

<b>Age</b>	<b>Ordinary Disability</b>	<b>Accidental Disability</b>
25	0.045%	0.029%
30	0.147	0.278
35	0.265	0.393
40	0.362	0.423
45	0.394	0.396
50	0.449	0.179
55	0.554	0.161
60	1.024	0.161
64	1.680	0.161
65+	0.000	0.000

Both ordinary and accidental disability rates apply at all ages until the mandatory retirement age of 65.

Members retiring under the ordinary disability decrement with less than four years of service are assumed to receive a return of Aggregate Contributions.

No members are assumed to receive the involuntary disability retirement benefit.

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

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**9. Mortality**

Pre-Retirement Accidental Mortality: Custom table with representative rates as follows.

Age	Rates
25	0.006%
30	0.006
35	0.008
40	0.008
45	0.009
50	0.009
55	0.014
60	0.013
64	0.008
65+	0.000

No mortality improvement is assumed for pre-retirement accidental mortality.

Pre-Retirement Ordinary Mortality: RP-2000 Combined Healthy Mortality Tables projected on a generational basis from the base year of 2000 to 2013 using Projection Scale BB and the Conduent Modified 2014 Projection Scale thereafter.

Post-Retirement Healthy Female Retiree and Beneficiary Mortality: RP-2000 Combined Healthy Mortality Tables projected on a generational basis from the base year of 2000 to 2013 using Projection Scale BB and the Conduent Modified 2014 Projection Scale thereafter.

Post-Retirement Healthy Male Retiree Mortality: RP-2000 Combined Healthy Mortality Tables projected on a generational basis using Projection Scale AA from the base year of 2012 to 2013 and the Conduent Modified 2014 Projection Scale thereafter.

Disabled Retiree Mortality: Custom table with representative rates as follows.

Age	Rates
35	0.598%
40	0.634
45	0.803
50	1.058
55	1.210
60	1.426
65	1.949

No mortality improvement is assumed for disabled retiree mortality.

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**10. Retirement**

Representative retirement rates are as follows:

Age	Years of Service			
	Less Than 21	21 - 24	25	26+
40	4.00%	0.60%	45.57%	15.40%
45	4.00	0.60	54.83	15.40
50	4.30	0.60	57.62	18.48
55	6.00	0.00	64.94	24.47
60	3.20	0.00	77.49	27.34
64	37.50	0.00	85.24	51.03

Mandatory retirement at age 65.

Retirement rates for less than 25 years of service prior to age 55 apply only to members enrolled as of January 18, 2000 upon completion of 20 years of service.

**11. Family Composition Assumptions**

For members not currently in receipt, 90% 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 post-retirement 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.

For current dependents receiving a pre-retirement accidental death benefit, those under age 24 are assumed to receive a benefit until age 24 while those over age 24 are assumed to receive a benefit for the remainder of their lifetime.

For current dependents receiving a benefit other than a pre-retirement accidental death benefit, those under age 19 are assumed to receive a benefit until age 19 while those over age 19 are assumed to receive a benefit for the remainder of their lifetime.

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

- |   |   |
|---|---|
| <b>12. Non-Contributory<br/>Group Insurance<br/>Benefit Form of<br/>Payment</b> | All benefits are assumed to be paid as lump sums.   |
| <b>13. Data</b>   | <p>Information provided by the prior actuary was relied upon for the purposes of setting the status of and valuing non-contributing active records.</p> <p>For current beneficiaries with missing data, reasonable assumptions were made based on the information available in prior years.</p> <p>Inactive participants receiving benefits according to the 2017 data but omitted from the 2018 data are assumed to have died without a beneficiary.</p>   |
| <b>14. Rationale for<br/>Assumptions</b>  | <p>The July 1, 2018 valuation results are based on the same actuarial methods and assumptions as used in the July 1, 2017 valuation produced by the prior actuary. The demographic assumptions were based on the July 1, 2010 – June 30, 2013 Experience Study prepared by the prior actuary, which was approved by the Board of Trustees on February 9, 2015. The valuation is based on a 7.50% interest rate, annual salary increases that are 0.5% lower than the rates shown in the experience study and a select period for annual salary increases through fiscal year ending 2026, which were recommended by the State Treasurer. Cheiron has reviewed the demographic and economic assumptions. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study.</p> |
| <b>15. Changes in Assumptions<br/>since Last Valuation</b>                      | None.   |

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**B. Projection Assumptions**

- 1. Investment Rate of Return**
  - 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. Appropriation Percentages**

The State is assumed to appropriate 70% of the Statutory contribution in FYE 2020, and to increase the percent by 10% a year, until reaching 100% of the Statutory contribution beginning with FYE 2023.
  
- 3. Administrative Expenses**

0.21% of expected pension benefit payments for the year for the State and 0.18% of expected pension benefit payments for the year for Local employers.
  
- 4. New Entrants**
  - Contributing active population assumed to remain at 2018 levels.
  - Assumed to join mid-year.
  - Age/sex distributions based on the last three years of new hires.
  - Salary based on salary for most recent hires reported on 2018 data.
  - New entrant salary assumed to increase with the age 64 salary increase rates.
  
- 5. Demographic Assumptions**

Same as those used for valuation purposes.

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**C. Actuarial Methods**

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

**1. Actuarial Cost Method**

The actuarial cost method for funding calculations is the Projected 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 Aggregate Contributions as of the valuation date as 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, 2018 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, 2028 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.

Certain portions of the normal cost and unfunded actuarial liabilities attributable to Local employers are payable by the State and/or over different periods in accordance with the NJ State Statutes.

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.



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**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, benefit payments and administrative expenses, and an assumed rate of return on the previous year's assets and the 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 Plan 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.

Local employers' contributions are expected to be paid on April 1<sup>st</sup>, 21 months after the associated valuation date.

Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, allows the PFRS to receive 1.20% 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 PFRS, 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.

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

Early Retirement Incentive Programs

The following legislation provides additional retirement benefits to certain employees of Local employers: Chapter 59, P.L. 1999, Chapter 126, P.L. 2000 and Chapter 130, P.L. 2003. The cost of the enhanced pension benefits will be funded by employer contributions to the retirement system and paid by the employer that elected to participate over amortization periods elected by the employer to the extent permitted by NJ Statute.

Chapter 59, P.L. 1999 authorizes municipalities, counties and other local units of government that enter into agreements to provide governmental services on a joint or consolidated basis, municipalities that join together to establish a new consolidated municipality, or school districts that have merged with one or more other school districts due solely to a municipal consolidation, to offer incentive programs for retirement or termination of employment for employees affected by the consolidation agreements. "County ERI Section 44" of Chapter 126, P.L. 2000 permitted local units to offer early retirement or termination incentives to certain employees of county governing bodies. Chapter 130, P.L. 2003 extended an Early Retirement Incentive Program similar to that offered by the State under Chapter 23, P.L. 2002 to members of Local employer locations. Appendix E lists all applicable locations and summarizes the contribution requirements under Chapter 59, Chapter 126 and Chapter 130.

Chapter 109, P.L.1979

Chapter 109, P.L. 1979 increased special retirement benefits for members who retire with 25 years of service from 50% to 60% of average final compensation. Under the provisions of this chapter, the State is liable for the increase in the normal contribution to fund the benefits provided by this act. As required by Chapter 109, additional State contributions of 1.1% of covered salary are required to provide for this additional benefit.

Chapter 204, P.L. 1989

Chapter 204 allowed employees who were previously excluded on the basis of their titles from PFRS membership to enter the System. Employers of such employees are required to contribute any additional contribution necessary to fund any unfunded actuarial liability arising from Chapter 204. The valuation reflects the additional actuarial liability for three State locations and fifteen Municipality and Local Group locations with certain employees participating in the System under the provisions of this legislation. Section IV lists all applicable locations and the required contributions.

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Chapter 511, P.L. 1991

Chapter 511 increased the benefit payable to the surviving spouse of a retiree from 35% to 50% of the retiree's average final compensation. This law also raised the minimum annual spouse's benefit from \$1,600 to \$4,500 for benefits granted prior to January 14, 1992. Chapter 511 required that the normal cost and actuarial liability contribution attributable to this chapter be separately determined. As a result of Chapter 115, P.L. 1997, the actuarial liability contribution attributable to Chapter 511 was eliminated at that time. However, because of the reductions (and anticipated reductions) in the required State contributions for fiscal years 2004 through 2019 due to the various Appropriation Acts and Chapter 1, P.L. 2010, the remaining required contributions that have not been made have been set up as an unfunded actuarial liability attributable to Chapter 511.

Chapter 247, P.L. 1993 and Chapter 201, P.L. 2001

Chapter 247 requires the State to pay the difference between the PFRS normal cost rate and the PERS normal cost rate for certain members who transferred into PFRS as of January 1, 1992 or later. In addition, the law requires the State to pay the "System" unfunded actuarial liability contribution for Municipalities and Local Groups that transferred into PFRS on and after January 1, 1992 without past service.

Chapter 201, P.L. 2001 made changes to Chapter 247, P.L. 1993 with respect to the benefits payable to members who transferred from PERS to PFRS as a result of the Chapter 247 legislation. The resulting increase in the unfunded actuarial liabilities due to the increased benefits was fully funded by the recognition of additional market value surplus in the determination of the actuarial value of assets in the July 1, 1999 valuation. However, because of the reductions (and anticipated reductions) in the required State contributions for fiscal years 2004 through 2019 due to the various Appropriation Acts and Chapter 1, P.L. 2010, the remaining required contributions which were not paid have been added to the Chapter 247 unfunded actuarial liability and will be included in future State contributions.

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Chapter 428, P.L. 1999

Chapter 428, P.L. 1999 made the following changes to the benefit provisions:

- Changed the compensation basis for benefits from 3-year average compensation to final compensation.
- Added a service retirement benefit of 50% of final compensation for members as of the date of enactment who retire with 20 years of service and for all other members at age 55 with 20 years of service.
- Added an additional service retirement benefit of 3% of final compensation per year of service in excess of 20 years for those who retire with less than 25 years of service.
- Reduced the service requirement for ordinary disability retirement from 5 years to 4 years.
- Added the special involuntary disability benefit.
- Changed the preretirement death benefit from a refund of contributions to a spousal annuity equal to 50% of final compensation.

Chapter 8, P.L. 2000 required that, if valuation assets are insufficient to fund the normal cost and actuarial liability costs attributable to Chapter 428, P.L. 1999, the contribution required to fund these costs for the State and other employers shall be paid by the State. For the current valuation, valuation assets were not sufficient to fund the costs attributable to Chapter 428. In addition, because of the reductions (and anticipated reductions) in the required State contributions for fiscal years 2004 through 2019 due to the various Appropriation Acts and Chapter 1, P.L. 2010, the remaining required contributions which were not paid have been added to the Chapter 428 unfunded actuarial liability and will be included in future State contributions.

Chapter 86, P.L. 2001 amended the active death benefits provided to a beneficiary of a member who died in active duty on or after January 1, 1998 and before January 18, 2000. The law required an eligible beneficiary to apply for the increased benefits within 90 days of enactment and return the member's aggregate contributions to the System. The State is liable for all costs to the System attributable to this law, and these costs have been included in the Chapter 428 actuarial liability contributions.

Chapter 318, P.L. 2001 amended the active death benefits provided to a beneficiary of a member with 10 or more years of service who died in active service on or after June 1, 1995 and before January 1, 1998 and whose beneficiary had, on May 1, 2001, an appeal of a denial of a benefit related to death in the line of duty pending before the Board of Trustees. The law requires that the appeal be withdrawn or denied and that an eligible beneficiary apply for the increased benefits and return the member's aggregate contributions received. The State is liable for all costs to the System attributable to this law and these costs are also included in the Chapter 428 actuarial liability contributions.

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Chapter 19, P.L. 2009

Chapter 19 provided that the State Treasurer will reduce for Local employers the normal and actuarial liability contributions to 50% of the amount certified for fiscal year 2009. The remaining 50% of the contribution (unfunded actuarial liability) will be paid by the Local employers in level annual payments over a period of 15 years with the first payment due in the fiscal year ending June 30, 2012. The unfunded liability will be adjusted by the rate of return on the actuarial value of assets. The legislation also provided that a Local employer may pay 100% of the contribution for the fiscal year 2009. Such an employer will be credited with the full payment and any such amounts will not be included in their unfunded actuarial liability. In addition, certain Local employers who were eligible to defer 50% of their fiscal year 2009 pension contributions but instead paid 100% of the fiscal year 2009 pension contributions were permitted to defer 50% of their 2010 fiscal year pension contributions. The unfunded actuarial liability will be paid by these Local employers over a period of 15 years with the first payment due in the fiscal year ending June 30, 2012. The unfunded actuarial liability will be adjusted by the rate of return on the actuarial value of assets.

**4. Changes in Actuarial Methods since Last Valuation**

None.

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**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

This summary of Plan provisions provides an overview of the major provisions of the PFRS used in the actuarial valuation. It is not intended to replace the more precise language of the NJ State Statutes, Title 43, Chapter 16A, 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 of Membership**

Eligibility is restricted to eligible police officers and firefighters in an eligible job title of classification who also meet the age, medical and training criteria for membership. The maximum enrollment age is 35.

- a) Tier 1 Member: Any member hired on or before May 21, 2010.
- b) Tier 2 Member: Any member hired after May 21, 2010 and on or before June 28, 2011.
- c) Tier 3 Member: Any member hired after June 28, 2011.

**2. Plan Year**

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

**3. Creditable Service**

A year of service is credited for each year an employee is a Member of the Retirement System plus service, if any, covered by a prior service liability.

**4. Compensation**

Base salary upon which contributions by a Member to the Annuity Savings Fund were based in the last year of service. Chapter 113, P.L. 1997 provides that Compensation cannot exceed the compensation limitation of Section 401(a)(17) of the Internal Revenue Code. Chapter 1, P.L. 2010 provides that for members hired on or after May 22, 2010, Compensation cannot exceed the annual maximum wage contribution base for Social Security, pursuant to the Federal Insurance Contribution Act.

**5. Final Compensation**

Annual compensation received by the Member in the last 12 months of Creditable Service preceding his retirement. Chapter 1, P.L. 2010 provides that for members hired on or after May 22, 2010, Final Compensation means the average annual compensation for the three fiscal years of membership providing the largest benefit.

**6. Aggregate Contributions**

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

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**7. Member Contributions**

Each Member contributes 10% of base salary.

**8. Benefits**

**a) Service and Special Retirement**

Mandatory retirement at age 65, except a Member hired prior to January 1, 1987 may remain a Member until attaining the earlier of age 68 or 25 years of Creditable Service. Voluntary retirement prior to age 65.

- (1) Service Retirement: For a Member enrolled as of January 18, 2000, age 55 or 20 years of Creditable Service. For a Member enrolled after January 18, 2000, age 55.

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

- a. 2% of Final Compensation for each year of Creditable Service up to 30 years plus 1% of Final Compensation for each year of Creditable Service over 30 years.
- b. 50% of Final Compensation for Members with 20 or more years of Creditable Service.
- c. 50% of Final Compensation plus 3% of Final Compensation for each year of Creditable Service in excess of 20 years for Members as of January 18, 2000 who would have 20 years of Creditable Service but not 25 years at age 65.

- (2) Special Retirement: 25 years of Creditable Service.

Benefit is in an annual retirement allowance comprised of a member annuity plus an employer pension which together equal:

- a. For Members enrolled on or before June 28, 2011, 65% of Final Compensation plus 1% of Final Compensation for each year of Creditable Service in excess of 25 years with a maximum of 70% of Final Compensation, except for those members with 30 or more years of Creditable Service on June 30, 1979.
- b. For Members hired after June 28, 2011, 60% of Final Compensation plus 1% of Final Compensation for each year of Creditable Service in excess of 25 years with a maximum of 65% of Final Compensation.

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**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**b) Deferred Retirement**

Termination of service prior to age 55 with 10 years of Creditable Service.

Benefit is either a refund of Aggregate Contributions, or a deferred life annuity commencing at age 55 comprised of a member annuity plus an employer pension which together equal 2% of Final Compensation for each year of Creditable Service up to 30 plus 1% of Final Compensation for each year of Creditable Service over 30 years.

For Members who die during the deferral period, the benefit is a return of Aggregate Contributions.

**c) Non-Vested Termination**

Termination of service prior to age 55 and less than 10 years of service credit.

Benefit is a return of Aggregate Contributions.

**d) Death Benefits**

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

- a. Lump sum payment equal to 350% of Compensation, also known as the non-contributory group life insurance benefit, plus
- b. Spousal life annuity of 50% of Final 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 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 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 Aggregate Contributions.

(2) Accidental Death Before Retirement: Death of an active Member resulting during performance of duties. Benefit is equal to:

- a. Lump sum payment equal to 350% of Compensation, also known as the non-contributory group life insurance benefit, plus
- b. Spousal life annuity of 70% of Compensation payable until spouse's death or remarriage. If there is no surviving spouse or upon death or remarriage, 70% of Compensation payable to dependent children in equal shares. If there is no surviving spouse or dependent child(ren), 25% (40%) of 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 Aggregate Contributions.



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- (3) Death After Retirement: Death of a retired Member. Benefit is equal to:
- a. Lump sum payment equal to 50% of Compensation for a Member retired under service, special or deferred retirement. For a Member receiving a disability benefit, lump sum payment of 350% of Compensation if death occurs prior to age 55 and 50% of final compensation if death occurs after age 55. This benefit is also known as the non-contributory group life insurance benefit, plus
  - b. For Members who retired on or after January 1, 1968, spouse life annuity of 50% of Final Compensation plus 15% (25%) of Final Compensation for one (two or more) dependent child(ren). The minimum benefit is \$4,500 per year. If there is no surviving spouse or upon death or remarriage, a total of 20% (35%, 50%) of Final Compensation payable to one (two, three or more) dependent child(ren). Previously granted COLAs also apply.

**e) Disability Retirement**

- (1) Ordinary Disability Retirement: Four years of Creditable Service and totally and permanently incapacitated from the performance of usual or available duties.

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

- a. 40% of Final Compensation, or
- b. 1.5% of Final Compensation for each year of Creditable Service.

- (2) Involuntary Ordinary Disability Retirement: Ordinary Disability Retirement applied for by the employer.

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

- a. For Members with 20 years of Creditable Service but less than 25 years, 50% of Final Compensation plus 3% of Final Compensation for each year of Creditable Service in excess of 20 years, to a maximum of 65% of Final Compensation.
- b. For all other members, the Ordinary Disability benefit.

- (3) Accidental Disability Retirement: Totally and permanently disabled as a direct result of a traumatic event occurring during and as a result of regular or assigned duties and such member is mentally or physically incapacitated for the performance of his usual duties.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together equal  $\frac{2}{3}$  of annual rate of compensation at the time of the traumatic event or retirement, whichever is greater.

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- (4) Special Disability Retirement: Under age 55 with 5 years of Creditable Service and received a heart transplant.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together equal 50% of Final Compensation.

**9. Forms of Payment**

No optional forms of payment are available.

**10. 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.

**11. Changes in Plan Provisions since Last Valuation**

None.

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**APPENDIX D – HISTORICAL DATA**

The information on the following tables for State and Local employers is based on the final actuarial valuation reports for the given years. The amounts do not reflect differences between the discounted State appropriations receivable and the actual State contribution amounts that became known after the issuance of the reports.

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**APPENDIX D – HISTORICAL DATA**

**Table D-1  
Historical Summary of Assets and Liabilities  
State**

Valuation Date July 1,	Market Value of Assets	Actuarial Value of Assets with Special Asset Value <sup>1</sup>	Actuarial Liability	Funded Ratio	
				Market Value	Actuarial Value
2018	\$ 1,683,271,926	\$ 2,023,529,750	\$ 4,983,733,970	33.8%	40.6%
2017	1,680,114,357	2,038,961,264	4,873,081,731	34.5%	41.8%
2016	1,646,171,965	2,079,326,401	4,676,642,040	35.2%	44.5%
2015	1,831,003,301	2,004,579,109	4,516,438,165	40.5%	44.4%
2014	1,950,490,493	2,062,185,965	4,365,609,664	44.7%	47.2%
2013	1,896,198,371	2,127,491,585	4,188,523,037	45.3%	50.8%
2012	1,829,418,795	2,137,727,566	4,026,954,882	45.4%	53.1%
2011	1,944,214,316	2,173,255,647	3,926,525,679	49.5%	55.3%
2010	1,771,575,807	2,190,654,958	3,672,361,258	48.2%	59.7%
2009	1,742,699,083	2,268,272,056	3,993,259,480	43.6%	56.8%

<sup>1</sup> Includes Special Asset Value beginning with July 1, 2016 valuation

**Table D-2  
Historical Summary of Employer Contributions<sup>1</sup>  
State**

Fiscal Year Ending June 30,	Statutory Contribution / Actuarially Determined Contribution	Actual Pension Contribution	Lottery Revenue	Contribution Deficiency/ (Excess)	Percentage of Contribution Covered
2019 <sup>2</sup>	\$ 529,722,755	\$ 305,387,870	\$ 12,451,257	\$ 211,883,628	60.0%
2018	502,917,964	239,446,000	11,712,026	251,759,938	49.9%
2017	483,877,347	195,221,000	0	288,656,347	40.3%
2016	461,081,051	138,324,000	0	322,757,051	30.0%
2015	414,316,953	139,297,000	0	275,019,953	33.6%
2014	389,689,529	115,623,000	0	274,066,529	29.7%
2013	393,637,547	112,468,000	0	281,169,547	28.6%
2012	375,234,766	53,606,000	0	321,628,766	14.3%
2011	339,480,900	0	0	339,480,900	0.0%
2010	299,131,628	0	0	299,131,628	0.0%

<sup>1</sup> Excludes contributions for NCGI

<sup>2</sup> Reflects the State's planned contribution of 60% of the Statutory contribution

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX D – HISTORICAL DATA**

**Table D-3  
Historical Summary of Assets and Liabilities  
Local Employers**

Valuation Date July 1,	Market Value of Assets	Actuarial Value of Assets	Actuarial Liability	Funded Ratio	
				Market Value	Actuarial Value
2018	\$ 25,680,517,916	\$ 26,109,128,660	\$ 35,523,376,524	72.3%	73.5%
2017	24,351,431,023	25,183,776,588	34,474,127,537	70.6%	73.1%
2016	22,469,694,913	24,420,145,823	32,793,439,210	68.5%	74.5%
2015	23,360,020,456	23,935,037,150	31,205,965,303	74.9%	76.7%
2014	23,143,934,984	23,066,498,788	30,239,286,907	76.5%	76.3%
2013	20,734,802,380	22,170,221,173	28,811,698,272	72.0%	76.9%
2012	19,296,197,115	21,549,327,079	27,705,168,437	69.6%	77.8%
2011	19,405,816,249	21,051,681,692	26,978,632,188	71.9%	78.0%
2010	17,108,014,883	20,367,865,987	25,601,998,126	66.8%	79.6%
2009	16,283,683,457	20,669,565,701	28,448,841,765	57.2%	72.7%

**Table D-4  
Historical Summary of Employer Contributions<sup>1</sup>  
Local Employers**

Fiscal Year Ending June 30,	Statutory Contribution /		Contribution Deficiency/ (Excess)	Percentage of Contribution Covered
	Actuarially Determined Contribution	Actual Pension Contribution		
2019	\$ 968,867,296	\$ 968,540,115	327,181	100.0%
2018	877,147,545	877,147,545	0	100.0%
2017	807,438,390	807,438,390	0	100.0%
2016	804,063,662	804,063,662	0	100.0%
2015	760,533,458	760,533,458	0	100.0%
2014	726,928,577	726,928,577	0	100.0%
2013	776,511,374	776,511,374	0	100.0%
2012	762,531,584	762,531,584	0	100.0%
2011	857,072,909	857,072,909	0	100.0%
2010 <sup>2</sup>	718,078,464	717,576,451	502,013	99.9%

<sup>1</sup> Excludes contributions for NCGI and includes ERIs and Chapter 19, P.L. 2009 payments

<sup>2</sup> Reflects contribution reductions due to Chapter 19, P.L. 2009

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX E – EARLY RETIREMENT INCENTIVE PROGRAMS**

<b>Table E-1 Local Employers ERI 1 Contribution Schedule</b>			
<b>Location Number</b>	<b>Location Name</b>	<b>Fiscal Year 2020 Payment</b>	<b>Present Value as of 7/1/2018</b>
22100	East Rutherford Borough	\$ 82,873	\$ 785,770
25500	Glen Ridge Borough	59,590	565,010
34600	Wallington Borough	38,960	369,406
38800	Phillipsburg Town	11,663	110,580
43400	Bound Brook Borough	34,629	328,337
54400	Linwood City	54,298	514,836
57100	Mine Hill Township	18,930	179,486
61200	Raritan Township	57,065	541,071
	<b>Total</b>	<b>\$ 358,008</b>	<b>\$ 3,394,496</b>

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**APPENDIX E – EARLY RETIREMENT INCENTIVE PROGRAMS**

<b>Table E-2</b>				
<b>Local Employers ERI Contribution Schedules due to Recent ERI Legislation</b>				
<b>Location Number</b>	<b>Location Name</b>	<b>Years and Form of Payment</b>	<b>Fiscal Year 2020 Payment</b>	<b>Present Value as of 7/1/2018</b>
<b>Chapter 126, P.L. 2000</b>				
71600	Passaic County	15 Year - Level	\$ 174,666	\$ 153,901
71603	Passaic County	15 Year - Level	27,688	24,396
72000	Union County	15 Year - Level	49,373	189,210
72001	Union County	15 Year - Level	17,653	67,654
72003	Union County	15 Year - Level	54,480	92,658
72003	Union County (Effective 2006)	15 Year - Level	198,432	760,445
	<b>Sub-Total</b>		<b>\$ 522,292</b>	<b>\$ 1,288,264</b>
<b>Chapter 130, P.L. 2003</b>				
20300	Bayonne City	15 Year - Increasing	\$ 323,915	\$ 558,869
22100	East Rutherford Borough	15 Year - Increasing	53,395	135,316
22400	Union City	15 Year - Increasing	37,881	65,359
28300	Montclair Township	15 Year - Increasing	300,001	517,609
31800	Harrison Town	15 Year - Increasing	217,481	375,232
32500	Nutley Township	15 Year - Increasing	118,646	204,707
33300	Wood-Ridge Borough	15 Year - Increasing	36,777	93,201
35400	Belleville Township	15 Year - Increasing	51,133	129,583
36000	Livingston Township	15 Year - Increasing	80,672	204,444
43100	Ewing Township	15 Year - Increasing	173,774	299,822
43600	Roseland Borough	15 Year - Increasing	42,928	108,789
49300	Berkeley Heights Township	15 Year - Increasing	42,062	106,596
56500	Franklin Township	15 Year - Increasing	38,338	97,158
61200	Raritan Township	15 Year - Increasing	26,579	67,359
62600	Monroe Township	15 Year - Increasing	21,541	54,591
71100	Mercer County	15 Year - Increasing	167,532	289,052
72000	Union County	15 Year - Increasing	1,241	3,146
72003	Union County	15 Year - Increasing	56,483	143,142
	<b>Sub-Total</b>		<b>\$ 1,790,379</b>	<b>\$ 3,453,975</b>
	<b>Total</b>		<b>\$ 2,312,671</b>	<b>\$ 4,742,239</b>

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX F – CHAPTER 19, P. L. 2009**

Table F-1 Local Employer Chapter 19, P.L. 2009 Deferral and Payment Schedule			
Location Number	Location Name	Fiscal Year 2020 Payment	Present Value as of 7/1/2018
20300	Bayonne City	\$ 619,387	\$ 3,107,443
20400	Salem City	24,446	122,646
20600	Plainfield City	354,249	1,777,256
21001	Elizabeth City	494,856	2,482,676
21002	Elizabeth City	354,239	1,777,205
21101	Newark City	1,848,643	9,274,574
21102	Newark City	902,643	4,528,529
21202	Camden City	307,383	1,542,127
21300	North Plainfield Borough	110,400	553,872
21600	Somerville Borough	43,690	219,192
21800	Roselle Borough	142,173	713,278
22000	Freehold Borough	52,730	264,544
22400	Union City	300,718	1,508,693
22501	Passaic City	268,287	1,345,987
22502	Passaic City	178,007	893,056
22800	Metuchen Borough	38,661	193,963
23000	West New York Town	174,564	875,780
23200	Oradell Borough	34,649	173,834
23301	Hoboken City	218,353	1,095,468
23302	Hoboken City	210,018	1,053,651
23400	Audubon Borough	25,266	126,760
23800	East Orange City	544,420	2,731,336
23900	Maplewood Township	157,231	788,823
24100	Hightstown Borough	19,869	99,680
24200	West Milford Township	79,584	399,271
24400	Saddle Brook Township	66,979	336,031
24500	Perth Amboy City	271,160	1,360,398
24600	Secaucus Town	103,375	518,631
24800	Lyndhurst Township	89,348	448,257
24900	Orange City	250,239	1,255,440
25500	Glen Ridge Borough	36,901	185,130
25600	Guttenberg Town	30,467	152,850
25801	Collingswood Borough	43,516	218,319
25802	Collingswood Borough	18,651	93,570
26100	Dunellen Borough	18,641	93,521

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.



**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**APPENDIX F – CHAPTER 19, P. L. 2009**

<b>Table F-1 (cont.)</b>			
<b>Local Employer Chapter 19, P.L. 2009 Deferral and Payment Schedule</b>			
<b>Location Number</b>	<b>Location Name</b>	<b>Fiscal Year 2020 Payment</b>	<b>Present Value as of 7/1/2018</b>
26600	Fairview Borough	\$ 53,097	\$ 266,388
26700	Keansburg Borough	44,374	222,625
27300	New Milford Borough	57,369	287,816
27400	Paramus Borough	185,590	931,100
27600	South Amboy City	37,552	188,399
27700	Weehawken Township	91,213	457,614
28000	Hackensack City	385,337	1,933,222
28500	Penns Grove Borough	18,624	93,436
28600	Matawan Borough	33,401	167,573
28700	Cedar Grove Township	50,675	254,235
28900	Bogota Borough	21,540	108,068
29100	Irvington Township	447,996	2,247,581
29200	Cinnaminson Township	64,048	321,326
29500	Little Ferry Borough	28,719	144,084
29700	Garwood Borough	23,134	116,063
30701	Paterson City	484,992	2,433,189
30702	Paterson City	383,793	1,925,475
30801	Atlantic City	475,548	2,385,809
30802	Atlantic City	352,501	1,768,484
31100	Fanwood Borough	28,160	141,278
31300	East Hanover Township	61,724	309,668
31600	Rutherford Borough	70,659	354,491
31800	Harrison Township	161,738	811,436
32200	Gloucester City	72,986	366,166
32600	Union Township	354,936	1,780,703
32700	Bloomfield Township	334,223	1,676,785
32900	Morristown Town	124,318	623,700
33200	Asbury Park City	186,108	933,699
33401	Trenton City	471,952	2,367,766
33402	Trenton City	352,415	1,768,055
33800	Lakewood Township	191,700	961,754
34000	North Arlington Borough	58,713	294,560
34100	Rahway City	206,016	1,033,577
34200	Verona Township	48,823	244,941
34301	Hillside Township	109,565	549,685

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
JULY 1, 2018 ACTUARIAL VALUATION**

**APPENDIX F – CHAPTER 19, P. L. 2009**

Table F-1 (cont.) Local Employer Chapter 19, P.L. 2009 Deferral and Payment Schedule			
Location Number	Location Name	Fiscal Year 2020 Payment	Present Value as of 7/1/2018
34302	Hillside Township	\$ 75,797	\$ 380,272
34600	Wallington Borough	39,668	199,013
34700	East Newark Borough	6,964	34,936
34800	Clifton City	470,602	2,360,995
34900	Wildwood City	79,429	398,491
35000	Palisades Park Borough	53,925	270,541
35100	Pleasantville City	160,255	803,993
35400	Belleville Township	286,159	1,435,650
35500	Dover Town	62,618	314,155
35600	South Orange Village	148,448	744,758
35800	Garfield City	107,784	540,750
35900	Linden City	391,159	1,962,432
36200	Bridgeton City	86,995	436,450
36400	Washington Borough	17,480	87,698
36700	Fairfield Township	58,348	292,732
36900	Middlesex Borough	46,694	234,261
37000	Middletown Township	167,520	840,442
37400	Maywood Borough	45,092	226,227
37700	Piscataway Township	135,261	678,602
38101	Jersey City	1,245,884	6,250,555
38102	Jersey City Fire Dept.	944,565	4,738,848
38500	Runnemede Borough	28,181	141,383
39500	Mountainside Borough	36,053	180,879
39900	Long Branch City	168,026	842,980
40400	Wanaque Borough	36,421	182,724
41000	Manville Borough	36,389	182,565
41400	Oceanport Borough	23,993	120,370
41500	Haworth Borough	19,362	97,137
41600	Little Falls Twp	32,594	163,524
41900	North Haledon Borough	25,957	130,228
42000	Haledon Borough	26,766	134,284
42500	Wharton Borough	30,596	153,498
43000	West Paterson Borough	39,048	195,902
43100	Ewing Township	141,216	708,477
43400	Bound Brook Borough	34,488	173,023

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX F – CHAPTER 19, P. L. 2009**

Table F-1 (cont.) Local Employer Chapter 19, P.L. 2009 Deferral and Payment Schedule			
Location Number	Location Name	Fiscal Year 2020 Payment	Present Value as of 7/1/2018
43500	Emerson Borough	\$ 34,078	\$ 170,967
43600	Roseland Borough	41,198	206,690
43700	Norwood Borough	23,507	117,932
43800	Prospect Park Borough	22,790	114,339
44100	Englewood Cliffs Borough	59,570	298,863
44800	Englishtown Borough	5,482	27,505
44900	Ringwood Borough	33,886	170,004
46300	Borough of Lake Como	13,869	69,580
46400	Aberdeen Township	46,837	234,978
46600	West Long Branch Borough	26,799	134,452
46700	Pt Pleasant Beach Borough	39,113	196,226
47300	Brooklawn Borough	6,086	30,533
47800	Hopatcong Borough	40,396	202,666
47900	West Deptford Township	54,375	272,798
48200	South Bound Brook Borough	19,643	98,546
48600	Gloucester Township	151,598	760,559
48800	Upper Saddle River Boro	33,046	165,790
49100	Willingboro Township	114,274	573,310
50000	Brielle Borough	25,250	126,676
50700	South Brunswick Township	126,206	633,169
51100	Jefferson Township	58,768	294,836
51600	Wall Township	127,946	641,899
52800	Berlin Borough	23,594	118,372
53500	Winslow Township	109,805	550,885
53900	Berkeley Township Municipal Bld	122,783	615,997
54100	Mansfield Township	17,166	86,120
54300	Lebanon Township	11,597	58,184
54700	Seaside Heights Borough	32,104	161,067
54800	Manchester Township	89,364	448,336
55100	Pine Hill Borough	26,598	133,442
55300	Lindenwold Borough	56,391	282,909
55700	Bloomingtondale Borough	24,977	125,309
56000	Howell Township	156,338	784,343
56200	Plainsboro Township	58,161	291,792
56300	Marlboro Township	131,227	658,359

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX F – CHAPTER 19, P. L. 2009**

Table F-1 (cont.) Local Employer Chapter 19, P.L. 2009 Deferral and Payment Schedule			
Location Number	Location Name	Fiscal Year 2020 Payment	Present Value as of 7/1/2018
56500	Franklin Township	\$ 34,629	\$ 173,731
58200	Egg Harbor Township	121,664	610,384
58400	Holmdel Township	71,188	357,150
58500	Milltown Borough	22,614	113,452
58900	Buena Borough	7,033	35,282
59000	Eastampton Township	22,410	112,432
59800	Chesilhurst Borough	8,354	41,914
59900	Egg Harbor City	14,765	74,077
60000	Harrison Township	16,976	85,169
60100	Woodbury Heights Borough	7,751	38,886
60600	Waterfront Comm of NY Harbor	1,913	9,598
61000	Somerdale Borough	14,734	73,922
61200	Raritan Township	55,029	276,080
62300	NJ Transit Corporation	265,652	1,332,768
63100	Allentown Borough	7,071	35,477
63300	Barnegat Township	39,078	196,051
67700	Lambertville City	9,918	49,759
68000	Lawnside Borough	7,799	39,130
68800	Mount Arlington Borough	13,751	68,986
69000	National Park Borough	4,447	22,310
70404	Camden County Regional	540,279	2,710,560
71600	Passaic County	895,337	4,491,872
71603	Passaic County	128,030	642,322
72000	Union County	417,934	2,096,761
72001	Union County	68,772	345,028
72003	Union County	321,939	1,615,157
72700	South Toms River Borough	7,397	37,110
73500	Union Beach Borough	12,561	63,018
74000	West Amwell Township	3,370	16,909
74100	Winfield Township	5,973	29,966
74400	Hamilton Twp Fire Comm Dist	10,293	51,640
75000	Lakewood Twp Fire District #1	5,031	25,241
75900	Gloucester Twp Fire District #2	3,419	17,153
79000	North Hudson Reg Fire & Rescue	518,725	2,602,425
<b>Total</b>		<b>\$ 25,467,677</b>	<b>\$ 127,770,470</b>

Consistent with established methodology, payment amounts calculated using a payment date 21 months after the valuation date.

Present values as of July 1, 2018 exclude expected payments for fiscal year ending 2019.

**APPENDIX G – GLOSSARY OF TERMS**

**1. Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

**2. Actuarial Cost Method**

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

**3. Actuarial Gain/(Loss)**

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

**4. Actuarial Liability**

The portion of the Actuarial Present Value of Projected Benefits which will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

**5. Actuarial Present Value (Present Value)**

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe \$100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you won't be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is:

$$\frac{\text{Amount}}{\text{Payment}} \times \frac{\text{Probability of}}{(1 - .01)} \times \frac{1/(1+\text{Investment Return})}{1/(1+.1)} = \$90$$

**6. Actuarial Valuation**

The determination, as of a specified date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

**APPENDIX G – GLOSSARY OF TERMS**

**7. Actuarial Value of Assets**

The value of cash, investments and other property belonging to a pension plan as used by the actuary for the purpose of an Actuarial Valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

**8. Actuarially Equivalent**

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

**9. Amortization Payment**

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

**10. Funded Ratio**

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

**11. Investment Return Assumption**

The assumed interest rate used for projecting dollar related values in the future.

**12. Mortality Table**

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

**13. Normal Cost**

That portion of the Actuarial Present Value of pension plan benefits and expenses, which is allocated to a valuation year by the Actuarial Cost Method.

**14. Projected Benefits**

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and increases in future compensation and service credits.

**POLICE AND FIREMEN'S RETIREMENT SYSTEM OF NEW JERSEY  
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**APPENDIX G – GLOSSARY OF TERMS**

**15. Projected Unit Credit Cost Method**

A method under which the Actuarial Liability is calculated as the Actuarial Present Value of the Projected Benefits allocated to periods prior to the valuation year.

**16. Unfunded Actuarial Liability**

The excess of the Actuarial Liability over the Actuarial Value of Assets.