



# State Universities Retirement System of Illinois

Actuarial Valuation Report as of  
June 30, 2020





October 29, 2020

Board of Trustees  
State Universities Retirement System of Illinois  
1901 Fox Drive  
Champaign, Illinois 61820

Dear Members of the Board:

At your request, we present the report of the actuarial valuation of the State Universities Retirement System of Illinois ("SURS") as of June 30, 2020. GRS has prepared this report exclusively for the Trustees of the State Universities Retirement System of Illinois; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than SURS only in its entirety and only with the permission of the Trustees.

This actuarial valuation provides information on the funding status and the contribution requirements of SURS. This actuarial valuation includes a determination of the statutory State contribution requirement (the "Statutory Contribution") for the fiscal year ending June 30, 2022, and provides estimates of Statutory contributions for subsequent years under Section 15-155 of the SURS Article of the Illinois Pension Code as amended by the provisions of Public Act ("PA") 100-0023 and 100-0587. SURS is currently not moving forward with the implementation of the Optional Hybrid Plan (OHP) created under PA 100-0023. Additional clarifying legislation is needed for SURS to be able to do so. Therefore, provisions related to the OHP are not reflected in this actuarial valuation. Under the provisions of PA 100-0023, employers make contributions beginning in fiscal year 2018 for current members who receive pay in excess of the Governor's pay and under PA 101-0010 (which rescinded the change to 3% from PA 100-0587), employers make contributions equal to the present value of the increase in benefit attributable to members who receive pay increases in excess of 6% during the final average salary (FAS) period. Information required by Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 is provided in a separate report. This report should not be relied on for any purpose other than the purpose described herein.

This actuarial valuation is based on the provisions of SURS in effect as of June 30, 2020, data on the SURS membership and information on the asset value of the trust fund as of that date. This actuarial valuation does not reflect the provisions of Public Act 98-0599 due to the court ruling that the changes in the Public Act were unconstitutional. The actuarial valuation was based upon the information furnished by SURS staff, concerning SURS benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by SURS.

The benefit provisions for members hired on or after January 1, 2011 were changed under Public Act 96-0889, which created a second tier of benefits for new members. Public Act 101-0610, effective January 1, 2020, added an unreduced retirement eligibility condition at age 60 with 20 years of service for Tier 2 police officers and firefighters. Effective September 1, 2020 the Self-Managed Plan (SMP) has been renamed the Retirement Savings Plan (RSP).

New retirement rates for Tier 2 police officers and firefighters were used for the new retirement eligibility condition. The actuarial cost method (Projected Unit Credit, as required by statute) and the asset smoothing method (also as required by statute) and all other assumptions and methods used in this actuarial valuation are unchanged from the prior June 30, 2019 actuarial valuation of SURS. 30% of assumed new hires in the actuarial valuation projections are assumed to elect the Self-Managed Plan and 70% are assumed to elect Tier 2 under Public Act 96-0889. The plan election assumptions were provided by SURS staff.

The actuarial assumptions were adopted by the Board pursuant to Section 15-155 of 40 ILCS 5 of the Illinois Pension Code. In our opinion, the actuarial assumptions are reasonable for the purpose of the measurement.

To the best of our knowledge, this actuarial statement is complete and accurate, fairly presents the actuarial position of SURS as of June 30, 2020, and has been prepared in accordance with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions, contribution amounts or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements in this report.

Actuarial valuations do not affect the ultimate cost of the Plan, only the timing of contributions into the Plan. Plan funding occurs over time. Contribution shortfalls (the difference between the actual contributions and the annual required contributions) remain the responsibility of the Plan sponsor and can be made in later years. If the contribution levels over a period of years are lower or higher than necessary, it is normal and expected practice for adjustments to be made to future contribution levels to take account of this variance, with a view to funding the plan over time.

Although prior year statutory contribution requirements were met, the statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution.



Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved; we recommend the development of and adherence to a funding policy that funds the normal cost of the plan as well as an amortization payment that would seek to pay off the total unfunded accrued liability over a closed period of no less than 15 years and no more than the period of time in order to attain 100% funding by 2045 (24 years remaining in the actuarial valuation as of June 30, 2020, which calculates the fiscal year 2022 contribution).

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report reflects the impact of COVID-19 through June 30, 2020. However, this report does not reflect the longer term and still developing future impact of COVID-19, which is likely to further influence demographic experience and economic expectations. We will continue to monitor these developments and their impact.

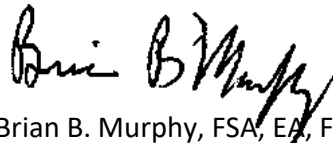
The signing actuaries are independent of the plan sponsor.

Amy Williams and Brian B. Murphy are Members of the American Academy of Actuaries (“MAAA”) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions herein.

Respectfully submitted,



Amy Williams, ASA, FCA, MAAA  
Senior Consultant



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD  
Senior Consultant

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# Table of Contents

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## Pages

### ***Summary of the Actuarial Valuation***

1	Executive Summary
2	Purposes of the Actuarial Valuation
2-3	Report Highlights
3	Actuarial Assumptions
3	SURS Benefits
4	Experience During 2020
4-6	Statutory Appropriations for the 2022 Fiscal Year and Beyond
6	Asset Information
7	Funding Status
7-8	Short Condition Test
8-9	Actuarial Funding and Statutory Funding
9	Additional Projection Details
9-12	Recommendations
12	GASB Disclosure
12	Future Considerations
13	Actuarial Standards of Practice (ASOP) 4 Disclosures
14-18	Risk Associated with Measuring the Accrued Liability and Contributions

### ***Appendix A: Asset Information***

19	Table 1 – Statement of Plan Net Position
20	Table 2 – Statement of Changes in Plan Net Position

### ***Appendix B: Membership Data***

21-23	Table 3A-3C – Summary of Data Characteristics
24	Table 4 – Distribution of Full-Time Active Members by Age and Years of Service
25	Table 5 – Distribution of Benefit Recipients by Age

### ***Appendix C: Actuarial Determinations***

26	Table 6 – Summary of Actuarial Values
27	Table 7 – Defined Benefit Plan Development of the Actuarial Value of Assets
28	Table 8 – Analysis of Change in Actuarial Accrued Liability and Actuarial Value of Assets
29	Table 9 – Analysis of Change in Unfunded Actuarial Accrued Liability
30	Table 10 – Analysis of Actuarial (Gains) and Losses
31	Table 11 – Funded Ratio and Illustrative Contributions under Funding Policy of Net Normal Cost Plus Level Percentage of Payroll Amortization of Unfunded Liability



# Table of Contents

---

## ***Appendix D: Actuarial Projections***

32	Table 12 – Baseline Projections
33	Graph 1 – Projected Funded Ratio Based on Statutory Contributions
34	Graph 2 – Projected Actuarial Accrued Liabilities
35	Graph 3 – Projected Benefit Payments
36	Table 13 – Projected Statutory Contributions before Impact of Bonds Issued in 2004
37	Table 14 – Projected Statutory Contributions Including Impact of Bonds Issued in 2004
38	Graph 4 – Projected Statutory Contributions vs. Contributions under Alternate Policy

## ***Appendix E: Additional Projection Details***

39	Table 15 – Projections Including Impact of Bonds Issued in 2004 (Does Not Reflect Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of Assets)
40	Table 16 – Development of Market and Actuarial Value of Assets as of June 30, 2020, after Bonds (Valuation Basis) and before Bonds (Hypothetical Basis)
41	Table 17 – Projections Before Impact of Bonds Issued in 2004 (Reflects Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of Assets)
42	Table 18 – Projections Before Impact of Bonds Issued in 2004 (Does Not Reflect Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of Assets)
43	Table 19 – Additional Details – Total Normal Cost Dollars
44	Table 20 – Additional Details – Normal Cost Rates
45	Table 21 – Additional Details – Number of Members, Contributions and Payroll
46	Table 22 – Additional Details – Present Value of Future Benefits and Benefit Payments
47	Table 23 – Additional Details – Actuarial Accrued Liability and Employer Normal Cost Dollars
48	Table 24 – Additional Details – Payroll and Payroll in Excess of Governor’s Pay
49	Table 25 – Additional Details – Statutorily Required Employer Contributions

## ***Appendix F: Historical Schedules***

50	Table 26 – Historical Schedule of Funding Status
51	Table 27 – Historical Comparison of ARC and State Contributions
52	Table 28 – Historical Schedule of Contributions



# Table of Contents

---

	<b><i>Appendix G: Actuarial Methods and Assumptions</i></b>
53	Projected Unit Credit Method
53-54	Funding Policy to Calculate Statutory Contributions
54	Statutory Contributions Related to the Optional Hybrid Plan
54-55	Phase In of the Financial Impact of Assumption Changes
55	Contribution Related to Pay in Excess of Governor’s Pay
56	Asset Valuation Method
57-65	Actuarial Methods and Assumptions
66-80	<b><i>Appendix H: Summary of Benefit Provisions of SURS</i></b>
81-82	<b><i>Appendix I: Glossary of Terms</i></b>
	<b><i>Appendix J: Stress Testing Scenarios</i></b>

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## **SUMMARY OF THE ACTUARIAL VALUATION**



# Executive Summary

## (\$ in Millions)

Actuarial Valuation Date:	June 30, 2019		June 30, 2020	
Fiscal Year Ending:	June 30, 2021		June 30, 2022	
Estimated Statutory Contribution:		% of Projected Capped Payroll		% of Projected Capped Payroll
· Defined Benefit Plans Contribution Amount <sup>1</sup>	\$ 1,954.566	41.88%	\$ 2,055.984	42.02%
· Self-Managed Plan Contribution Amount <sup>1</sup>	81.230	1.74%	86.033	1.76%
· Total Qualified Plan Contribution Amount	\$ 2,035.796	43.62%	\$ 2,142.017	43.78%
· Excess Benefit Arrangement (EBA) Contribution Amount <sup>2</sup>	18.000	0.39%	21.500	0.44%
· Supplemental Plan Administrative Expense	-		0.131	0.00%
· Combined State and Employer Contribution Amount	\$ 2,053.796	44.00%	\$ 2,163.648	44.22%
Estimated Statutory Contribution from Other Sources:				
· Federal/Trust Contribution Amount <sup>6</sup>	\$ 52.500		\$ 57.000	
· Employer Contribution Amount Related to - Compensation in Excess of Governor's	\$ 5.529		\$ 5.369	
Net State Contribution:				
· Net Dollar Amount (Including EBA Contribution)	\$ 1,995.767	42.76%	\$ 2,101.279	42.94%
Actuarially Determined Contribution (ADC): <sup>3,4</sup>				
· Annual Amount	\$ 2,454.215	52.58%	\$ 2,499.393	51.08%
Membership				
· Number of				
- Active Members (full time and part time)	75,120		76,335	
- Members Receiving Payments <sup>3</sup>	67,842		69,172	
- Inactive Members	93,077		94,024	
- Total	236,039		239,531	
· Covered Payroll Provided as of Valuation Date	\$ 4,356.631		\$ 4,583.907	
· Projected Capped Payroll for Fiscal Year	4,667.191		4,892.989	
· Defined Benefit Plan Capped Payroll <sup>5</sup>	3,506.650		3,642.617	
· Annualized Benefit Payments <sup>3</sup>	2,560.431		2,667.147	
Assets <sup>2</sup>				
· Market Value of Assets (MVA)	\$ 19,717.348		\$ 19,617.016	
· Actuarial Value of Assets (AVA)	19,661.891		20,091.675	
· SURS Reported Market Value Rate of Return	6.07%		2.64%	
· Estimated Return on MVA	5.96%		2.80%	
· Estimated Return on AVA	5.52%		5.54%	
· Ratio – AVA to MVA	100%		102%	
Actuarial Information <sup>3</sup>				
· Total Normal Cost Rate	20.71%		20.33%	
· Employer Normal Cost Rate	12.70%		12.32%	
· Employer Normal Cost Amount	\$ 444.743		\$ 445.084	
· Actuarial Accrued Liability (AAL)	46,443.937		47,580.470	
· Unfunded Actuarial Accrued Liability (UAAL)	26,782.045		27,488.795	
· Funded Ratio based on AVA	42.33%		42.23%	
· UAAL as % of Defined Benefit Plan Capped Payroll	763.75%		754.64%	
· Funded Ratio based on MVA	42.45%		41.23%	
· Defined Benefit Plans Contribution Amount as % of ADC	79.64%		82.26%	

Amounts from the June 30, 2019 and June 30, 2020 actuarial valuations assume 30% elect SMP and 70% elect Tier 2.

<sup>1</sup> SMP contributions are net of SMP forfeitures of \$6,578,000 for fiscal year 2021 and of \$5,672,000 for fiscal year 2022. Projected Self-Managed Plan (SMP) contribution is updated based on the most recent actuarial valuation. Contribution amount for SURS defined benefit plans is the total qualified plan statutory contribution minus the SMP contribution.

<sup>2</sup> Amounts provided by SURS.

<sup>3</sup> Excludes SMP.

<sup>4</sup> 30-year initial closed period (24 years remaining as of June 30, 2020, applicable to the fiscal year 2022 contribution).

<sup>5</sup> Defined benefit payroll from the current actuarial valuation increased with one year of wage inflation.

<sup>6</sup> Pay increases in excess of 6% during FAS period for fiscal year 2021 and 2022 are included in the Federal/Trust Contribution Amount.



# Summary of the Valuation

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## Purposes of the Actuarial Valuation

At your request we have performed an actuarial valuation of the State Universities Retirement System of Illinois (“SURS”) as of June 30, 2020.

The purposes of this actuarial valuation are as follows:

- To determine the funding status of SURS as of the valuation date based on the market value of assets and the actuarial value of assets; and
- To develop the level of contributions required under Section 15-155 of the SURS Article of the Illinois Pension Code as amended by the provisions of PA 100-0023 and PA 100-0587, (1) for the fiscal year ending June 30, 2022, and (2) to estimate contributions required under that Section for subsequent years of the funding period ending in the year 2045.

Accounting information required under Governmental Accounting Standards Board (“GASB”) Statement Nos. 67 and 68 is presented in a separate report.

## Report Highlights

The Statutory contribution (including the employer contribution and federal and trust fund contributions) for FY 2022 is \$2.164 billion (\$2.142 billion excluding the EBA contribution and the new supplemental defined contribution plan projected administrative expense) and includes the State’s projected FY 2022 normal cost of \$433.1 million, an unfunded liability contribution of \$1.623 billion, a contribution to fund benefits from the Excess Benefit Arrangement (“EBA”) of \$21.5 million, a contribution to fund the administrative expenses of the new supplemental defined contribution plan of \$0.1 million and the Self-Managed Plan (“SMP”) contribution of \$86.0 million. The 2019 actuarial valuation had projected the Statutory contribution would increase, from \$2.036 billion for FY 2021 to \$2.112 billion for FY 2022 (excluding EBA contributions). The primary reason for the increase in the Statutory contribution over the projected amount from the prior actuarial valuation is due to unfavorable experience and an increase in the number of current and projected future active members from 75,120 to 76,335.

Over the past 10 years, SURS experienced investment gains on a market value basis (compared to the actuarial assumption) in fiscal years 2011, 2013, 2014, 2017 and 2018. However, SURS incurred investment losses (or shortfalls in return compared to the actuarial assumption) in fiscal years 2012, 2015, 2016, 2019 and 2020. The market return for the year ending June 30, 2020, was approximately 2.64% and was 6.07% in FY 2019. The average market value investment return over the most recent 10 years has been approximately 8.5%.

The funded ratio decreased from 42.5% as of June 30, 2019, to 41.2% as of June 30, 2020, based on the market value of assets, and decreased slightly from 42.3% as of June 30, 2019, to 42.2% as of June 30, 2020, based on the actuarial value of assets. The net deferred asset losses will be recognized in the actuarial value of assets over the next four years.

The ratio of the market value of assets of the Defined Benefit Plan to the annual deductions (consisting of benefit payments, refunds of contributions and administrative expenses) and sometimes referred to as the liquidation ratio is about 7.1.



## Summary of the Valuation

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This means that approximately seven to eight years of retiree benefit payments can be paid from current assets. The ability to make such payments beyond that period is heavily dependent upon future State and employer contributions and future investment return.

### Actuarial Assumptions

The asset valuation method was changed from market value of assets to actuarial value of assets effective with the actuarial valuation as of June 30, 2009, as required by statute.

The plan election assumptions for new hires remain the same as in the prior actuarial valuation. Future new hires are assumed to elect to participate in the offered plans as follows: 30% would elect to participate in the Self-Managed Plan (SMP) and 70% would elect to participate in the Tier 2 Plan.

New retirement rates for Tier 2 police officers and firefighters were used for the new retirement eligibility condition. All other actuarial assumptions were first adopted by the Board for use with the actuarial valuation as of June 30, 2018, and were based on the recommendations from the experience review performed for the period from June 30, 2014, through June 30, 2017. An experience review will be completed for the period June 30, 2017, through June 30, 2020 prior to the next actuarial valuation.

The assumption for members electing the accelerated pension benefit payment options is 0%. The rationale for this assumption can be found in a separate letter issued to the Board. Buyout election statistics can be found on page 64.

The assumptions can be found in Appendix G of the report.

In addition, we have assumed that the Statutory contribution will be calculated as a level percentage of pensionable payroll. Pensionable payroll for members hired on or after January 1, 2011 is limited by the pay cap for Tier 2 members. The basis for this assumption comes from 40 ILCS 5/1-160 (b-5) for Tier 2.

### SURS Benefits

Public Act 101-0610 added an unreduced retirement eligibility condition for Tier 2 police officers and firefighters to retire at age 60 with 20 years of service. All other benefit provisions valued in this June 30, 2020 actuarial valuation are identical to those valued in the prior actuarial valuation as of June 30, 2019. Due to the court ruling recent pension reform unconstitutional, this actuarial valuation does not reflect the provisions of Public Act 98-0599.

Public Act 100-0769 requires the SURS Board of Trustees, as soon as practicable after the effective date of the legislation, to establish and maintain a defined contribution plan. The defined contribution benefit must be an optional benefit to any member who chooses to participate.

Projected administrative expenses for this plan are included in the Statutory contribution. Other costs are not reflected in this valuation.

Effective September 1, 2020 the Self-Managed Plan (SMP) has been renamed the Retirement Savings Plan (RSP).



# Summary of the Valuation

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## Experience During 2020

The System assets earned approximately 2.64% on a market value basis during FY 2020 which was less than the investment return assumption of 6.75% for FY 2020. The System assets earned 5.54% on an actuarial value of assets basis during FY 2020, due to recognition of a portion of current year asset losses and prior year net deferred investment losses under the asset smoothing method. Because 5.54% is less than the assumed rate of investment return of 6.75% for FY 2020, there was an asset loss of \$233.5 million on the actuarial value of assets.

There was also a net loss of \$102.5 million from actuarial liabilities, which is comprised of a loss of approximately \$97.1 million from demographic experience, and a loss of \$5.4 million from higher than expected pay increases.

The changes in retirement eligibility for Tier 2 police officers and firefighters increased the actuarial liabilities by \$1.0 million.

The estimated reduction in the actuarial liabilities due to the buyouts during fiscal year 2020 is \$5.2 million.

The SURS defined benefit programs experienced an overall actuarial loss of \$336.0 million.

The experience of the population determines the liability gain or loss for the year. There was a loss on salaries, due to larger salary increases than assumed and a small loss from active member mortality experience. From last year to this year, there were losses from retirement, termination and retiree mortality experience and a gain from disabilities. The other assumptions not easily attributable to one of the other categories generated an actuarial gain.

See Table 10 (page 30), Appendix C, for detail of the gains and losses by source.

## Statutory Appropriations for the 2022 Fiscal Year and Beyond

Section 15-155, which governs the development of Employer/State contributions to SURS, provides that:

1. Employer/State contributions are determined under the following process:
  - a) The overall objective of the statute is to achieve a funded ratio of 90% by the end of fiscal year ("FY") 2045.
  - b) The Employer/State contribution for FY 2012 and each year thereafter to and including FY 2045 is to be based on a (theoretically) constant percentage of the payroll<sup>1</sup> of active members of SURS based on the actuarial value of assets at the actuarial valuation date and assuming the actuarial value of assets earns the assumed investment return in the future.

<sup>1</sup> We have assumed the contribution would be based on pensionable payroll. Pensionable payroll for members hired on or after January 1, 2011, is limited by the pay cap.

## Summary of the Valuation

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- i. Requires any change in an actuarial assumption that increases or decreases the required State contribution to be implemented in equal annual amounts over a five-year period beginning in the State fiscal year in which the change first applies to the required State contribution.
  - o For changes that first applied in FY 2014, FY 2015, FY 2016 or FY 2017, the impact is calculated based on a five-year period and the applicable portion is recognized during the remaining fiscal years in that five-year period.
- ii. Required the State to make additional contributions to SURS in FY 2018, FY 2019 and FY 2020 equal to 2% of the total payroll of each employee who participates in the Optional Hybrid Plan or who participates in the Tier 2 Plan in lieu of the Optional Hybrid Plan.
- iii. Requires employers to make contributions as follows:
  - o Requires employers to contribute the employer normal cost of the portion of an employee's earnings that exceeds the amount of salary set for the governor, for academic years beginning on or after July 1, 2017. (Applicable to Tier 1 and Tier 2 employees.)
  - o Requires employers to contribute for each employee of the employer who participates in the Optional Hybrid Plan or participates in the Tier 2 Plan in lieu of the Optional Hybrid Plan.
    - 1) The employer normal cost for Fiscal Years 2018, 2019 and 2020.
    - 2) The employer normal cost plus two percent of pay for Fiscal Years 2021 and thereafter.
    - 3) Beginning in FY 2018, the amount for that fiscal year to amortize any unfunded actuarial accrued liability attributable to the defined benefits of the employer's employees who first became participants on or after the implementation date of the Optional Hybrid Plan and the employer's employees who were previously Tier 2 participants but elected to participate in the Optional Hybrid Plan, determined as a level percentage of payroll over a 30-year rolling amortization period.
    - 4) For academic years beginning on or after July 1, 2018, and for earnings paid under a contract or collective bargaining agreement entered into, amended or renewed on or after the effective date of the amendatory Act, if a participant's earnings for any academic year with the same employer as the previous academic year used to determine the final average salary increased by more than 3.00%, then the participant's employer shall pay the System the present value of the increase in benefits resulting from the portion of the increase in earnings that is in excess of 3.00%. Prior to the effective date of Public Act 100-0587, the payment from employers was for pay increases in excess of 6.00%.
- c) After 2045, the Employer/State contribution rate is to be sufficient to maintain the funding level at 90%.
  - o Employers continue to make the required normal cost and unfunded liability contributions.
  - o The financial impact of changes in actuarial assumptions continue to be phased in over a five-year period.

## Summary of the Valuation

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2. During the period of amortization of the 2003 bond issue, the Employer/State contribution in any fiscal year may not exceed the difference between:
  - a) The contribution, as developed in the preceding number 1., assuming that the special contribution (from the bond proceeds) has not been made, and
  - b) The debt service on the bond issue for the fiscal year.
3. Pursuant to Public Act 97-0694, Section 15-165, the dollar amount of the proposed Employer/State contribution required for a fiscal year shall be certified to the Governor no later than November 1 for the fiscal year commencing on the following July 1. The required amounts are budgeted pursuant to the continuing appropriations process. The State Actuary is required to review the actuarial assumptions and actuarial valuation and issue a preliminary report. After the Board considers the State Actuary's report, the certification is finalized no later than January 15.

SURS is currently not moving forward with the implementation of the Optional Hybrid Plan (OHP) created under PA 100-0023. Additional clarifying legislation is needed for SURS to be able to do so. Therefore, contributions related to the OHP are not included in the actuarial valuation, including contributions for employer normal cost, additional 2% of payroll contributions and unfunded liability contributions. Estimates of Statutory contributions through 2045, assuming that 70% of future new members elect the Tier 2 Plan, 30% of future new members elect SMP and all other actuarial assumptions are realized, are set out in Table 14 (page 37).

The Statutory contributions set out in this report represent the contribution amount determined consistent with the State Statute. The net State appropriation certified to the Governor is the total calculated in this report for the qualified plan, plus an estimated amount to fund the annual benefit payments payable from the Excess Benefit Arrangement (EBA), adjusted by contributions from federal and trust funds and employers. The estimated contributions from the federal and trust funds for FY 2022 is \$57,000,000, as estimated by SURS.

## Asset Information

Prior to the actuarial valuation as of June 30, 2009, the market value, without adjustment, was used for all actuarial purposes. Legislation in 2009 required that first effective for the actuarial valuation as of June 30, 2009, contribution projections would be calculated based on the actuarial value of assets. Funding status determinations and the contribution requirements were calculated based on the actuarial value of assets.

The market value of the assets of the System that is available for benefits decreased from \$19,717.3 million as of June 30, 2019, to \$19,617.0 million as of June 30, 2020. The actuarial value of assets as of June 30, 2020, is \$20,091.7 million, which is \$474.7 million larger than the market value of assets. This difference is due to the continuing recognition of deferred investment gains and losses. Twenty percent of these gains and losses are recognized each year. The \$474.7 million, which is the value of net deferred losses, will be smoothed into the actuarial value of assets over the next four years. The remaining unrecognized net asset gains from FY 2017 and FY 2018 will be smoothed in over the next one and two



## Summary of the Valuation

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years, respectively, and the remaining asset losses from FY 2019 and FY 2020 will be smoothed in over the next three and four years, respectively.

The detailed determinations of asset values utilized in this valuation and asset growth in the last year are set out in Appendix A and Table 7 (page 27) of Appendix C.

### Funding Status

The funding status of SURS is measured by the Funded Ratio. The Funded Ratio is the ratio of the assets available for benefits compared to the actuarial accrued liability of the System. Thus, it reflects the portion of benefits earned to date by SURS members, which are covered by current System assets.

A funded ratio of 100% means that all of the benefits earned to date by SURS members are covered by assets. By monitoring changes in the funded ratio each year we can determine whether or not funding progress is being made.

As shown below, the SURS funded ratio decreased from 42.5% as of June 30, 2019, to 41.2% as of June 30, 2020, based on the market value of assets, and decreased slightly from 42.3% as of June 30, 2019, to 42.2% as of June 30, 2020, based on the actuarial value of assets. There are net deferred losses that will be smoothed into the actuarial value of assets over the next four years. As a result of the net deferred losses and the funding policy, the funded ratio is projected to increase very slightly over the next four years if all assumptions are realized and all employer contributions are made on a timely basis.

Fiscal Year	Funded Ratio	
	AVA	MVA
2016	43.3 %	41.6 %
2017	44.4	44.2
2018	42.8	42.7
2019	42.3	42.5
2020	42.2	41.2

### Short Condition Test

The following table shows a comparison, for fiscal years 2011 through 2020, of the percentage of benefits that are covered by the actuarial value of assets. The employer financed liabilities for current active and inactive members are 0% funded by the assets. Only a portion of the retiree liabilities are funded by current assets and the percentage covered decreased from 41.0% as of June 30, 2019, to 40.9% as of June 30, 2020.



## Summary of the Valuation

Fiscal Year	Percentage of Benefits Covered by Net Assets (in Millions)						
	Member Acc Contrib.	Members Receiving Benefits	Act/Inact Employer Portion	Net Actuarial Value of Assets	% of Benefits Covered by Assets		
	(1)	(2)	(3)		(1)	(2)	(3)
2011	\$ 6,007.4	\$ 18,918.1	\$ 6,588.8	\$ 13,945.7	100.0%	42.0%	0.0%
2012	5,962.4	20,651.4	6,556.4	13,949.9	100.0%	38.7%	0.0%
2013	5,830.1	22,099.9	6,443.1	14,262.6	100.0%	38.2%	0.0%
2014	6,094.9	24,388.6	6,946.0	15,844.7	100.0%	40.0%	0.0%
2015	6,196.6	26,042.4	7,281.7	17,104.6	100.0%	41.9%	0.0%
2016	6,145.8	27,342.2	7,435.3	17,701.6	100.0%	42.3%	0.0%
2017	6,348.8	28,226.0	7,278.6	18,594.3	100.0%	43.4%	0.0%
2018	6,516.3	30,710.7	8,031.7	19,347.9	100.0%	41.8%	0.0%
2019	6,594.1	31,856.5	7,993.4	19,661.9	100.0%	41.0%	0.0%
2020	6,651.0	32,862.0	8,067.5	20,091.7	100.0%	40.9%	0.0%

### Actuarial Funding and Statutory Funding

Measuring the Statutory Contribution against a funding policy under which the sum of the normal cost and amortization of the unfunded accrued liability is contributed helps evaluate the funding adequacy of the current Statutory funding method. The rationale for contributions based on an accrual pattern of normal cost plus amortization of the unfunded liability is to have benefits accrued within the same generation that has earned them as well as to ensure that all benefit obligations will be met. Table 14 illustrates an “alternative policy contribution” which is the sum of the employer normal cost and an initial 30-year closed period (24 years remaining as of the actuarial valuation as of June 30, 2020, applicable to the fiscal year 2022 contribution) level percentage of defined benefit plan capped payroll amortization payment. The alternative funding policy would require higher contributions in the near term compared to the Statutory funding policy. However, as shown in Graph 1 (page 33) and Graph 4 (page 38), the funded ratio would increase more quickly and require lower contributions than under the Statutory policy after approximately 13 years. The Statutory contributions are projected to continue to rise in order to meet the ultimate funding objective of a 90% funded ratio in 2045.

Based on projections assuming that the Statutory contributions are made every year (as shown in Table 12, page 32) and an investment return of 6.75% each year, the funded ratio is projected to begin to increase from about 42% funded to 90% funded at 2045. The funded ratio is not projected to exceed 50% until 2032, 70% until 2041 and is projected to increase to 90% during the four-year period from 2041 until 2045. If the Statutory contributions are not made or investment return is less than the assumption of 6.75%, the funded ratio will be lower and the cash flow strain will be higher. If another significant market downturn occurred while the System’s funded ratio is low, the System could be required to liquidate assets in order to pay benefits which could have a further adverse effect on the funded status of the System.





# Summary of the Valuation

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The projected actuarial accrued liability of current retirees, current active and inactive members and future members is expected to increase from \$47.580 billion as of the end of FY 2020 to \$52.423 billion as of the end of FY 2045 (as shown in Graph 2, page 34, and Table 23, page 47). Total benefit payments are projected to increase from \$2.745 billion in fiscal year 2020 to \$4.393 billion in fiscal year 2045. Graph 3 (page 35, and Table 22, page 46) shows projected benefit payments separately for retirees as of June 30, 2020, active and inactive members as of June 30, 2020, and future members.

## Additional Projection Details

At the request of the State Actuary, we have included exhibits with additional projection details that can be found in Appendix E. The additional projections illustrate the impact on contributions and funded status if deferred asset gains and losses are not recognized.

## Recommendations

The calculations in this report were prepared based on the methods required by the Statutory funding policy including the asset smoothing method that was adopted for the first time in the June 30, 2009 actuarial valuation. GRS does not endorse this funding policy because the Statutory funding policy defers funding for these benefits into the future and places a higher burden on future generations of taxpayers.

We recommend the following changes:

1. Implementing a funding policy that contributes normal cost plus closed period amortization as a level percentage of defined benefit plan capped payroll of the unfunded liability. (Policy which recognizes unfunded liability at the valuation date and not projected liability in the year 2045.)
2. If the current Statutory funding policy is retained, we recommend:
  - a. Eliminating the maximum contribution cap
  - b. Calculating contributions as a level percentage of defined benefit plan pensionable payroll only instead of total payroll (including SMP payroll)
  - c. Eliminating smoothing of the change in the contribution requirement due to assumption changes.
3. Implementing an asset corridor to constrain the actuarial value of assets within a certain percentage of the market value of assets (for example, 20 percent).
4. Changing the actuarial cost method for calculating liabilities from the Projected Unit Credit to the Entry Age Normal method.
5. Considering whether a decrease in total active membership is expected to continue, and if so, incorporating this into the projections used to calculate the Statutory contribution requirements.

### Change Funding Policy to a More Standard Actuarial Method

We recommend a funding policy that contributes normal cost plus closed period amortization as a level percentage of defined benefit plan capped payroll for paying off the current unfunded accrued liability (i.e., the amortization period declines by one year with each actuarial valuation) such that the funded ratio is projected to be 100 percent funded by 2045 or earlier. A 30-year closed amortization period (at the actuarial valuation as of June 30, 2014) methodology pays off the unfunded accrued liability in full by the end of the 30-year period in 2045. The Fiscal Year 2022 contribution would be \$2,585.426



## Summary of the Valuation

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(\$2,499.393 million for the SURS contribution and \$86.033 million for SMP) under this alternate funding policy. The current Statutory contribution does not comply with this recommendation. Underfunding the System creates the risk that ultimately benefit obligations cannot be met from the trust, and will require a greater amount of funding from other State resources. In addition, continually underfunding the System also creates more of a funding need from contributions since less is available from investment return – thereby creating a more expensive plan. Projected contributions under the current Statutory policy and the recommended policy are shown in Graph 4 on page 38 and projected funded ratios are shown in Graph 1 on page 33.

### Eliminate Maximum Contribution Cap

If the current statutory funding policy is not changed, we recommend that the provision that establishes a maximum contribution cap be eliminated. The contribution cap is based on the projected hypothetical contributions if the proceeds from the 2003 bond issue had not been received. The cap is projected to lower contributions during fiscal years 2023 through 2033 compared to if no maximum contribution methodology was in place.

### Calculate Defined Benefit Plan Contributions Based on Defined Benefit Payroll Only

Currently, the Statutory contributions to the SURS defined benefit plan are calculated based on a level percentage of total pensionable payroll, including SMP payroll. We recommend that the contributions be calculated as a level percentage of defined benefit plan pensionable payroll only.

### Implement an Asset Corridor

In addition, we recommend that an asset corridor on the actuarial value of assets be implemented, in case there is another significant market downturn similar to Fiscal Year 2009. The following table compares the ratio of the actuarial value of assets to the market value of assets since Fiscal Year 2009. Using an actuarial value of assets that is significantly higher than the market value of assets delays funding to the System by further deferring contributions into the future. The plan is already in serious funding jeopardy, and we cannot recommend an asset valuation method that does not include a corridor because it could add additional risk to the funding of the benefit obligations if another downturn occurred.

## Summary of the Valuation

(\$ in Millions)					
Year	Actuarial Value of Assets		Market Value of Assets		Ratio of Actuarial Value to Market Value
2011	\$	13,945.680	\$	14,274.003	98 %
2012		13,949.905		13,705.143	102
2013		14,262.621		15,037.102	95
2014		15,844.714		17,391.323	91
2015		17,104.607		17,462.968	98
2016		17,701.646		17,005.630	104
2017		18,594.326		18,484.820	101
2018		19,347.886		19,321.076	100
2019		19,661.891		19,717.348	100
2020		20,091.675		19,617.016	102

### Change the Actuarial Cost Method to the Entry Age Normal Method

The current actuarial cost method is the Projected Unit Credit method, which is required by statute. The Projected Unit Credit method recognizes costs such that the normal cost for an individual member increases as a percentage of payroll throughout his/her career. The Entry Age Normal cost method is the most commonly used method in the public sector. It is also the method required to be used for financial reporting under GASB 67 and 68. The Entry Age Normal method recognizes costs as a level percentage of payroll over a member's career. We recommend a change to the Entry Age Normal method.

### Number of Projected Future Active Members

The statutory contribution is based on performing an open group projection through the year 2045. The projection is based on assuming that new active members are hired to replace the current members who leave active membership (through termination, retirement, death or disability). The number of active members has decreased by about 8 percent between 2010 and 2020, which is an average annualized decrease of about 0.8 percent.

Currently, the actuarial valuation assumes that the total number of active members in the future will be equal to the number active in the current actuarial valuation. Given the decrease in the number of active members over the past 10 years, if SURS expects to continue to see a similar decline of the active population in the near term the Board may want to consider an update to the population projection assumption to include a decreasing population in the near term before reaching an equilibrium number of active members long term.

## Summary of the Valuation

Total Active Members (Full and Part Time)						
June 30	Traditional & Portable	SMP	Total	Annual Change in Membership	% Annual Change in Membership	Earnings (\$ in Millions)
2010	72,996	9,746	82,742			\$3,904.6
2011	71,888	9,723	81,611	(1,131)	-1.4%	3,893.4
2012	71,056	10,100	81,156	(455)	-0.6%	3,956.6
2013	70,556	10,746	81,302	146	0.2%	4,078.1
2014	69,436	11,409	80,845	(457)	-0.6%	4,131.0
2015	69,381	11,928	81,309	464	0.6%	4,280.5
2016	66,245	11,880	78,125	(3,184)	-3.9%	4,218.4
2017	64,117	11,852	75,969	(2,156)	-2.8%	4,184.5
2018	62,844	12,106	74,950	(1,019)	-1.3%	4,264.3
2019	62,589	12,531	75,120	170	0.2%	4,356.6
2020	63,206	13,129	76,335	1,215	1.6%	4,583.9
Total Change				(6,407)	-0.8%	

We recognize that the State Statute governs the funding policy of the System. The purpose of these comments is to highlight the difference between the Statutory appropriation methodology and the recommended actuarial funding policy and to highlight the risks and additional costs of continuing to underfund the System. We believe that the State Statute would allow the Board to change the assumption regarding the projected number of future active members.

## GASB Disclosure

A separate actuarial valuation report with calculations completed in accordance with the provisions of GASB Statement Nos. 67 and 68 has been issued.

## Future Considerations

Changes (such as the phase-in of assumption changes, five-year asset smoothing and the addition of the two new benefit tiers) have had the effect of reducing the Statutory contribution amounts that would have otherwise been made. However, the change in the investment return assumption and other changes to more closely align the actuarial assumptions with current market expectations have increased the contribution amounts that would otherwise have been made. Assuming the statutory contributions are received (and the actuarial assumptions are met including a 6.75% investment rate of return, each year through 2045) SURS is currently projected to have contributions sufficient to increase the funded ratio from the current level of 42.2% to 90.0% by 2045. However, policy makers should be aware that current capital market assumptions suggest that it is unlikely that 6.75% will be realized in the near term, and that a certain amount of erosion in funding level may occur.

**This is a severely underfunded plan and the ability of the plan to reach 90% funding by 2045 is heavily dependent on the plan sponsor contributing the statutory contributions each and every year until 2045. We are not able to assess the plan sponsor's ability to make contributions when due.**



# Summary of the Valuation

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## Actuarial Standards of Practice (ASOP) 4 Disclosures

### General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.75% on the actuarial value of assets), it is expected that:

1. The combined State and employer contribution rate will be level as a percentage of payroll through 2045 (after all assumption changes and deferred asset gains and losses are fully recognized);
2. The unfunded liability will increase in dollar amount through 2025 before it begins to decrease;
3. The unfunded actuarial accrued liabilities will never be fully amortized; and
4. The funded status of the plan will increase gradually towards a 90% funded ratio in 2045.

### Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
2. The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3. The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

**Limitation of Project Scope:** Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.



## Summary of the Valuation

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### Risks Associated with Measuring the Accrued Liability and Contributions

The determination of the accrued liability and the statutory and actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the statutory and actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll or other relevant contribution factor;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.



## Summary of the Valuation

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The statutory contribution may be considered as a minimum contribution that complies with State statute. Contributions above this minimum level would enhance benefit security and improve the plan's funding level. The timely receipt of contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made in accordance with the funding policy do not necessarily guarantee benefit security.

### Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2019	2020
Ratio of the market value of assets to total payroll	4.53	4.28
Ratio of actuarial accrued liability to payroll	10.66	10.38
Ratio of actives to retirees and beneficiaries	1.11	1.10
Ratio of net cash flow to market value of assets	-3.7%	-3.3%
Approximate modified duration of the present value of future benefits	13.44	13.33

Payroll used in the above table includes SMP payroll.

### Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

### Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

# Summary of the Valuation

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## Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

## Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

## Duration of the Present Value of Future Benefits

The duration of the present value of future benefits may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

## Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.



## Summary of the Valuation

### Risk Measures Summary (\$ in Millions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Market		Market				
Valuation	Accrued	Market	Value	Valuation	Funded	Retiree	RetLiab /	AAL /	Assets /
Date	Liabilities	Value of	Unfunded	Payroll	Ratio	Liabilities	AAL	Payroll	Payroll
(6/30)	(AAL)	Assets	AAL		(2)/(1)	(RetLiab)	(6)/(1)	(1)/(4)	(2)/(4)
2014	\$ 37,430	\$ 17,391	\$ 20,038	\$ 4,131	46.5%	\$ 24,389	65.2%	906.1%	421.0%
2015	39,521	17,463	22,058	4,281	44.2%	26,042	65.9%	923.3%	408.0%
2016	40,923	17,006	23,918	4,218	41.6%	27,342	66.8%	970.1%	403.1%
2017	41,853	18,485	23,369	4,184	44.2%	28,226	67.4%	1000.2%	441.7%
2018	45,259	19,321	25,938	4,264	42.7%	30,711	67.9%	1061.3%	453.1%
2019	46,444	19,717	26,727	4,357	42.5%	31,857	68.6%	1066.1%	452.6%
2020	47,580	19,617	27,963	4,584	41.2%	32,862	69.1%	1038.0%	428.0%

	(10)	(11)	(12)	(13)	(14)	(15)	(16)
				Non-			
Valuation	Portfolio	Std Dev %	Unfunded	Investment	NICF /	Market	5-Year
Date	StdDev	of Pay	/ Payroll	Cash Flow	Assets	Rate of	Trailing
(6/30)				(NICF)	(13)/(2)	Return	Average
2014			485.1%	\$ (314)	-1.8%	17.9%	13.6%
2015			515.3%	(432)	-2.5%	2.9%	11.1%
2016			567.0%	(474)	-2.8%	0.1%	6.5%
2017			558.5%	(515)	-2.8%	11.9%	8.9%
2018			608.3%	(664)	-3.4%	8.3%	8.0%
2019			613.5%	(734)	-3.7%	6.0%	5.8%
2020	10.9%	46.6%	610.0%	(643)	-3.3%	2.8%	5.7%

- (5). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.
- (6) and (7). The ratio of Retiree liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system.
- (8) and (9). The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.
- (10) and (11). The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment

## Summary of the Valuation

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volatility and the challenges volatility brings to sustainability. This ratio is likely to increase as the plan approaches full funding which is expected to lead to increasing volatility of contribution rates..

- (12). The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.
- (13) and (14). The ratio of Non-Investment Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.
- (15) and (16). Investment return is probably the largest single risk that most systems face. The year-by-year return and the 5-year geometric average both give an indication of the reasonableness of the system's assumed return. Of course, past performance is not a guarantee of future results. Market rate shown is based on actuarial estimation method and differs modestly from figures reported by State Street.

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## **APPENDICES**

## **APPENDIX A**

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### **ASSET INFORMATION**

# Table 1

## Statement of Plan Net Position

### as of June 30, 2020 and June 30, 2019

	Defined Benefit	Self Managed	Total	
	Plan	Plan	2020	2019
<b>Assets</b>				
Cash and short-term investments	\$ 1,266,766,677	-	\$ 1,266,766,677	\$ 819,413,471
<b>Receivables</b>				
Members	11,158,593	\$ 4,559,763	15,718,356	17,067,516
Non-employer contributing entity	116,889,698	2,074,606	118,964,304	152,988,640
Federal, trust funds, and other	6,687,733	28,535	6,716,268	6,983,445
Pending investment sales	1,952,064,461	-	1,952,064,461	360,501,773
Interest and dividends	47,440,102	-	47,440,102	47,226,953
Total receivables	2,134,240,587	6,662,904	2,140,903,491	584,768,327
Prepaid expenses	133,923	-	133,923	147,246
<b>Investments, at fair value</b>				
Equity investments	6,684,436,960	48,304,182	6,732,741,142	10,512,849,950
Fixed income investments	5,467,304,396	40,073,020	5,507,377,416	4,880,148,427
Real estate investments	1,124,007,562	8,341,514	1,132,349,076	1,195,261,337
Alternative investments	4,977,446,278	35,007,388	5,012,453,666	2,451,664,597
Mutual fund and variable annuities		2,884,738,092	2,884,738,092	2,592,580,384
Total investments	18,253,195,196	3,016,464,196	21,269,659,392	21,632,504,695
Securities lending collateral	1,381,940,165	-	1,381,940,165	878,205,520
Capital assets, at cost, net of accum deprec \$20,508,432 and \$20,143,800 respectively	10,388,424	-	10,388,424	9,796,210
Total assets	23,046,664,972	3,023,127,100	26,069,792,072	23,924,835,469
<b>Liabilities</b>				
Benefits payable	12,718,437	-	12,718,437	10,467,190
Refunds payable	3,601,916	-	3,601,916	5,200,177
Securities lending collateral	1,381,486,080	-	1,381,486,080	876,550,517
Payable to brokers for unsettled trades	2,013,885,643	-	2,013,885,643	483,348,912
Reverse repurchase agreements	512,000	-	512,000	85,456,713
Administrative expenses payable	17,445,290	-	17,445,290	16,856,965
Total liabilities	3,429,649,366	-	3,429,649,366	1,477,880,474
Plan Net Position	\$ 19,617,015,606	\$ 3,023,127,100	\$ 22,640,142,706	\$ 22,446,954,995



## Table 2

### Statement of Changes in Plan Net Position for Years Ended June 30, 2020 and June 30, 2019

	Defined Benefit	Self Managed	Totals	
	Plan	Plan	2020	2019
<b>Additions</b>				
<b>Contributions</b>				
Employer	\$ 52,968,295	\$ 9,378,893	\$ 62,347,188	\$ 58,133,608
Non-employer contributing entity	1,785,817,785	68,874,215	1,854,692,000	1,655,154,000
Member	282,367,290	95,728,110	378,095,400	368,588,213
Total Contributions	<u>2,121,153,370</u>	<u>173,981,218</u>	<u>2,295,134,588</u>	<u>2,081,875,821</u>
<b>Investment Income</b>				
<b>Net appreciation</b>				
in fair value of investments	213,670,350	223,640,319	437,310,669	958,763,679
Interest	191,342,519	-	191,342,519	155,798,932
Dividends	200,038,867	-	200,038,867	237,287,406
Securities lending	5,597,401	-	5,597,401	5,191,144
Gross Investment Income	<u>610,649,137</u>	<u>223,640,319</u>	<u>834,289,456</u>	<u>1,357,041,161</u>
<b>Less investment expense</b>				
Asset management expense	67,967,190	-	67,967,190	64,109,736
Securities lending expense	504,180	-	504,180	468,824
Net investment income	<u>542,177,767</u>	<u>223,640,319</u>	<u>765,818,086</u>	<u>1,292,462,601</u>
Total additions	<u>2,663,331,137</u>	<u>397,621,537</u>	<u>3,060,952,674</u>	<u>3,374,338,422</u>
<b>Deductions</b>				
Benefits	2,676,192,703	67,927,971	2,744,120,674	2,617,196,859
Refunds of contributions	69,001,514	35,408,462	104,409,976	115,051,659
Administrative expense	18,469,275	765,038	19,234,313	16,662,874
Total deductions	<u>2,763,663,492</u>	<u>104,101,471</u>	<u>2,867,764,963</u>	<u>2,748,911,392</u>
Net increase (decrease)	(100,332,355)	293,520,066	193,187,711	625,427,030
<b>Plan Net Position</b>				
Beginning of year	<u>19,717,347,961</u>	<u>2,729,607,034</u>	<u>22,446,954,995</u>	<u>21,821,527,965</u>
End of year	<u>\$ 19,617,015,606</u>	<u>\$ 3,023,127,100</u>	<u>\$ 22,640,142,706</u>	<u>22,446,954,995</u>



## **APPENDIX B**

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### **MEMBERSHIP DATA**

## Table 3A

### Summary of Data Characteristics – Active, Inactive, Retired (\$ in Millions)

	June 30, 2019		June 30, 2020	
	Number	Earnings	Number	Earnings
<b>Active Members</b>				
Full time				
Traditional SURS	41,801	\$2,212.0	42,143	\$2,298.1
Portable SURS	17,192	1,158.4	17,446	1,203.8
SMP	12,118	956.4	12,726	1,052.2
Total Full Time <sup>1</sup>	71,111	\$4,326.9	72,315	\$4,554.1
Part time				
Traditional SURS	3,124	\$ 21.6	3,133	\$ 21.9
Portable SURS	472	4.2	484	4.2
SMP	413	3.9	403	3.7
Total Part Time	4,009	\$ 29.7	4,020	\$ 29.8
Total	75,120	\$4,356.6	76,335	\$4,583.9
<b>Inactive Members</b>				
Traditional SURS	70,114		70,630	
Portable SURS	12,930		13,114	
SMP	10,033		10,280	
Total	93,077		94,024	

<sup>1</sup> Includes 677 police officers and firefighters (including SMP) as of June 30, 2019, and 678 as of June 30, 2020.

	Annual		Annual	
	Number	Benefits	Number	Benefits
<b>Benefit Recipients</b>				
Retirement				
Traditional SURS	50,900	\$ 2,110.9	51,534	\$ 2,174.4
Portable SURS	6,990	244.3	7,526	274.8
Total Retirement	57,890	\$ 2,355.2	59,060	\$ 2,449.2
Survivor				
Traditional SURS	8,720	\$ 177.9	8,874	\$ 189.9
Portable SURS	253	5.0	283	5.8
Total Survivor	8,973	\$ 182.8	9,157	\$ 195.7
Disability				
Traditional SURS	795	\$ 17.5	779	\$ 17.5
Portable SURS	184	4.9	176	4.8
Total Disability	979	\$ 22.4	955	\$ 22.3
Total	67,842	\$ 2,560.4	69,172	\$ 2,667.1
<b>Total Participants</b>				
Total Traditional SURS	175,454		177,093	
Total Portable SURS	38,021		39,029	
Total SMP	22,564		23,409	
Total	236,039		239,531	

Values may not add due to rounding.





## Table 3B

### Summary of Data Characteristics – Full Time Active

(\$ in Millions)

	June 30, 2019		June 30, 2020	
	Number	Earnings	Number	Earnings
<b>Active Members</b>				
Full time				
Continuing Actives - Tier 1				
Traditional SURS	25,622	\$ 1,591.3	24,231	\$ 1,559.0
Portable SURS	9,943	775.6	9,408	759.4
SMP	5,490	465.4	5,254	464.8
Total	41,055	\$ 2,832.3	38,893	\$ 2,783.2
Continuing Actives - Tier 2				
Traditional SURS	12,206	\$ 530.0	14,065	\$ 641.2
Portable SURS	5,945	338.3	6,724	395.5
SMP	5,422	433.6	6,193	512.5
Total	23,573	\$ 1,301.9	26,982	\$ 1,549.3
New Actives - Tier 1				
Traditional SURS	456	\$ 11.8	378	\$ 10.3
Portable SURS	94	3.2	79	3.1
SMP	67	2.2	50	2.1
Total	617	\$ 17.3	507	\$ 15.5
New Actives - Tier 2				
Traditional SURS	3,517	\$ 79.0	3,469	\$ 87.6
Portable SURS	1,210	41.3	1,235	45.7
SMP	1,139	55.2	1,229	72.8
Total	5,866	\$ 175.5	5,933	\$ 206.1
Total Actives - Tier 1				
Traditional SURS	26,078	\$ 1,603.1	24,609	\$ 1,569.3
Portable SURS	10,037	778.8	9,487	762.5
SMP	5,557	467.6	5,304	467.0
Total	41,672	\$ 2,849.5	39,400	\$ 2,798.8
Total Actives - Tier 2				
Traditional SURS	15,723	\$ 609.0	17,534	\$ 728.8
Portable SURS	7,155	379.6	7,959	441.3
SMP	6,561	488.8	7,422	585.3
Total	29,439	\$ 1,477.4	32,915	\$ 1,755.3
Total Actives - Tier 1 and Tier 2				
Traditional SURS	41,801	\$ 2,212.0	42,143	\$ 2,298.1
Portable SURS	17,192	1,158.4	17,446	1,203.8
SMP	12,118	956.4	12,726	1,052.2
Total	71,111	\$ 4,326.9	72,315	\$ 4,554.1

Values may not add due to rounding.



## Table 3C

### Summary of Data Characteristics – Part Time Active/Inactive

(\$ in Millions)

	June 30, 2019		June 30, 2020	
	Number	Earnings	Number	Earnings
<b>Active Members</b>				
Part time				
Total Actives - Tier 1				
Traditional SURS	900	\$ 6.0	826	\$ 5.5
Portable SURS	135	1.0	152	1.0
SMP	101	0.8	79	0.6
Total	1,136	\$ 7.8	1,057	\$ 7.1
Total Actives - Tier 2				
Traditional SURS	2,224	\$ 15.6	2,307	\$ 16.4
Portable SURS	337	3.2	332	3.2
SMP	312	3.1	324	3.1
Total	2,873	\$ 21.9	2,963	\$ 22.7
Total Actives - Tier 1 and Tier 2				
Traditional SURS	3,124	\$ 21.6	3,133	\$ 21.9
Portable SURS	472	4.2	484	4.2
SMP	413	3.9	403	3.7
Total	4,009	\$ 29.7	4,020	\$ 29.8
<b>Inactive Members</b>				
Total Inactives - Tier 1				
Traditional SURS	56,142		54,916	
Portable SURS	9,275		9,025	
SMP	7,055		6,926	
Total	72,472		70,867	
Total Inactives - Tier 2				
Traditional SURS	13,972		15,714	
Portable SURS	3,655		4,089	
SMP	2,978		3,354	
Total	20,605		23,157	
Total Inactives - Tier 1 and Tier 2				
Traditional SURS	70,114		70,630	
Portable SURS	12,930		13,114	
SMP	10,033		10,280	
Total	93,077		94,024	

Values may not add due to rounding.



**Table 4**  
**Distribution of Full-Time Active Members by Age and Years of Service**  
**as of June 30, 2020**

Age	Years of Service									Totals
	Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30 & Over		
Under 20	11	17	-	-	-	-	-	-	-	28
	\$ 80,532	\$ 288,286	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 368,818
20-24	356	876	17	-	-	-	-	-	-	1,249
	\$ 4,279,382	\$ 25,575,638	\$ 478,768	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30,333,789
25-29	642	3,463	549	6	-	-	-	-	-	4,660
	\$ 10,030,684	\$ 146,968,388	\$ 24,625,005	\$ 236,477	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 181,860,554
30-34	594	4,224	2,261	349	6	-	-	-	-	7,434
	\$ 11,256,198	\$ 230,536,402	\$ 124,508,487	\$ 20,333,989	\$ 311,872	\$ -	\$ -	\$ -	\$ -	\$ 386,946,949
35-39	422	3,273	3,074	1,585	415	20	-	-	-	8,789
	\$ 8,492,114	\$ 193,195,219	\$ 193,519,255	\$ 102,877,936	\$ 26,867,847	\$ 1,175,273	\$ -	\$ -	\$ -	\$ 526,127,645
40-44	312	2,574	2,675	2,013	1,347	402	12	-	-	9,335
	\$ 6,340,088	\$ 145,192,141	\$ 177,243,916	\$ 150,084,835	\$ 100,738,379	\$ 28,393,800	\$ 709,137	\$ -	\$ -	\$ 608,702,297
45-49	286	1,926	2,135	1,867	1,735	1,188	314	10	-	9,461
	\$ 6,066,716	\$ 102,913,877	\$ 130,913,117	\$ 144,424,486	\$ 148,031,416	\$ 96,937,454	\$ 25,386,987	\$ 576,793	\$ -	\$ 655,250,845
50-54	224	1,667	1,917	1,647	1,727	1,512	832	222	-	9,748
	\$ 3,994,225	\$ 87,019,851	\$ 110,738,736	\$ 115,708,109	\$ 141,690,447	\$ 131,853,290	\$ 71,566,280	\$ 18,040,818	\$ -	\$ 680,611,755
55-59	179	1,309	1,698	1,475	1,640	1,472	949	415	-	9,137
	\$ 3,955,605	\$ 69,760,074	\$ 91,443,635	\$ 96,452,113	\$ 124,431,599	\$ 126,379,364	\$ 90,906,051	\$ 41,193,532	\$ -	\$ 644,521,971
60-64	74	878	1,356	1,141	1,227	1,069	725	462	-	6,932
	\$ 1,306,251	\$ 42,709,339	\$ 72,490,133	\$ 71,187,164	\$ 89,508,340	\$ 84,338,489	\$ 75,152,016	\$ 50,995,144	\$ -	\$ 487,686,878
65 & Over	42	578	1,060	964	1,020	800	609	469	-	5,542
	\$ 728,698	\$ 22,685,351	\$ 44,165,654	\$ 48,515,930	\$ 67,663,591	\$ 58,540,801	\$ 48,282,436	\$ 61,121,093	\$ -	\$ 351,703,553
Total Count	3,142	20,785	16,742	11,047	9,117	6,463	3,441	1,578	-	72,315
Total Payroll	\$ 56,530,494	\$ 1,066,844,567	\$ 970,126,705	\$ 749,821,039	\$ 699,243,491	\$ 527,618,471	\$ 312,002,907	\$ 171,927,380	\$ -	\$ 4,554,115,054

*Includes the use of capped payroll for defined benefit plan members hired on or after January 1, 2011. Includes SMP.*



**Table 5**  
**Distribution of Benefit Recipients by Age**  
**as of June 30, 2020**

<u>Age</u>	<u>Number</u>	<u>Annual Benefit</u>
<b>Retirees and Survivors</b>		
Under 50	432	\$ 3,794,022
50-54	409	15,683,779
55-59	3,370	118,344,471
60-64	8,278	301,935,059
65-69	14,035	520,602,485
70-74	15,152	585,561,976
75-79	11,335	493,170,677
80-84	7,396	313,406,684
85-89	4,663	189,435,008
90 & Over	<u>3,147</u>	<u>102,911,499</u>
Total	68,217	\$ 2,644,845,660
<b>Disabilitants</b>		
Under 50	127	\$ 3,060,105
50-54	98	2,530,977
55-59	194	4,893,820
60-64	220	5,404,472
65-69	165	3,471,094
70-74	83	1,684,005
75-79	37	660,498
80-84	17	402,322
85-89	7	97,788
90 & Over	<u>7</u>	<u>96,264</u>
Total	955	\$ 22,301,345

Excludes SMP.



## **APPENDIX C**

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### **ACTUARIAL DETERMINATIONS**

**Table 6**  
**Summary of Actuarial Values**  
**as of June 30, 2020**  
(\$ in Millions)

	Actuarial Present Value of Projected Benefits (APV)	Projected Unit Credit Values		Gross NC % of Pay <sup>1</sup>
		Actuarial Accrued Liability (AAL)	Gross Normal Cost (NC) <sup>1</sup>	
<b>1. Active Members</b>				
a. Retirement	\$14,950.4	\$ 10,041.2	\$539.4	14.83%
b. Death	285.5	184.7	11.8	0.32%
c. Disability	268.5	164.3	16.3	0.45%
d. Termination	2,169.3	1,364.8	149.5	4.11%
Total - Active Members	\$17,673.8	\$ 11,755.1	\$717.0	19.71%
<b>2. Benefit Recipients</b>				
a. Retirement	\$30,762.3	\$30,762.3	\$ 0.0	
b. Survivor	1,829.5	1,829.5	0.0	
c. Disability	270.2	270.2	0.0	
Total - Benefit Recipients	\$32,862.0	\$32,862.0	\$ 0.0	
<b>3. Other Inactive</b>	\$ 2,963.4	\$ 2,963.4		
<b>4. Grand Total</b>	\$53,499.2	\$47,580.5	\$717.0	19.71%
<b>5. Operating Expense</b>			\$ 22.7	0.62%
<b>6. Total Normal Cost<sup>2</sup></b>			\$739.7	20.33%
<b>7. Expected Pay During Fiscal Year 2021 for Defined Benefit Plans<sup>1</sup></b>				\$ 3,637.6
<b>8. Present Value of Future Salaries (PVFS)<sup>1</sup></b>				\$ 28,264.8

<sup>1</sup> For members currently active as of June 30, 2020, in the Traditional and Portable defined benefit plans and includes the use of capped payroll for members hired on or after January 1, 2011.

<sup>2</sup> The normal cost as a percent of capped pay is 25.39% for Tier 1 members and 11.09% for Tier 2 members.

Excludes SMP.

Values may not add due to rounding.



**Table 7**  
**Defined Benefit Plan Development of the Actuarial Value of Assets**  
**for the Year Ending June 30, 2020**

	2019	2020	2021	2022	2023	2024
Beginning of Year:						
(1) Market Value of Assets	\$19,321,075,501	\$19,717,347,961				
(2) Actuarial Value of Assets	19,347,886,135	19,661,891,301				
End of Year:						
(3) Market Value of Assets	19,717,347,961	19,617,015,606				
(4) Net of Contributions and Disbursements	(733,540,302)	(642,510,122)				
(5) Total Investment Income						
=(3)-(1)-(4)	1,129,812,762	542,177,767				
(6) Projected Rate of Return	6.75%	6.75%				
(7) Projected Investment Income						
=(1)x(6)+[(1+(6))^5-1]x(4)	1,279,819,853	1,309,590,348				
(8) Investment Income in Excess of Projected Income	(150,007,091)	(767,412,581)				
(9) Excess Investment Income Recognized						
This Year (5 year recognition)						
(9a) From This Year	(30,001,418)	(153,482,516)				
(9b) From One Year Ago	36,662,742	(30,001,418)	\$ (153,482,516)			
(9c) From Two Years Ago	155,949,656	36,662,742	(30,001,418)	\$ (153,482,516)		
(9d) From Three Years Ago	(246,425,206)	155,949,656	36,662,742	(30,001,418)	\$ (153,482,516)	
(9e) From Four Years Ago	(148,460,159)	(246,425,207)	155,949,656	36,662,744	(30,001,419)	\$ (153,482,517)
(9f) Total Recognized Investment Gain/(Loss)	(232,274,385)	(237,296,743)	9,128,464	(146,821,190)	(183,483,935)	(153,482,517)
(10) Change in Actuarial Value of Assets						
=(4)+(7)+(9f)	314,005,166	429,783,483				
End of Year:						
<b>(3) Market Value of Assets</b>	<b>19,717,347,961</b>	<b>19,617,015,606</b>				
<b>(11) Final Actuarial Value of Assets</b>	<b>19,661,891,301</b>	<b>20,091,674,784</b>				
(12) Difference Between Market & Actuarial Values	55,456,660	(474,659,178)				
(13) Actuarial Value Rate of Return	5.52 %	5.54 %				
(14) Estimated Market Value Rate of Return	5.96 %	2.80 %				
(15) Ratio of Actuarial Value to Market Value	100 %	102 %				
(16) SURS Reported Market Value Rate of Return	6.07 %	2.64 %				

Excludes SMP.



**Table 8**  
**Analysis of Change in**  
**Actuarial Accrued Liability and Actuarial Value of Assets**  
**for the Year Ending June 30, 2020**  
(\$ in Millions)

1. Actuarial (Gain)/Loss on Actuarial Accrued Liability ("AAL")		
(a) AAL 6/30/2019		\$ 46,443.9
(b) Normal Cost FY 2020	\$ 729.3	
(c) Benefits and Admin Expenses Paid FY 2020	(2,763.7)	
(d) Interest on (a), (b), and (c) at 6.75%	3,067.4	
(e) Expected AAL 6/30/2020 (a+b+c+d)		47,477.0
(f) Actual AAL 6/30/2020 Before Assumption and Method Changes		47,579.5
(g) Actuarial (Gain)/Loss on AAL (f-e)		<u>\$ 102.5</u>
(h) Impact of Benefit Changes <sup>1</sup>		1.0
(i) Impact of Change in Actuarial Assumptions and Methods		0.0
(j) Actual AAL After Changes (f+h+i)		<u>\$ 47,580.5</u>
2. Actuarial (Gain)/Loss on Assets		
(a) Actuarial Value of Assets 6/30/2019		\$ 19,661.9
(b) Contributions FY 2020	2,121.2	
(c) Benefits and Administrative Expenses	(2,763.7)	
(d) Interest on (a), (b), and (c) at 6.75%	1,305.8	
(e) Expected Assets 6/30/2020 (a+b+c+d)		\$ 20,325.2
(f) Actual Actuarial Value of Assets 6/30/2020		20,091.7
(g) Actuarial (Gain)/Loss on Assets (e-f)		<u>\$ 233.5</u>
3. Total Actuarial (Gain)/Loss		
(a) (Gain)/Loss on AAL		\$ 102.5
(b) (Gain)/Loss on Assets		233.5
(c) Net (Gain)/Loss (a+b)		<u>\$ 336.0</u>

*Excludes SMP.*

*Values may not add due to rounding.*

<sup>1</sup>*Under Public Act 101-610, an additional unreduced retirement eligibility condition was added for Tier 2 police officers and firefighters to retire at age 60 with 20 years of service.*





**Table 9**  
**Analysis of Change in**  
**Unfunded Actuarial Accrued Liability**  
**for the Year Ending June 30, 2020**  
**(\$ in Millions)**

1.	Unfunded Actuarial Accrued Liability (UAAL) at 06/30/2019	\$	26,782.0
2.	Contributions		
a.	Contributions equal to normal cost plus interest on UAAL		
i.	Interest on 1)	\$	1,807.8
ii.	Member contributions		282.4
iii.	Employer/State normal cost		447.0
iv.	Interest on ii and iii		24.2
v.	Total due	\$	2,561.3
b.	Contributions paid based on funding policy		
i.	Member contributions	\$	282.4
ii.	Employer/State contributions		1,838.8
iii.	Interest on i and ii		70.4
iv.	Total paid	\$	2,191.6
c.	Expected increase in UAAL (2a.v-2b.iv)		369.8
3.	Expected UAAL at 06/30/2020 (1+2c)		27,151.8
4.	(Gains)/Losses		
a.	Investment income	\$	233.5
b.	Salary increases		5.4
c.	Demographic and other		97.1
d.	Total	\$	336.0
5.	Plan Provision Changes <sup>1</sup>		1.0
6.	Assumption Changes		-
7.	Total Change in UAAL (2c + 4d + 5 + 6)		706.8
8.	UAAL at 06/30/2020 (1 + 7)	\$	27,488.8

*Excludes SMP.*

*Values may not add due to rounding.*

<sup>1</sup>*Under Public Act 101-610, an additional unreduced retirement eligibility condition was added for Tier 2 police officers and firefighters to retire at age 60 with 20 years of service.*



**Table 10**  
**Analysis of Actuarial (Gains) and Losses**  
(\$ in Millions)

	Amount of (Gain) or Loss			
	FY 2017	FY 2018	FY 2019	FY 2020
Investment Return <sup>1</sup>	\$ (142.8)	\$ (92.7)	\$ 234.1	\$ 233.5
Salary Increase	(144.7)	(8.5)	(55.2)	5.4
Age and Service Retirement	(26.0)	16.1	53.4	6.0
General Employment Termination	10.7	15.3	29.3	22.3
Disability Incidence	0.3	5.4	4.5	(1.7)
In Service Mortality	(7.3)	(3.4)	(5.5)	1.2
Benefit Recipient <sup>2</sup>	14.2	20.1	41.8	13.3
New Entrants <sup>3</sup>	84.1	76.6	87.1	83.1
Data Refinements <sup>4</sup>	(152.9)	0.0	0.0	0.0
Other <sup>5</sup>	(28.8)	(13.6)	(35.9)	(27.1)
<b>Total Actuarial (Gain)/Loss</b>	<b>\$ (393.2)</b>	<b>\$ 15.3</b>	<b>\$ 353.6</b>	<b>\$ 336.0</b>
BOY Actuarial Accrued Liability (AAL)	\$ 40,923.3	\$ 41,853.3	\$ 45,258.8	\$ 46,443.9
(Gain)/Loss as a % of BOY AAL	(1.0)%	0.0%	0.8%	0.7%
<b>Total Non-Investment (Gain)/Loss</b>	<b>\$ (250.4)</b>	<b>\$ 108.0</b>	<b>\$ 119.5</b>	<b>\$ 102.5</b>
(Gain)/Loss as a % of BOY AAL	(0.6)%	0.3%	0.3%	0.2%

Excludes SMP.

<sup>1</sup>Gain/Loss is based on actuarial value of assets.

<sup>2</sup>Benefit recipient (gain)/loss includes mortality gains and losses as well as gains and losses due to unexpected changes in benefit amounts from year to year. Unexpected changes may occur when benefits that are initially paid as preliminary estimates are finalized. Mortality gains and losses include deviations in the assumed demographics of future beneficiaries compared to the actual demographics of new beneficiaries.

Beginning with the actuarial valuation as of June 30, 2011, there is an additional load of 10% on the liabilities of those retirees who are currently receiving benefits as a preliminary estimate. Beginning with the actuarial valuation as of June 30, 2015, the load of 10% was reduced to 5% for retirees who are currently receiving benefits as a preliminary estimate for whom Staff provided a best formula benefit.

<sup>3</sup>Only includes liability for new entrants. Does not include the impact of new entrant contributions.

<sup>4</sup>In the actuarial valuation as of June 30, 2017, a new data field was used to estimate money purchase benefit amounts, which reflects the Effective Rate of Interest (ERI) declared by the State Comptroller (which differs from the ERI declared by the SURS Board).

<sup>5</sup>Includes other experience such as deviations between actual and expected benefit payments and refunds that were not easily attributable to one of the categories above.



**Table 11**  
**Funded Ratio and Illustrative Contributions under Funding Policy of Net Normal Cost Plus**  
**Level Percentage of Payroll Amortization of Unfunded Liability**  
**(\$ in Millions)**

Fiscal Year	DB Payroll <sup>1</sup>	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL)	Funded Ratio	Total Normal Cost	Member Contributions <sup>2</sup>	Amortization of UAAL (30-year open) <sup>3</sup>	Net State Contribution (30-year open) <sup>3</sup>	Amortization of UAAL (30-year closed) <sup>4</sup>	Net State Contribution (30-year closed) <sup>4</sup>	Net State 30-year closed with 1 year Interest Adjustment <sup>4</sup>
2015	\$3,606.537	\$17,104.607	\$39,520.687	\$22,416.080	43.28 %	\$730.020	\$267.682	\$1,160.318	\$1,622.656			
2016	3,513.108	17,701.646	40,923.301	23,221.655	43.26	739.549	278.884	1,205.004	1,665.669	\$1,350.394	\$1,811.060	\$1,942.361
2017	3,458.320	18,594.326	41,853.348	23,259.022	44.43	719.225	278.643	1,248.309	1,688.891	1,424.261	1,864.843	2,000.044
2018	3,470.226	19,347.886	45,258.751	25,910.865	42.75	701.871	282.726	1,250.317	1,669.462	1,442.888	1,862.033	1,997.030
2019	3,506.650	19,661.891	46,443.937	26,782.046	42.33	730.265	280.018	1,392.034	1,842.281	1,789.119	2,239.366	2,390.524
2020	3,642.617	20,091.675	47,580.470	27,488.795	42.23	729.332	282.367	1,414.304	1,861.269	1,852.066	2,299.031	2,454.215
2021						739.676	294.592	1,451.626	1,896.710	1,896.268	2,341.352	2,499.393

<sup>1</sup> Defined Benefit Plan payroll is rolled forward with one year of salary scale at 3.25% (3.75% prior to fiscal year 2018) and uses capped payroll for members hired on and after January 1, 2011.

<sup>2</sup> Projected for Fiscal Year 2021 and actual for years prior to Fiscal Year 2021.

<sup>3</sup> A 30-year open period amortization policy is not a funding policy recommended by GRS. This illustrative contribution was included at the request of the Governor's Office. The amortization payment was calculated as a level percentage of total uncapped payroll (assumed to increase by 3.25% each year, 3.75% for years prior to Fiscal Year 2019).

<sup>4</sup> GRS recommends a 30-year (or shorter) closed amortization period beginning with Fiscal Year 2015, 24 years remaining at Fiscal Year 2021. (The statutory contribution would apply to Fiscal Year 2022; therefore a one year interest adjustment was applied). The amortization payment was calculated as a level percentage of defined benefit plan pensionable (capped) payroll.

## **APPENDIX D**

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### **ACTUARIAL PROJECTIONS**

## Table 12

### Baseline Projections – Actuarial Valuation June 30, 2020

#### Assumes Contributions Based on Table 14 & Investment Return of 6.75% Each Year

(\$ in Millions)

Fiscal Year Ending	Total Payroll <sup>1</sup>	SMP Payroll	DB Payroll <sup>1</sup>	SURS Contributions <sup>2</sup>	Member Contributions	Benefits	Expenses	Assets EOY	AAL	Funding Ratio	UAAL	Debt Service	Maximum Contribution <sup>3</sup>	SURS Contribution % of Total Payroll
2020	\$ 4,583.907	\$ 1,055.949	\$ 3,527.958	\$ 1,838.786	\$ 282.367	\$ 2,745.194	\$ 18.469	\$ 20,091.675	\$ 47,580.470	42.23 %	\$ 27,488.795	\$ 132.009	\$ 1,841.289	40.11 %
2021	4,819.585	1,141.786	3,677.799	1,954.566	294.592	2,954.590	22.708	20,672.638	48,480.243	42.64	27,807.605	139.615	1,966.283	40.55
2022	4,892.989	1,192.608	3,700.381	2,055.984	296.400	3,015.379	23.446	21,179.335	49,366.678	42.90	28,187.343	146.736	2,059.760	42.02
2023	4,981.962	1,247.474	3,734.488	2,126.724	299.132	3,115.551	24.208	21,665.107	50,199.054	43.16	28,533.947	153.373	2,126.724	42.69
2024	5,080.891	1,303.135	3,777.756	2,205.973	302.598	3,215.479	24.995	22,207.458	50,975.092	43.57	28,767.634	164.417	2,205.973	43.42
2025	5,184.626	1,359.421	3,825.205	2,258.319	306.399	3,321.078	25.807	22,898.327	51,685.207	44.30	28,786.880	174.604	2,258.319	43.56
2026	5,293.145	1,415.941	3,877.204	2,316.262	310.564	3,424.900	26.646	23,591.865	52,327.656	45.08	28,735.791	179.149	2,316.262	43.76
2027	5,406.414	1,472.954	3,933.460	2,365.616	315.070	3,529.986	27.512	24,278.395	52,897.827	45.90	28,619.432	183.195	2,365.616	43.76
2028	5,525.376	1,530.524	3,994.852	2,413.260	319.988	3,629.736	28.406	24,961.587	53,397.800	46.75	28,436.213	191.634	2,413.260	43.68
2029	5,648.061	1,588.895	4,059.166	2,463.408	325.139	3,730.896	29.329	25,642.557	53,821.940	47.64	28,179.383	199.325	2,463.408	43.62
2030	5,773.801	1,648.243	4,125.558	2,510.852	330.457	3,836.165	30.282	26,314.258	54,160.993	48.59	27,846.735	211.160	2,510.852	43.49
2031	5,903.125	1,709.664	4,193.461	2,560.984	335.896	3,936.786	31.267	26,983.736	54,413.989	49.59	27,430.253	221.997	2,560.984	43.38
2032	6,039.836	1,774.398	4,265.438	2,620.489	341.662	4,025.587	32.283	27,673.043	54,587.785	50.69	26,914.742	226.944	2,620.489	43.39
2033	6,183.587	1,841.773	4,341.814	2,688.954	347.779	4,107.308	33.332	28,400.418	54,685.449	51.93	26,285.031	226.249	2,688.954	43.49
2034	6,332.784	1,911.096	4,421.688	2,808.304	354.177	4,184.028	34.415	29,226.428	54,708.205	53.42	25,481.777	NA	2,985.540	44.35
2035	6,486.230	1,982.291	4,503.939	2,876.351	360.765	4,255.835	35.534	30,109.960	54,656.664	55.09	24,546.704	NA	3,057.881	44.35
2036	6,644.488	2,055.280	4,589.209	2,946.531	367.596	4,245.281	36.688	31,142.408	54,611.359	57.03	23,468.951	NA	3,132.491	44.35
2037	6,807.163	2,130.409	4,676.753	3,018.670	374.608	4,299.041	37.881	32,269.548	54,506.652	59.20	22,237.104	NA	3,209.182	44.35
2038	6,975.119	2,207.927	4,767.193	3,093.151	381.852	4,347.286	39.112	33,506.090	54,344.911	61.65	20,838.821	NA	3,288.364	44.35
2039	7,148.364	2,286.739	4,861.625	3,169.977	389.416	4,385.276	40.383	34,872.727	54,134.277	64.42	19,261.550	NA	3,370.039	44.35
2040	7,327.371	2,368.094	4,959.277	3,249.359	397.238	4,414.690	41.696	36,389.963	53,882.047	67.54	17,492.084	NA	3,454.431	44.35
2041	7,513.880	2,451.785	5,062.095	3,332.067	405.474	4,433.527	43.051	38,082.714	53,598.666	71.05	15,515.952	NA	3,542.359	44.35
2042	7,706.500	2,537.980	5,168.520	3,417.486	413.998	4,438.243	44.450	39,980.469	53,299.267	75.01	13,318.798	NA	3,633.168	44.35
2043	7,904.557	2,625.854	5,278.703	3,505.315	422.824	4,431.948	45.894	42,111.197	52,996.414	79.46	10,885.217	NA	3,726.540	44.35
2044	8,106.900	2,715.668	5,391.232	3,595.045	431.838	4,417.435	47.386	44,501.226	52,700.181	84.44	8,198.955	NA	3,821.933	44.35
2045	8,313.292	2,807.990	5,505.302	3,686.570	440.975	4,392.809	48.926	47,180.438	52,422.709	90.00	5,242.271	NA	3,919.235	44.35

Projections are based on 70% of new hires electing Tier 2 and 30% electing SMP and 76,335 total active members (72,315 full time and 4,020 part time) in each future year.

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

<sup>2</sup> Excludes SMP contributions. Includes employer contributions.

<sup>3</sup> Maximum contribution after the impact of debt service. Maximum contribution is equal to the SURS contribution shown on Table 17 (before the impact of the bonds issued in 2004) minus the debt service.

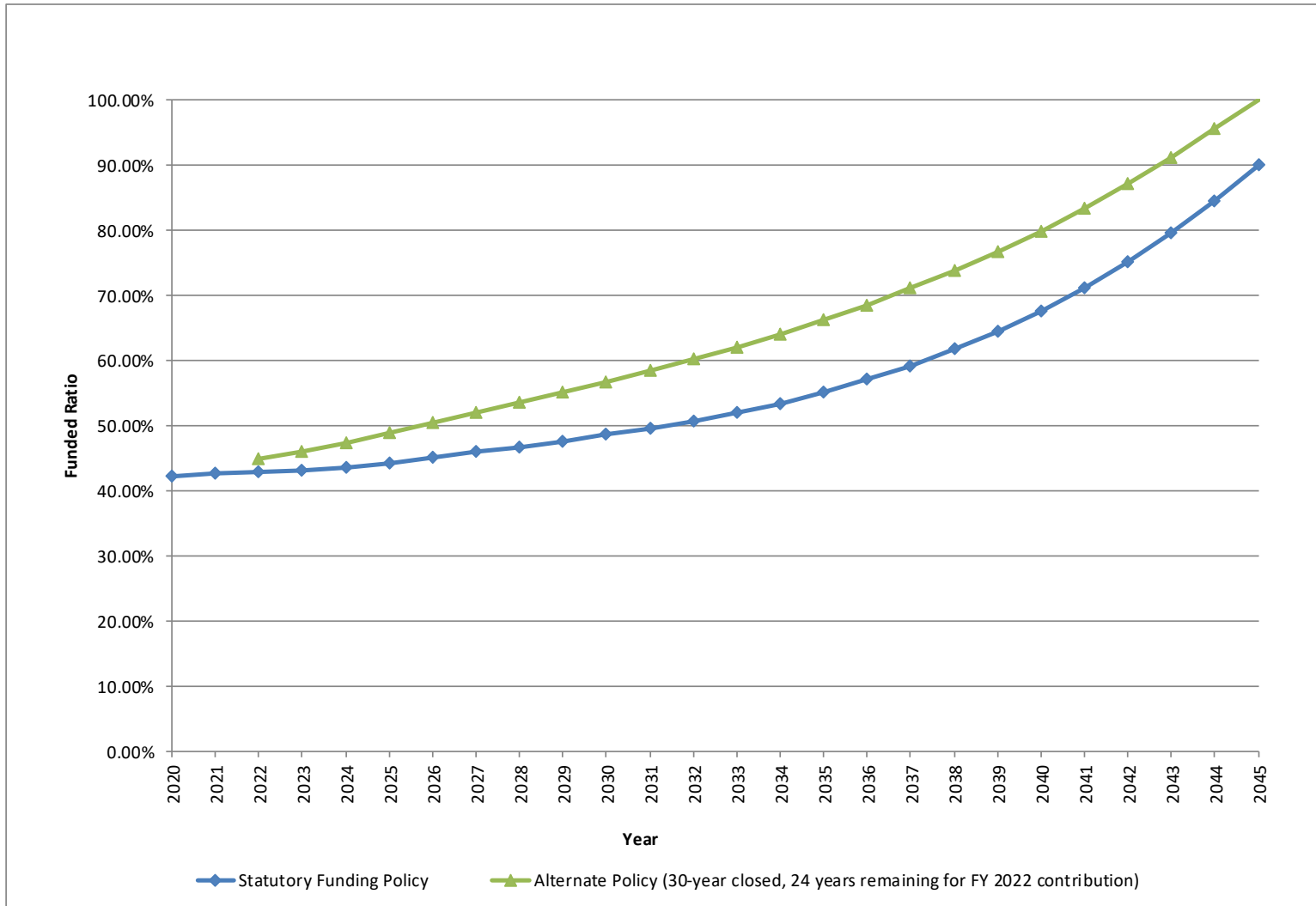


# Graph 1

## Projected Funded Ratio Based on Statutory Contributions

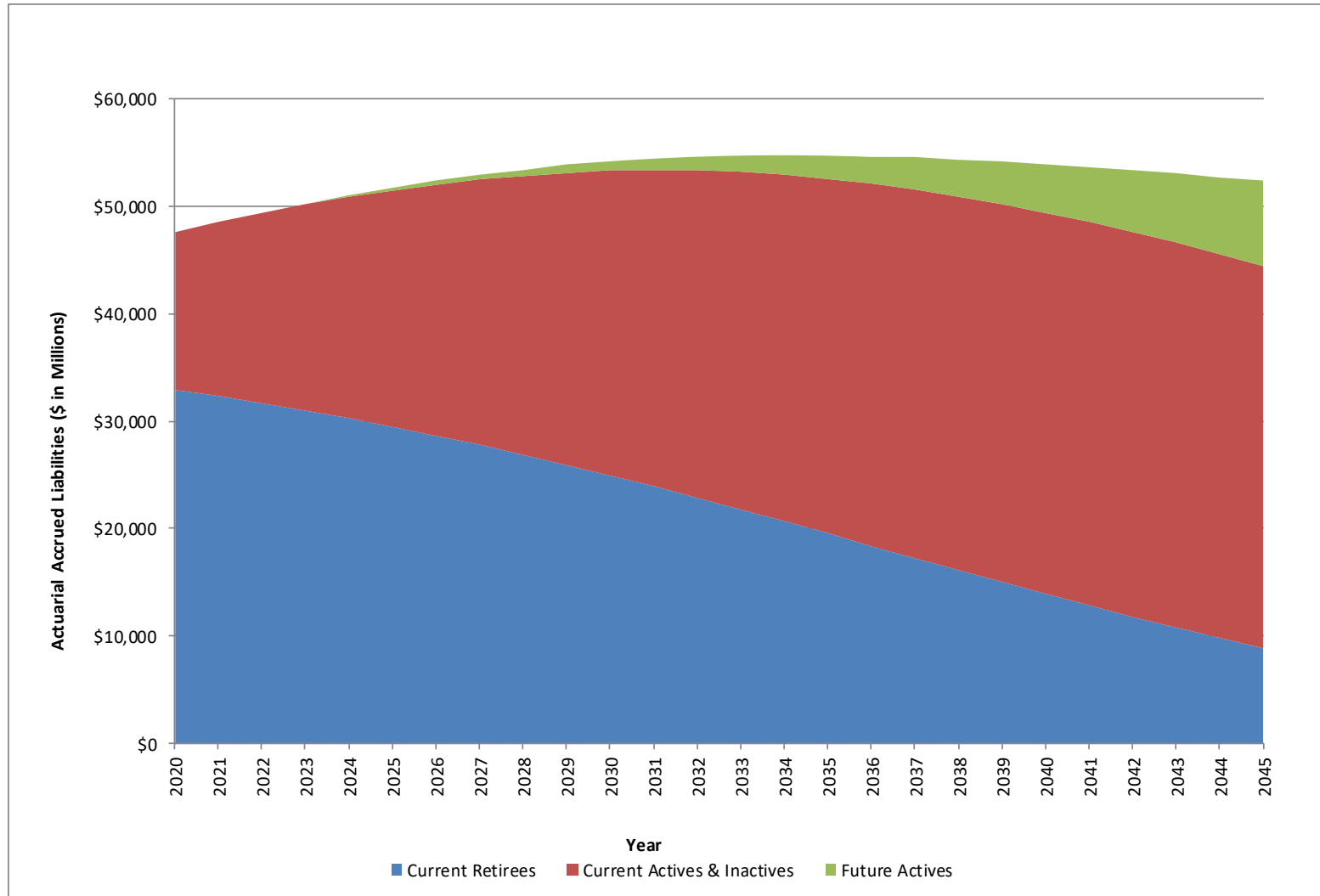
### Actuarial Valuation as of June 30, 2020

(\$ in Millions)

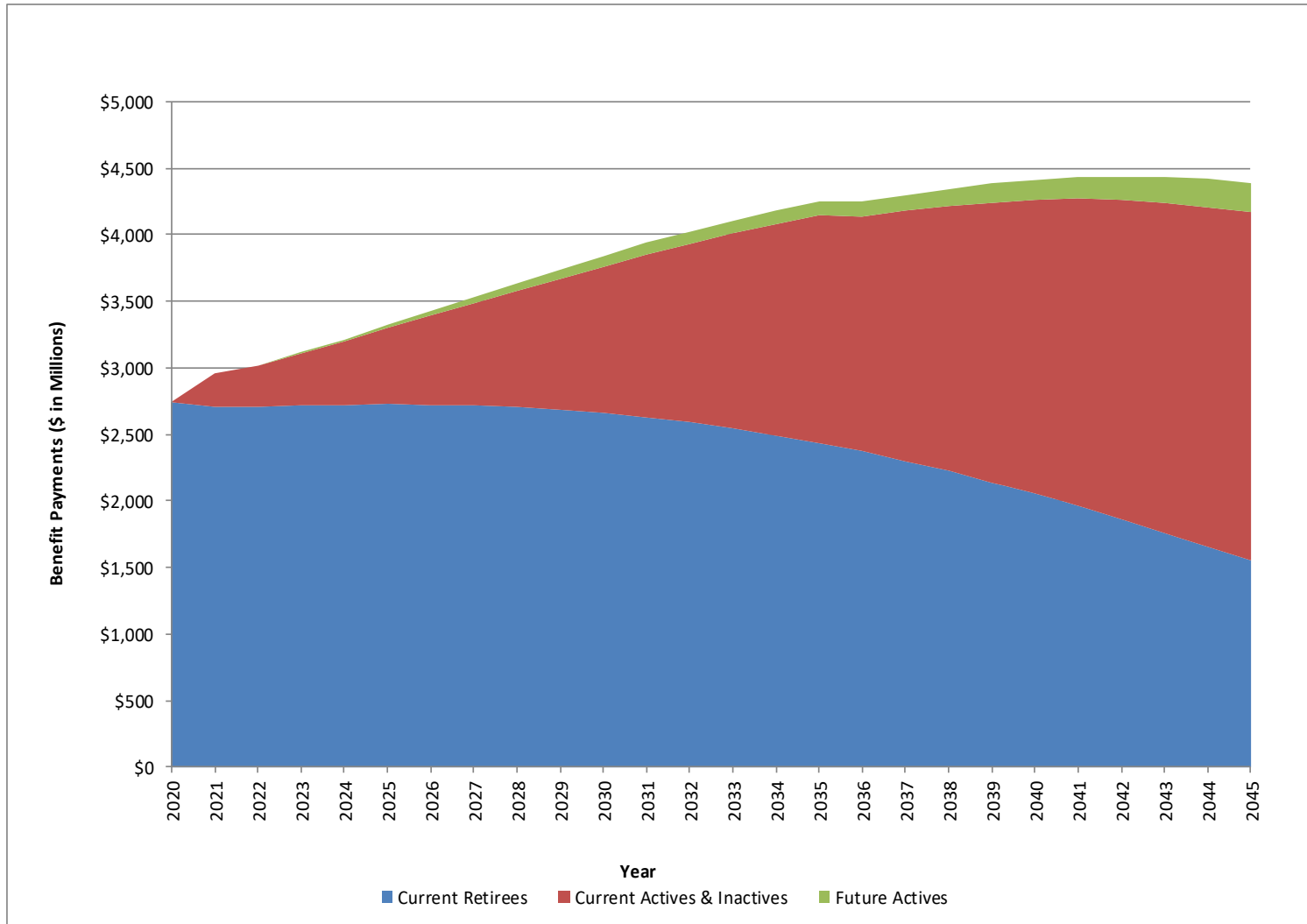


## Graph 2

### Projected Actuarial Accrued Liabilities Actuarial Valuation as of June 30, 2020 (\$ in Millions)



### Graph 3 Projected Benefit Payments Actuarial Valuation as of June 30, 2020 (\$ in Millions)





**Table 13**  
**Projected Statutory Contributions for the Actuarial Valuation as of June 30, 2020**  
**Before Impact of Bonds Issued in 2004**  
(\$ in Millions)

FYE	70% of New Members to Tier 2, 30% to SMP Combined State and Employer Contribution			
	SURS Cont.	SMP Cont.	\$	% of Pay <sup>1</sup>
2021	\$ 2,105.898	\$ 81.230	\$ 2,187.128	45.38 %
2022	2,206.496	86.033	2,292.529	46.85
2023	2,280.096	88.716	2,368.812	47.55
2024	2,370.390	92.662	2,463.052	48.48
2025	2,432.922	96.653	2,529.575	48.79
2026	2,495.411	100.662	2,596.073	49.05
2027	2,548.811	104.706	2,653.517	49.08
2028	2,604.894	108.791	2,713.685	49.11
2029	2,662.733	112.933	2,775.666	49.14
2030	2,722.012	117.146	2,839.158	49.17
2031	2,782.981	121.505	2,904.486	49.20
2032	2,847.432	126.099	2,973.531	49.23
2033	2,915.203	130.879	3,046.082	49.26
2034	2,985.540	135.798	3,121.338	49.29
2035	3,057.881	140.850	3,198.731	49.32
2036	3,132.491	146.030	3,278.521	49.34
2037	3,209.182	151.362	3,360.544	49.37
2038	3,288.364	156.863	3,445.227	49.39
2039	3,370.039	162.457	3,532.496	49.42
2040	3,454.431	168.231	3,622.662	49.44
2041	3,542.359	174.172	3,716.531	49.46
2042	3,633.168	180.290	3,813.458	49.48
2043	3,726.540	186.529	3,913.069	49.50
2044	3,821.933	192.905	4,014.838	49.52
2045	3,919.235	199.460	4,118.695	49.54
Total	\$74,116.442	\$3,362.962	\$77,479.404	

<sup>1</sup> Percent of pay amounts are calculated based on pensionable pay. Pensionable pay does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

**Table 14**  
**Projected Statutory Contributions for the Actuarial Valuation as of June 30, 2020**  
**Including Impact of Bonds Issued in 2004**  
(\$ in Millions)

FYE	70% of New Members to Tier 2, 30% to SMP		Combined State and Employer Contribution		Debt Service		SURS Alternate Policy Contribution <sup>2</sup>		Projected % of Alternate Policy Contributed <sup>3</sup>	Employer Contributions	Federal/Trust Fund Contributions	Qualified Plan State Contribution
	SURS Cont.	SMP Cont.	\$	% of Pay <sup>1</sup>	\$	% of Pay <sup>1</sup>	SURS Cont.	Total (w/SMP)				
2021	\$ 1,954.566	\$ 81.230	\$ 2,035.796	42.24 %	\$ 139.615	2.90 %	\$ 2,454.215	\$ 2,535.445	80.29 %	\$ 5.529	\$ 52.500	\$ 1,977.767
2022	2,055.984	86.033	2,142.017	43.78	146.736	3.00	2,499.393	2,585.426	82.85	5.369	57.000	2,079.648
2023	2,126.724	88.716	2,215.440	44.47	153.373	3.08	2,508.114	2,596.830	85.31	8.411	NA	2,207.029
2024	2,205.973	92.662	2,298.635	45.24	164.417	3.24	2,530.045	2,622.707	87.64	8.109	NA	2,290.526
2025	2,258.319	96.653	2,354.972	45.42	174.604	3.37	2,555.554	2,652.207	88.79	7.990	NA	2,346.982
2026	2,316.262	100.662	2,416.924	45.66	179.149	3.38	2,578.086	2,678.748	90.23	7.881	NA	2,409.043
2027	2,365.616	104.706	2,470.322	45.69	183.195	3.39	2,587.261	2,691.967	91.77	7.755	NA	2,462.567
2028	2,413.260	108.791	2,522.051	45.64	191.634	3.47	2,603.291	2,712.082	92.99	7.597	NA	2,514.454
2029	2,463.408	112.933	2,576.341	45.61	199.325	3.53	2,620.560	2,733.493	94.25	7.489	NA	2,568.852
2030	2,510.852	117.146	2,627.998	45.52	211.160	3.66	2,638.274	2,755.420	95.38	7.352	NA	2,620.646
2031	2,560.984	121.505	2,682.489	45.44	221.997	3.76	2,655.993	2,777.498	96.58	7.205	NA	2,675.284
2032	2,620.489	126.099	2,746.588	45.47	226.944	3.76	2,673.564	2,799.663	98.10	7.000	NA	2,739.588
2033	2,688.954	130.879	2,819.833	45.60	226.249	3.66	2,691.201	2,822.080	99.92	6.697	NA	2,813.136
2034	2,808.304	135.798	2,944.102	46.49			2,712.078	2,847.876	103.38	6.421	NA	2,937.681
2035	2,876.351	140.850	3,017.201	46.52			2,733.436	2,874.286	104.97	6.133	NA	3,011.068
2036	2,946.531	146.030	3,092.561	46.54			2,754.513	2,900.543	106.62	5.840	NA	3,086.721
2037	3,018.670	151.362	3,170.032	46.57			2,774.814	2,926.176	108.33	5.507	NA	3,164.525
2038	3,093.151	156.863	3,250.014	46.59			2,793.945	2,950.808	110.14	5.147	NA	3,244.867
2039	3,169.977	162.457	3,332.434	46.62			2,813.307	2,975.764	111.99	4.748	NA	3,327.686
2040	3,249.359	168.231	3,417.590	46.64			2,830.696	2,998.927	113.96	4.324	NA	3,413.266
2041	3,332.067	174.172	3,506.239	46.66			2,845.024	3,019.196	116.13	3.897	NA	3,502.342
2042	3,417.486	180.290	3,597.776	46.68			2,854.157	3,034.447	118.56	3.462	NA	3,594.314
2043	3,505.315	186.529	3,691.844	46.71			2,853.470	3,039.999	121.44	3.054	NA	3,688.790
2044	3,595.045	192.905	3,787.950	46.73			2,829.993	3,022.898	125.31	2.651	NA	3,785.299
2045	3,686.570	199.460	3,886.030	46.74			2,733.721	2,933.181	132.49	2.297	NA	3,883.733
Total	\$ 69,240.217	\$ 3,362.962	\$ 72,603.179		\$ 2,418.397		\$ 67,124.703	\$ 70,487.665		\$ 147.864	\$ 109.500	\$ 72,345.815

<sup>1</sup> Percent of pay amounts are calculated based on pensionable pay. Pensionable pay does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

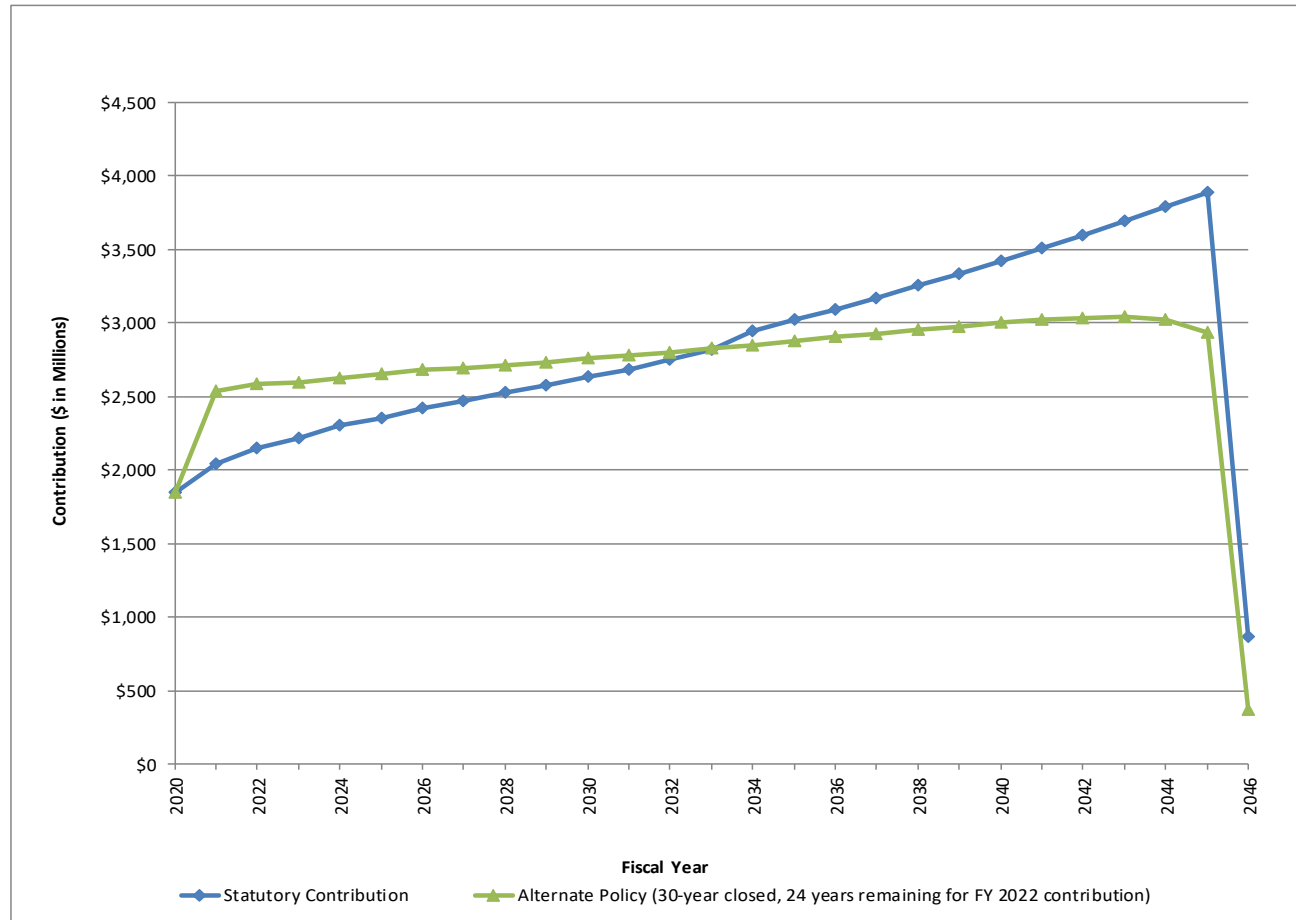
<sup>2</sup> Alternate funding policy of normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of defined benefit plan capped payroll beginning in FY 2016 with 24 years remaining as of FY 2022.

<sup>3</sup> Compares the SURS Statutory contribution (targets a funded ratio of 90% in 2045) against an alternate funding policy (targets a funded ratio of 100% in 2045).



## Graph 4

### Projected Statutory Contributions vs. Contributions under Alternate Policy (Normal Cost Plus 30-year Closed Period Level Percent of Pay Amortization) (24 years remaining in Amortization Period for FY 2022 Contribution) (\$ in Millions)



*Alternate funding policy of normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of defined benefit plan capped payroll beginning in FY 2016 and 24 years remaining in FY 2022. Alternate funding policy contributions based on actual assets as of the current valuation and the alternate policy contribution being made.*

## **APPENDIX E**

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### **ADDITIONAL PROJECTION DETAILS**

Table 15

**Projections – Does Not Reflect Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of Assets (Impact of Bonds Issued in 2004 Included)**  
**Assumes Investment Return of 6.75% Each Year on Actuarial Value of Assets**  
**(\$ in Millions)**

Fiscal Year Ending	Total Payroll <sup>1</sup>	SMP Payroll	DB Payroll <sup>1</sup>	SURS Contributions <sup>2</sup>	Member Contributions	Benefits	Expenses	Assets EOY	AAL	Funding Ratio	UAAL	Debt Service	Maximum Contribution <sup>3</sup>	SURS Contribution % of Total Payroll
2020	\$ 4,583.907	\$ 1,055.949	\$ 3,527.958	\$ 1,838.786	\$ 282.367	\$ 2,745.194	\$ 18.469	\$ 20,091.675	\$ 47,580.470	42.23 %	\$ 27,488.795	\$ 132.009	\$ 1,841.289	40.11 %
2021	4,819.585	1,141.786	3,677.799	1,954.566	294.592	2,954.590	22.708	20,695.549	48,480.243	42.69	27,784.694	139.615	1,966.283	40.55
2022	4,892.989	1,192.608	3,700.381	2,055.984	296.400	3,015.379	23.446	21,383.269	49,366.678	43.32	27,983.409	146.736	2,059.760	42.02
2023	4,981.962	1,247.474	3,734.488	2,125.131	299.132	3,115.551	24.208	22,087.390	50,199.054	44.00	28,111.664	153.373	2,125.131	42.66
2024	5,080.891	1,303.135	3,777.756	2,192.357	302.598	3,215.479	24.995	22,808.019	50,975.092	44.74	28,167.073	164.417	2,192.357	43.15
2025	5,184.626	1,359.421	3,825.205	2,230.288	306.399	3,321.078	25.807	23,510.465	51,685.207	45.49	28,174.742	174.604	2,230.288	43.02
2026	5,293.145	1,415.941	3,877.204	2,276.080	310.564	3,424.900	26.646	24,203.805	52,327.656	46.25	28,123.851	179.149	2,276.080	43.00
2027	5,406.414	1,472.954	3,933.460	2,324.574	315.070	3,529.986	27.512	24,889.236	52,897.827	47.05	28,008.591	183.195	2,324.574	43.00
2028	5,525.376	1,530.524	3,994.852	2,371.314	319.988	3,629.736	28.406	25,570.321	53,397.800	47.89	27,827.479	191.634	2,371.314	42.92
2029	5,648.061	1,588.895	4,059.166	2,420.531	325.139	3,730.896	29.329	26,248.081	53,821.940	48.77	27,573.859	199.325	2,420.531	42.86
2030	5,773.801	1,648.243	4,125.558	2,467.020	330.457	3,836.165	30.282	26,915.369	54,160.993	49.70	27,245.624	211.160	2,467.020	42.73
2031	5,903.125	1,709.664	4,193.461	2,516.170	335.896	3,936.786	31.267	27,579.120	54,413.989	50.68	26,834.869	221.997	2,516.170	42.62
2032	6,039.836	1,774.398	4,265.438	2,574.638	341.662	4,025.587	32.283	28,261.242	54,587.785	51.77	26,326.543	226.944	2,574.638	42.63
2033	6,183.587	1,841.773	4,341.814	2,642.011	347.779	4,107.308	33.332	28,979.820	54,685.449	52.99	25,705.629	226.249	2,642.011	42.73
2034	6,332.784	1,911.096	4,421.688	2,746.464	354.177	4,184.028	34.415	29,781.046	54,708.205	54.44	24,927.159	NA	2,937.465	43.37
2035	6,486.230	1,982.291	4,503.939	2,813.012	360.765	4,255.835	35.534	30,636.573	54,656.664	56.05	24,020.091	NA	3,008.641	43.37
2036	6,644.488	2,055.280	4,589.209	2,881.647	367.596	4,245.281	36.688	31,637.529	54,611.359	57.93	22,973.830	NA	3,082.050	43.37
2037	6,807.163	2,130.409	4,676.753	2,952.197	374.608	4,299.041	37.881	32,729.411	54,506.652	60.05	21,777.241	NA	3,157.506	43.37
2038	6,975.119	2,207.927	4,767.193	3,025.038	381.852	4,347.286	39.112	33,926.619	54,344.911	62.43	20,418.292	NA	3,235.413	43.37
2039	7,148.364	2,286.739	4,861.625	3,100.173	389.416	4,385.276	40.383	35,249.519	54,134.277	65.11	18,884.758	NA	3,315.773	43.37
2040	7,327.371	2,368.094	4,959.277	3,177.806	397.238	4,414.690	41.696	36,718.261	53,882.047	68.15	17,163.786	NA	3,398.805	43.37
2041	7,513.880	2,451.785	5,062.095	3,258.694	405.474	4,433.527	43.051	38,357.363	53,598.666	71.56	15,241.303	NA	3,485.318	43.37
2042	7,706.500	2,537.980	5,168.520	3,342.231	413.998	4,438.243	44.450	40,195.903	53,299.267	75.42	13,103.364	NA	3,574.664	43.37
2043	7,904.557	2,625.854	5,278.703	3,428.126	422.824	4,431.948	45.894	42,261.422	52,996.414	79.74	10,734.992	NA	3,666.533	43.37
2044	8,106.900	2,715.668	5,391.232	3,515.880	431.838	4,417.435	47.386	44,579.797	52,700.181	84.59	8,120.384	NA	3,760.390	43.37
2045	8,313.292	2,807.990	5,505.302	3,605.390	440.975	4,392.809	48.926	47,180.438	52,422.709	90.00	5,242.271	NA	3,856.125	43.37

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

<sup>2</sup> Excludes SMP contributions. Includes employer contributions.

<sup>3</sup> Maximum contribution after impact of debt service.



**Table 16**  
**Development of Market and Actuarial Value of Assets as of June 30, 2020**  
**after Bonds (Valuation Basis) and before Bonds (Hypothetical Basis)**

		After Bonds (Valuation Basis)	Before Bonds (Hypothetical)
1	Market Value at 6/30/2019	\$19,717,347,961	\$17,353,349,341
2a	Employer and Non-Employer Contributing Entity Contributions <sup>1</sup>	1,838,786,080	1,973,298,892
2b	Member Contributions	282,367,290	282,367,290
2c	Benefits and Expenses	2,763,663,492	2,763,663,492
2d	Net Non-Investment Cash Flow	(642,510,122)	(507,997,310)
3	Investment Return (Based on Estimated Rate of 2.8%)	542,177,767	478,026,011
4	Expected Return (Based on Estimated Rate of 6.75%)	1,309,590,348	1,154,486,121
5	Market Value at 6/30/2020 (1+2d+3)	19,617,015,606	17,323,378,042
6	Expected Market Value at 6/30/2020 (1+2d+4)	20,384,428,187	17,999,838,152
7a	Actuarial Gain/(Loss) Current Year	(767,412,581)	(676,460,110)
7b	Actuarial Gain/(Loss) 1 Year Prior	(150,007,091)	(131,557,100)
7c	Actuarial Gain/(Loss) 2 Years Prior	183,313,712	161,071,013
7d	Actuarial Gain/(Loss) 3 Years Prior	779,748,280	680,927,833
7e	Actuarial Gain/(Loss) 4 Years Prior	(1,232,126,031)	(1,069,638,132)
8	Actuarial Value at 6/30/2019	19,661,891,301	17,303,508,886
9	Actuarial Value at 6/30/2020 (8+2d+4+.2*(7a+7b+7c+7d+7e))	20,091,674,784	17,742,866,398

<sup>1</sup>Hypothetical contributions (before bonds) are equal to the total contributions of \$2,051,552,000 minus actual fiscal year 2020 SMP contributions of \$78,253,108.



**Table 17**  
**Hypothetical Assets to Determine Maximum Contribution**  
**Projections – Reflects Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of**  
**Assets (Before Impact of Bonds Issued in 2004)**  
**(\$ in Millions)**

Fiscal Year Ending	Total Payroll <sup>1</sup>	SMP Payroll	DB Payroll <sup>1</sup>	SURS Contributions <sup>2</sup>	Member			Assets		Funding		Debt Service	SURS Contribution % of Total Payroll
					Contributions	Benefits	Expenses	EOY	AAL	Ratio	UAAL		
2020	\$ 4,583.907	\$ 1,055.949	\$ 3,527.958	\$ 1,973.299	\$ 282.367	\$ 2,745.194	\$ 18.469	\$ 17,742.866	\$ 47,580.470	37.29 %	\$ 29,837.604	NA	43.05 %
2021	4,819.585	1,141.786	3,677.799	2,105.898	294.592	2,954.590	22.708	18,323.033	48,480.243	37.79	30,157.210	NA	43.69
2022	4,892.989	1,192.608	3,700.381	2,206.496	296.400	3,015.379	23.446	18,847.954	49,366.678	38.18	30,518.724	NA	45.10
2023	4,981.962	1,247.474	3,734.488	2,280.096	299.132	3,115.551	24.208	19,359.407	50,199.054	38.57	30,839.647	NA	45.77
2024	5,080.891	1,303.135	3,777.756	2,370.390	302.598	3,215.479	24.995	19,935.418	50,975.092	39.11	31,039.674	NA	46.65
2025	5,184.626	1,359.421	3,825.205	2,432.922	306.399	3,321.078	25.807	20,653.324	51,685.207	39.96	31,031.883	NA	46.93
2026	5,293.145	1,415.941	3,877.204	2,495.411	310.564	3,424.900	26.646	21,380.420	52,327.656	40.86	30,947.236	NA	47.14
2027	5,406.414	1,472.954	3,933.460	2,548.811	315.070	3,529.986	27.512	22,106.955	52,897.827	41.79	30,790.872	NA	47.14
2028	5,525.376	1,530.524	3,994.852	2,604.894	319.988	3,629.736	28.406	22,841.570	53,397.800	42.78	30,556.230	NA	47.14
2029	5,648.061	1,588.895	4,059.166	2,662.733	325.139	3,730.896	29.329	23,585.383	53,821.940	43.82	30,236.557	NA	47.14
2030	5,773.801	1,648.243	4,125.558	2,722.012	330.457	3,836.165	30.282	24,336.395	54,160.993	44.93	29,824.598	NA	47.14
2031	5,903.125	1,709.664	4,193.461	2,782.981	335.896	3,936.786	31.267	25,101.735	54,413.989	46.13	29,312.254	NA	47.14
2032	6,039.836	1,774.398	4,265.438	2,847.432	341.662	4,025.587	32.283	25,898.484	54,587.785	47.44	28,689.301	NA	47.14
2033	6,183.587	1,841.773	4,341.814	2,915.203	347.779	4,107.308	33.332	26,739.836	54,685.449	48.90	27,945.613	NA	47.14
2034	6,332.784	1,911.096	4,421.688	2,985.540	354.177	4,184.028	34.415	27,636.878	54,708.205	50.52	27,071.327	NA	47.14
2035	6,486.230	1,982.291	4,503.939	3,057.881	360.765	4,255.835	35.534	28,600.672	54,656.664	52.33	26,055.992	NA	47.14
2036	6,644.488	2,055.280	4,589.209	3,132.491	367.596	4,245.281	36.688	29,723.377	54,611.359	54.43	24,887.982	NA	47.14
2037	6,807.163	2,130.409	4,676.753	3,209.182	374.608	4,299.041	37.881	30,951.569	54,506.652	56.78	23,555.083	NA	47.14
2038	6,975.119	2,207.927	4,767.193	3,288.364	381.852	4,347.286	39.112	32,300.842	54,344.911	59.44	22,044.069	NA	47.14
2039	7,148.364	2,286.739	4,861.625	3,370.039	389.416	4,385.276	40.383	33,792.828	54,134.277	62.42	20,341.449	NA	47.14
2040	7,327.371	2,368.094	4,959.277	3,454.431	397.238	4,414.690	41.696	35,449.051	53,882.047	65.79	18,432.996	NA	47.14
2041	7,513.880	2,451.785	5,062.095	3,542.359	405.474	4,433.527	43.051	37,295.563	53,598.666	69.58	16,303.103	NA	47.14
2042	7,706.500	2,537.980	5,168.520	3,633.168	413.998	4,438.243	44.450	39,363.028	53,299.267	73.85	13,936.239	NA	47.14
2043	7,904.557	2,625.854	5,278.703	3,726.540	422.824	4,431.948	45.894	41,680.650	52,996.414	78.65	11,315.764	NA	47.14
2044	8,106.900	2,715.668	5,391.232	3,821.933	431.838	4,417.435	47.386	44,276.037	52,700.181	84.01	8,424.144	NA	47.14
2045	8,313.292	2,807.990	5,505.302	3,919.235	440.975	4,392.809	48.926	47,180.438	52,422.709	90.00	5,242.271	NA	47.14

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

<sup>2</sup> Excludes SMP contributions. Includes employer contributions.



**Table 18**

**Hypothetical Assets to Determine Maximum Contribution**

**Projections – Does Not Reflect Recognition of Deferred Asset Gains and Losses in Projected Actuarial Value of Assets  
(Before Impact of Bonds Issued in 2004)**

**Assumes Investment Return of 6.75% Each Year on Actuarial Value of Assets  
(\$ in Millions)**

Fiscal Year Ending	Total Payroll <sup>1</sup>	SMP Payroll	DB Payroll <sup>1</sup>	SURS Contributions <sup>2</sup>	Member Contributions	Benefits	Expenses	Assets EOY	AAL	Funding Ratio	UAAL	Debt Service	SURS Contribution % of Total Payroll
2020	\$ 4,583.907	\$ 1,055.949	\$ 3,527.958	\$ 1,973.299	\$ 282.367	\$ 2,745.194	\$ 18.469	\$ 17,742.866	\$ 47,580.470	37.29 %	\$ 29,837.604	NA	43.05 %
2021	4,819.585	1,141.786	3,677.799	2,105.898	294.592	2,954.590	22.708	18,344.552	48,480.243	37.84	30,135.691	NA	43.69
2022	4,892.989	1,192.608	3,700.381	2,206.496	296.400	3,015.379	23.446	19,029.089	49,366.678	38.55	30,337.589	NA	45.10
2023	4,981.962	1,247.474	3,734.488	2,278.503	299.132	3,115.551	24.208	19,732.767	50,199.054	39.31	30,466.287	NA	45.74
2024	5,080.891	1,303.135	3,777.756	2,356.774	302.598	3,215.479	24.995	20,464.335	50,975.092	40.15	30,510.757	NA	46.39
2025	5,184.626	1,359.421	3,825.205	2,404.892	306.399	3,321.078	25.807	21,188.982	51,685.207	41.00	30,496.225	NA	46.39
2026	5,293.145	1,415.941	3,877.204	2,455.228	310.564	3,424.900	26.646	21,910.718	52,327.656	41.87	30,416.938	NA	46.39
2027	5,406.414	1,472.954	3,933.460	2,507.768	315.070	3,529.986	27.512	22,630.643	52,897.827	42.78	30,267.184	NA	46.39
2028	5,525.376	1,530.524	3,994.852	2,562.949	319.988	3,629.736	28.406	23,357.269	53,397.800	43.74	30,040.531	NA	46.39
2029	5,648.061	1,588.895	4,059.166	2,619.856	325.139	3,730.896	29.329	24,091.590	53,821.940	44.76	29,730.350	NA	46.39
2030	5,773.801	1,648.243	4,125.558	2,678.181	330.457	3,836.165	30.282	24,831.485	54,160.993	45.85	29,329.508	NA	46.39
2031	5,903.125	1,709.664	4,193.461	2,738.168	335.896	3,936.786	31.267	25,583.942	54,413.989	47.02	28,830.047	NA	46.39
2032	6,039.836	1,774.398	4,265.438	2,801.581	341.662	4,025.587	32.283	26,365.867	54,587.785	48.30	28,221.918	NA	46.39
2033	6,183.587	1,841.773	4,341.814	2,868.260	347.779	4,107.308	33.332	27,190.267	54,685.449	49.72	27,495.182	NA	46.39
2034	6,332.784	1,911.096	4,421.688	2,937.465	354.177	4,184.028	34.415	28,068.041	54,708.205	51.30	26,640.164	NA	46.39
2035	6,486.230	1,982.291	4,503.939	3,008.641	360.765	4,255.835	35.534	29,010.064	54,656.664	53.08	25,646.600	NA	46.39
2036	6,644.488	2,055.280	4,589.209	3,082.050	367.596	4,245.281	36.688	30,108.287	54,611.359	55.13	24,503.072	NA	46.39
2037	6,807.163	2,130.409	4,676.753	3,157.506	374.608	4,299.041	37.881	31,309.070	54,506.652	57.44	23,197.582	NA	46.39
2038	6,975.119	2,207.927	4,767.193	3,235.413	381.852	4,347.286	39.112	32,627.764	54,344.911	60.04	21,717.147	NA	46.39
2039	7,148.364	2,286.739	4,861.625	3,315.773	389.416	4,385.276	40.383	34,085.749	54,134.277	62.97	20,048.528	NA	46.39
2040	7,327.371	2,368.094	4,959.277	3,398.805	397.238	4,414.690	41.696	35,704.272	53,882.047	66.26	18,177.775	NA	46.39
2041	7,513.880	2,451.785	5,062.095	3,485.318	405.474	4,433.527	43.051	37,509.077	53,598.666	69.98	16,089.589	NA	46.39
2042	7,706.500	2,537.980	5,168.520	3,574.664	413.998	4,438.243	44.450	39,530.508	53,299.267	74.17	13,768.759	NA	46.39
2043	7,904.557	2,625.854	5,278.703	3,666.533	422.824	4,431.948	45.894	41,797.435	52,996.414	78.87	11,198.979	NA	46.39
2044	8,106.900	2,715.668	5,391.232	3,760.390	431.838	4,417.435	47.386	44,337.119	52,700.181	84.13	8,363.062	NA	46.39
2045	8,313.292	2,807.990	5,505.302	3,856.125	440.975	4,392.809	48.926	47,180.438	52,422.709	90.00	5,242.271	NA	46.39

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

<sup>2</sup> Excludes SMP contributions. Includes employer contributions.





**Table 19**  
**Additional Details – Total Normal Cost Dollars**  
(\$ in Millions)

Fiscal Year Ending	Total Normal Cost <sup>1</sup>				Admin Expense				Normal Cost with Admin Expense			
	Tier 2				Tier 2				Tier 2			
	Tier 1	Current	Future	Total	Tier 1	Current	Future	Total	Tier 1	Current	Future	Total
2021	\$ 582.499	\$ 134.469	\$ 0.000	\$ 716.968	\$ 14.685	\$ 8.023	\$ 0.000	\$ 22.708	\$ 597.183	\$ 142.493	\$ 0.000	\$ 739.676
2022	553.294	127.537	25.233	706.064	14.192	7.577	1.677	23.446	567.486	135.114	26.910	729.510
2023	525.750	121.762	48.491	696.003	13.695	7.178	3.335	24.208	539.445	128.940	51.827	720.212
2024	498.649	117.254	71.119	687.022	13.142	6.848	5.004	24.995	511.791	124.102	76.124	712.017
2025	471.747	113.823	92.548	678.118	12.577	6.618	6.612	25.807	484.324	120.440	99.161	703.925
2026	445.199	111.192	113.665	670.056	11.995	6.448	8.203	26.646	457.194	117.640	121.868	696.702
2027	419.333	109.233	134.648	663.214	11.406	6.314	9.793	27.512	430.739	115.547	144.440	690.726
2028	394.189	107.747	155.836	657.772	10.801	6.195	11.410	28.406	404.990	113.942	167.246	686.178
2029	369.295	106.588	176.989	652.872	10.190	6.097	13.042	29.329	379.485	112.685	190.031	682.201
2030	343.974	105.627	198.477	648.078	9.562	6.012	14.708	30.282	353.537	111.639	213.184	678.360
2031	318.105	104.891	220.260	643.256	8.915	5.938	16.413	31.267	327.021	110.829	236.673	674.523
2032	292.234	104.338	242.302	638.874	8.256	5.867	18.159	32.283	300.490	110.205	260.462	671.157
2033	267.292	103.836	264.428	635.556	7.610	5.793	19.929	33.332	274.901	109.629	284.357	668.887
2034	243.284	103.416	286.693	633.393	6.976	5.717	21.722	34.415	250.260	109.132	308.415	667.807
2035	219.510	103.098	309.196	631.804	6.345	5.640	23.549	35.534	225.855	108.738	332.745	667.338
2036	195.812	102.820	332.020	630.652	5.715	5.561	25.413	36.688	201.527	108.381	357.432	667.340
2037	172.317	102.523	355.040	629.880	5.092	5.480	27.310	37.881	177.409	108.002	382.350	667.761
2038	149.238	102.195	378.331	629.764	4.479	5.394	29.239	39.112	153.717	107.589	407.570	668.876
2039	127.299	101.883	401.816	630.998	3.892	5.305	31.186	40.383	131.191	107.188	433.002	671.381
2040	107.024	101.483	425.406	633.913	3.343	5.208	33.145	41.696	110.367	106.691	458.551	675.609
2041	89.098	100.876	449.106	639.080	2.847	5.100	35.104	43.051	91.945	105.976	484.210	682.131
2042	73.942	100.069	472.795	646.806	2.414	4.981	37.054	44.450	76.357	105.050	509.849	691.256
2043	61.188	99.054	496.486	656.728	2.040	4.854	39.001	45.894	63.227	103.908	535.487	702.622
2044	50.500	97.664	520.243	668.407	1.717	4.712	40.957	47.386	52.217	102.377	561.200	715.794
2045	41.328	95.803	544.161	681.292	1.431	4.556	42.939	48.926	42.760	100.358	587.100	730.218
2046	33.360	93.512	568.258	695.130	1.176	4.385	44.955	50.516	34.536	97.897	613.214	745.647

<sup>1</sup> Normal Cost excludes expense portion.

Values may not add due to rounding.



**Table 20**  
**Additional Details – Normal Cost Rates**  
(\$ in Millions)

Fiscal Year Ending	Expected Defined Benefit Plan Pay <sup>1</sup>				Total Normal Cost Rate <sup>1</sup>					Employer Normal Cost Rate		
	Tier 1	Tier 2		Total	Tier 1	Tier 2		Total	Combined Tier 2	Tier 1	Tier 2	Total
		Current	Future			Current	Future					
2021	\$ 2,352.349	\$ 1,285.247	\$ 0.000	\$ 3,637.596	25.39%	11.09%		20.33%	11.09%	17.38%	3.08%	12.32%
2022	2,210.308	1,180.032	261.095	3,651.435	25.67%	11.45%	10.31%	19.98%	11.24%	17.66%	3.23%	11.97%
2023	2,078.238	1,089.324	506.155	3,673.717	25.96%	11.84%	10.24%	19.60%	11.33%	17.95%	3.32%	11.59%
2024	1,951.366	1,016.866	743.067	3,711.299	26.23%	12.20%	10.24%	19.19%	11.38%	18.22%	3.37%	11.18%
2025	1,828.551	962.177	961.398	3,752.126	26.49%	12.52%	10.31%	18.76%	11.42%	18.48%	3.41%	10.75%
2026	1,709.415	918.954	1,168.990	3,797.359	26.75%	12.80%	10.43%	18.35%	11.47%	18.74%	3.46%	10.34%
2027	1,594.671	882.716	1,369.119	3,846.506	27.01%	13.09%	10.55%	17.96%	11.55%	19.00%	3.54%	9.95%
2028	1,484.170	851.331	1,567.868	3,903.369	27.29%	13.38%	10.67%	17.58%	11.62%	19.28%	3.61%	9.57%
2029	1,376.736	823.796	1,762.161	3,962.693	27.56%	13.68%	10.78%	17.22%	11.71%	19.55%	3.70%	9.21%
2030	1,270.706	798.991	1,954.497	4,024.194	27.82%	13.97%	10.91%	16.86%	11.80%	19.81%	3.79%	8.85%
2031	1,165.565	776.340	2,145.811	4,087.716	28.06%	14.28%	11.03%	16.50%	11.89%	20.05%	3.88%	8.49%
2032	1,062.856	755.241	2,337.689	4,155.786	28.27%	14.59%	11.14%	16.15%	11.98%	20.26%	3.97%	8.14%
2033	965.170	734.765	2,527.680	4,227.615	28.48%	14.92%	11.25%	15.82%	12.08%	20.47%	4.07%	7.81%
2034	872.291	714.788	2,716.111	4,303.190	28.69%	15.27%	11.36%	15.52%	12.17%	20.68%	4.16%	7.51%
2035	782.438	695.447	2,903.881	4,381.766	28.87%	15.64%	11.46%	15.23%	12.27%	20.86%	4.26%	7.22%
2036	695.319	676.569	3,091.965	4,463.853	28.98%	16.02%	11.56%	14.95%	12.36%	20.97%	4.35%	6.94%
2037	611.311	657.883	3,278.870	4,548.064	29.02%	16.42%	11.66%	14.68%	12.46%	21.01%	4.45%	6.67%
2038	530.812	639.295	3,465.229	4,635.336	28.96%	16.83%	11.76%	14.43%	12.55%	20.95%	4.54%	6.42%
2039	455.526	620.884	3,650.187	4,726.597	28.80%	17.26%	11.86%	14.20%	12.65%	20.79%	4.64%	6.19%
2040	386.579	602.229	3,832.892	4,821.700	28.55%	17.72%	11.96%	14.01%	12.74%	20.54%	4.73%	6.00%
2041	325.445	583.005	4,013.156	4,921.606	28.25%	18.18%	12.07%	13.86%	12.84%	20.24%	4.83%	5.85%
2042	272.976	563.251	4,189.674	5,025.901	27.97%	18.65%	12.17%	13.75%	12.94%	19.96%	4.93%	5.74%
2043	228.147	542.962	4,362.637	5,133.746	27.71%	19.14%	12.27%	13.69%	13.03%	19.70%	5.02%	5.68%
2044	189.984	521.539	4,532.803	5,244.326	27.48%	19.63%	12.38%	13.65%	13.13%	19.47%	5.12%	5.64%
2045	156.721	498.764	4,701.187	5,356.672	27.28%	20.12%	12.49%	13.63%	13.22%	19.27%	5.21%	5.62%
2046	127.352	474.811	4,868.128	5,470.291	27.12%	20.62%	12.60%	13.63%	13.31%	19.11%	5.30%	5.62%

<sup>1</sup>Expected pay for members in the defined benefit plans at June 30. Used to develop normal cost as a percent of pay.

Values may not add due to rounding.



**Table 21**  
**Additional Details – Number of Members, Contributions and Payroll**  
(\$ in Millions)

Fiscal Year Ending	SMP Total Active Members	Number of Defined Benefit Plan Active				Defined Benefit Plan Payroll <sup>1</sup>				Member Contributions			
		Tier 2				Tier 2				Tier 2			
		Tier 1	Current	Future	Total	Tier 1	Current	Future	Total	Tier 1	Current	Future	Total
2020	13,129	35,074	28,132	0	63,206	\$ 2,338.314	\$ 1,189.645	\$ 0.000	\$ 3,527.958				\$ 282.367
2021	14,367	31,416	23,969	6,583	61,968	2,229.673	1,189.828	258.298	3,677.799	\$ 178.597	\$ 95.305	\$ 20.690	294.592
2022	15,473	28,173	20,461	12,228	60,862	2,098.689	1,099.901	501.791	3,700.381	168.105	88.102	40.193	296.400
2023	16,456	25,218	17,528	17,133	59,879	1,973.287	1,022.205	738.996	3,734.488	158.059	81.879	59.194	299.132
2024	17,152	22,747	15,642	20,794	59,183	1,851.920	963.937	961.899	3,777.756	148.339	77.211	77.048	302.598
2025	17,706	20,559	14,271	23,799	58,629	1,733.374	918.613	1,173.218	3,825.205	138.843	73.581	93.975	306.399
2026	18,190	18,558	13,140	26,447	58,145	1,619.025	881.547	1,376.632	3,877.204	129.684	70.612	110.268	310.564
2027	18,623	16,717	12,172	28,823	57,712	1,508.863	849.679	1,574.918	3,933.460	120.860	68.059	126.151	315.070
2028	19,007	15,030	11,340	30,958	57,328	1,402.706	821.818	1,770.328	3,994.852	112.357	65.828	141.803	319.988
2029	19,349	13,467	10,609	32,910	56,986	1,298.298	796.883	1,963.985	4,059.166	103.994	63.830	157.315	325.139
2030	19,663	12,005	9,957	34,710	56,672	1,194.769	774.119	2,156.670	4,125.558	95.701	62.007	172.749	330.457
2031	19,955	10,637	9,376	36,367	56,380	1,091.907	753.294	2,348.260	4,193.461	87.461	60.339	188.096	335.896
2032	20,228	9,389	8,837	37,881	56,107	993.214	733.238	2,538.986	4,265.438	79.557	58.732	203.373	341.662
2033	20,481	8,258	8,335	39,261	55,854	900.247	713.521	2,728.046	4,341.814	72.110	57.153	218.516	347.779
2034	20,714	7,218	7,870	40,533	55,621	810.922	694.518	2,916.248	4,421.688	64.955	55.631	233.591	354.177
2035	20,930	6,254	7,437	41,714	55,405	723.834	675.919	3,104.186	4,503.939	57.979	54.141	248.645	360.765
2036	21,127	5,370	7,032	42,806	55,208	639.884	657.654	3,291.671	4,589.209	51.255	52.678	263.663	367.596
2037	21,310	4,554	6,649	43,822	55,025	558.893	639.400	3,478.460	4,676.753	44.767	51.216	278.625	374.608
2038	21,479	3,810	6,287	44,759	54,856	481.861	621.392	3,663.940	4,767.193	38.597	49.773	293.482	381.852
2039	21,628	3,154	5,945	45,608	54,707	411.184	603.483	3,846.958	4,861.625	32.936	48.339	308.141	389.416
2040	21,764	2,579	5,615	46,377	54,571	346.595	584.896	4,027.786	4,959.277	27.762	46.850	322.626	397.238
2041	21,880	2,102	5,297	47,056	54,455	291.374	565.732	4,204.989	5,062.095	23.339	45.315	336.820	405.474
2042	21,982	1,710	4,988	47,655	54,353	243.754	546.071	4,378.695	5,168.520	19.525	43.740	350.733	413.998
2043	22,068	1,389	4,689	48,189	54,267	203.530	525.793	4,549.380	5,278.703	16.303	42.116	364.405	422.824
2044	22,145	1,122	4,391	48,677	54,190	168.941	503.882	4,718.409	5,391.232	13.532	40.361	377.945	431.838
2045	22,215	897	4,096	49,127	54,120	138.285	480.935	4,886.082	5,505.302	11.077	38.523	391.375	440.975

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in the Tier 2 participating in the Traditional and Portable plans.

Values may not add due to rounding.



**Table 22**  
**Additional Details – Present Value of Future Benefits and Benefit Payments**  
(\$ in Millions)

Fiscal Year Ending	Present Value of Future Benefits						Benefit Payments					
	Current Retirees	Current Inactives	Tier 1 Actives	Tier 2 Actives		Total	Current Retirees	Current Inactives	Tier 1 Actives	Tier 2 Actives		Total
				Current	Future					Current	Future	
2020	\$ 32,861.981	\$ 2,963.417	\$ 15,555.616	\$ 2,118.149	\$ 0.000	\$ 53,499.163						\$ 2,745.194
2021	32,282.740	3,092.461	16,478.582	2,203.893	218.865	54,276.541	2,707.536	68.706	122.955	55.393	0.000	2,954.590
2022	31,669.689	3,213.377	17,414.271	2,296.164	458.234	55,051.735	2,702.419	85.003	170.941	54.677	2.339	3,015.379
2023	31,001.972	3,331.194	18,338.335	2,396.643	723.647	55,791.791	2,715.277	95.902	243.321	52.760	8.291	3,115.551
2024	30,281.076	3,444.473	19,244.039	2,508.982	1,008.815	56,487.385	2,723.125	107.991	321.461	47.846	15.056	3,215.479
2025	29,508.462	3,552.114	20,123.049	2,633.680	1,314.005	57,131.310	2,726.083	120.849	406.469	43.223	24.454	3,321.078
2026	28,686.039	3,650.977	20,972.832	2,771.799	1,639.866	57,721.513	2,723.817	136.377	492.183	38.381	34.142	3,424.900
2027	27,816.223	3,741.156	21,786.150	2,924.259	1,986.050	58,253.838	2,715.957	151.241	582.993	33.523	46.272	3,529.986
2028	26,901.406	3,819.589	22,560.675	3,092.690	2,352.916	58,727.276	2,702.685	168.501	673.675	28.027	56.848	3,629.736
2029	25,944.604	3,884.704	23,290.844	3,276.081	2,741.501	59,137.734	2,683.555	186.515	767.206	24.551	69.069	3,730.896
2030	24,949.209	3,935.526	23,968.215	3,470.639	3,153.203	59,476.792	2,658.401	204.603	866.011	25.723	81.427	3,836.165
2031	23,919.085	3,969.986	24,584.578	3,673.047	3,597.626	59,744.322	2,626.983	223.760	969.311	30.836	85.896	3,936.786
2032	22,858.561	3,989.216	25,139.680	3,883.218	4,075.390	59,946.065	2,589.107	240.751	1,068.872	36.547	90.310	4,025.587
2033	21,772.396	3,993.073	25,630.617	4,100.993	4,587.380	60,084.459	2,544.638	256.887	1,167.240	42.917	95.626	4,107.308
2034	20,665.828	3,979.265	26,053.703	4,326.281	5,135.503	60,160.580	2,493.427	274.236	1,264.984	49.873	101.508	4,184.028
2035	19,544.334	3,946.983	26,403.424	4,558.952	5,721.655	60,175.348	2,435.579	291.215	1,363.634	57.446	107.961	4,255.835
2036	18,413.681	3,971.977	26,677.210	4,798.843	6,347.331	60,209.042	2,371.176	233.669	1,459.975	65.658	114.803	4,245.281
2037	17,279.894	3,986.214	26,870.797	5,045.469	7,014.458	60,196.832	2,300.341	245.714	1,555.485	74.812	122.689	4,299.041
2038	16,149.284	3,988.993	26,979.920	5,298.215	7,723.994	60,140.406	2,223.193	257.734	1,649.882	85.001	131.476	4,347.286
2039	15,028.098	3,980.197	27,004.642	5,556.639	8,476.779	60,046.355	2,140.210	269.119	1,738.699	96.018	141.230	4,385.276
2040	13,922.610	3,959.563	26,943.880	5,820.148	9,274.654	59,920.855	2,051.770	280.001	1,823.052	107.979	151.888	4,414.690
2041	12,838.990	3,927.173	26,799.529	6,087.674	10,117.964	59,771.330	1,958.381	290.032	1,899.985	121.306	163.823	4,433.527
2042	11,783.158	3,883.909	26,577.312	6,357.953	11,008.382	59,610.714	1,860.690	298.441	1,965.918	136.121	177.073	4,438.243
2043	10,760.666	3,830.277	26,281.390	6,629.709	11,947.798	59,449.840	1,759.444	305.648	2,022.738	152.347	191.771	4,431.948
2044	9,776.699	3,766.348	25,914.989	6,901.175	12,938.726	59,297.937	1,655.357	312.111	2,071.619	170.384	207.964	4,417.435
2045	8,835.876	3,692.867	25,484.744	7,169.779	13,983.132	59,166.398	1,549.314	317.180	2,109.474	190.887	225.954	4,392.809

Values may not add due to rounding.



**Table 23**  
**Additional Details – Actuarial Accrued Liability and Employer Normal Cost Dollars**  
(\$ in Millions)

Fiscal Year Ending	Actuarial Accrued Liability						Fiscal Year Ending	Employer Normal Cost Dollar		
	Current Retirees	Current Inactives	Tier 1 Actives	Tier 2 Actives		Total		Tier 1	Tier 2	Total
				Current	Future					
2020	\$ 32,861.981	\$ 2,963.417	\$ 11,128.410	\$ 626.662	\$ 0.000	\$ 47,580.470	2021	\$ 418.586	\$ 26.498	\$ 445.084
2021	32,282.740	3,092.461	12,354.378	750.664	0.000	48,480.243	2022	399.381	33.729	433.110
2022	31,669.689	3,213.377	13,583.345	876.613	23.654	49,366.678	2023	381.386	39.694	421.080
2023	31,001.972	3,331.194	14,792.025	1,007.077	66.786	50,199.054	2024	363.452	45.967	409.419
2024	30,281.076	3,444.473	15,973.559	1,146.766	129.218	50,975.092	2025	345.481	52.045	397.526
2025	29,508.462	3,552.114	17,119.220	1,297.116	208.295	51,685.207	2026	327.510	58.628	386.138
2026	28,686.039	3,650.977	18,226.222	1,459.900	304.518	52,327.656	2027	309.879	65.777	375.656
2027	27,816.223	3,741.156	19,287.399	1,636.667	416.382	52,897.827	2028	292.633	73.557	366.190
2028	26,901.406	3,819.589	20,300.534	1,829.509	546.762	53,397.800	2029	275.491	81.571	357.062
2029	25,944.604	3,884.704	21,259.699	2,037.762	695.171	53,821.940	2030	257.836	90.067	347.903
2030	24,949.209	3,935.526	22,155.361	2,257.866	863.031	54,160.993	2031	239.560	99.067	338.627
2031	23,919.085	3,969.986	22,978.022	2,486.786	1,060.110	54,413.989	2032	220.933	108.562	329.495
2032	22,858.561	3,989.216	23,726.618	2,724.685	1,288.705	54,587.785	2033	202.791	118.317	321.108
2033	21,772.396	3,993.073	24,398.338	2,971.543	1,550.099	54,685.449	2034	185.305	128.325	313.630
2034	20,665.828	3,979.265	24,989.607	3,227.442	1,846.063	54,708.205	2035	167.876	138.697	306.573
2035	19,544.334	3,946.983	25,494.297	3,492.462	2,178.588	54,656.664	2036	150.272	149.472	299.744
2036	18,413.681	3,971.977	25,909.032	3,766.599	2,550.070	54,611.359	2037	132.642	160.511	293.153
2037	17,279.894	3,986.214	26,228.804	4,049.475	2,962.265	54,506.652	2038	115.120	171.904	287.024
2038	16,149.284	3,988.993	26,448.786	4,340.579	3,417.269	54,344.911	2039	98.255	183.710	281.965
2039	15,028.098	3,980.197	26,569.182	4,639.629	3,917.171	54,134.277	2040	82.605	195.766	278.371
2040	13,922.610	3,959.563	26,589.604	4,946.092	4,464.178	53,882.047	2041	68.606	208.051	276.657
2041	12,838.990	3,927.173	26,513.395	5,258.845	5,060.263	53,598.666	2042	56.832	220.426	277.258
2042	11,783.158	3,883.909	26,348.261	5,576.568	5,707.371	53,299.267	2043	46.924	232.874	279.798
2043	10,760.666	3,830.277	26,100.098	5,897.923	6,407.450	52,996.414	2044	38.685	245.271	283.956
2044	9,776.699	3,766.348	25,773.635	6,220.899	7,162.600	52,700.181	2045	31.683	257.560	289.243
2045	8,835.876	3,692.867	25,376.550	6,542.569	7,974.847	52,422.709	2046	25.620	269.791	295.411

Values may not add due to rounding.



**Table 24**  
**Additional Details – Payroll and Payroll in Excess of Governor’s Pay**  
**(\$ in Millions)**

Fiscal Year Ending	Defined Benefit Plan Payroll <sup>1</sup>				Defined Benefit Plan Payroll in Excess of Governor's Pay <sup>2</sup>		
	Tier 1	Tier 2		Total	Tier 1	Tier 2	
		Current	Future			Current	Total
2020	\$ 2,338.314	\$ 1,189.645	\$ 0.000	\$ 3,527.958	\$ 58.515	\$ 0.000	\$ 58.515
2021	2,229.673	1,189.828	258.298	3,677.799	68.020	0.000	68.020
2022	2,098.689	1,099.901	501.791	3,700.381	64.547	0.000	64.547
2023	1,973.287	1,022.205	738.996	3,734.488	62.658	0.000	62.658
2024	1,851.920	963.937	961.899	3,777.756	60.936	0.000	60.936
2025	1,733.374	918.613	1,173.218	3,825.205	59.131	0.000	59.131
2026	1,619.025	881.547	1,376.632	3,877.204	57.114	0.000	57.114
2027	1,508.863	849.679	1,574.918	3,933.460	55.496	0.000	55.496
2028	1,402.706	821.818	1,770.328	3,994.852	53.709	0.000	53.709
2029	1,298.298	796.883	1,963.985	4,059.166	51.953	0.000	51.953
2030	1,194.769	774.119	2,156.670	4,125.558	49.883	0.000	49.883
2031	1,091.907	753.294	2,348.260	4,193.461	47.218	0.000	47.218
2032	993.214	733.238	2,538.986	4,265.438	44.808	0.000	44.808
2033	900.247	713.521	2,728.046	4,341.814	42.367	0.000	42.367
2034	810.922	694.518	2,916.248	4,421.688	40.006	0.000	40.006
2035	723.834	675.919	3,104.186	4,503.939	37.512	0.000	37.512
2036	639.884	657.654	3,291.671	4,589.209	34.993	0.000	34.993
2037	558.893	639.400	3,478.460	4,676.753	32.379	0.000	32.379
2038	481.861	621.392	3,663.940	4,767.193	29.709	0.000	29.709
2039	411.184	603.483	3,846.958	4,861.625	27.103	0.000	27.103
2040	346.595	584.896	4,027.786	4,959.277	24.431	0.000	24.431
2041	291.374	565.732	4,204.989	5,062.095	21.855	0.000	21.855
2042	243.754	546.071	4,378.695	5,168.520	19.221	0.000	19.221
2043	203.530	525.793	4,549.380	5,278.703	16.850	0.000	16.850
2044	168.941	503.882	4,718.409	5,391.232	14.600	0.000	14.600
2045	138.285	480.935	4,886.082	5,505.302	12.425	0.000	12.425

<sup>1</sup> Payroll shown is pensionable pay. It does not include amounts in excess of the pay caps applicable to members in Tier 2 participating in the Traditional and Portable plans.

<sup>2</sup> Governor’s pay is \$181,700 in 2020 and is projected to increase annually by 1.125 percent.

Values may not add due to rounding.



## Table 25

### Additional Details – Statutorily Required Employer Contributions

(\$ in Millions)

Fiscal Year Ending	Applicable Employer Normal Cost Rates		Employer Normal Cost Contributions for Pay in Excess of the Governor's Pay <sup>1</sup>			Total Employer Contributions Required by Statute <sup>2</sup>		
	Tier 1	Total	Tier 1	Tier 2	Total	Tier 1	Tier 2	Total
2022	17.38%	12.32%			\$ 5.369	\$ 0.000	\$ 0.000	\$ 5.369
2023	17.66%	11.97%	\$ 8.411	\$ 0.000	8.411	8.411	0.000	8.411
2024	17.95%	11.59%	8.109	0.000	8.109	8.109	0.000	8.109
2025	18.22%	11.18%	7.990	0.000	7.990	7.990	0.000	7.990
2026	18.48%	10.75%	7.881	0.000	7.881	7.881	0.000	7.881
2027	18.74%	10.34%	7.755	0.000	7.755	7.755	0.000	7.755
2028	19.00%	9.95%	7.597	0.000	7.597	7.597	0.000	7.597
2029	19.28%	9.57%	7.489	0.000	7.489	7.489	0.000	7.489
2030	19.55%	9.21%	7.352	0.000	7.352	7.352	0.000	7.352
2031	19.81%	8.85%	7.205	0.000	7.205	7.205	0.000	7.205
2032	20.05%	8.49%	7.000	0.000	7.000	7.000	0.000	7.000
2033	20.26%	8.14%	6.697	0.000	6.697	6.697	0.000	6.697
2034	20.47%	7.81%	6.421	0.000	6.421	6.421	0.000	6.421
2035	20.68%	7.51%	6.133	0.000	6.133	6.133	0.000	6.133
2036	20.86%	7.22%	5.840	0.000	5.840	5.840	0.000	5.840
2037	20.97%	6.94%	5.507	0.000	5.507	5.507	0.000	5.507
2038	21.01%	6.67%	5.147	0.000	5.147	5.147	0.000	5.147
2039	20.95%	6.42%	4.748	0.000	4.748	4.748	0.000	4.748
2040	20.79%	6.19%	4.324	0.000	4.324	4.324	0.000	4.324
2041	20.54%	6.00%	3.897	0.000	3.897	3.897	0.000	3.897
2042	20.24%	5.85%	3.462	0.000	3.462	3.462	0.000	3.462
2043	19.96%	5.74%	3.054	0.000	3.054	3.054	0.000	3.054
2044	19.70%	5.68%	2.651	0.000	2.651	2.651	0.000	2.651
2045	19.47%	5.64%	2.297	0.000	2.297	2.297	0.000	2.297
2046	19.27%	5.62%	1.970	0.000	1.970	1.970	0.000	1.970
2047	19.11%	5.62%	1.662	0.000	1.662	1.662	0.000	1.662

<sup>1</sup> FY 2022 amount based on excess pay amount as provided by SURS and the total employer normal cost rate. Amounts in FY 2023 and thereafter based on excess pay amount projected by GRS and the employer normal cost rate by tier. SURS may want to consider having employer normal cost contributions be based on the normal cost rate by tier. 30% of future Tier 1 excess pay employer contributions that would have been calculated are not included because they are already assumed to be part of the federal and trust funds contributions.

<sup>2</sup> Projected employer contributions do not include 6% employer billing contributions. No additional assumption is made for earnings greater than 6% during the final average salary (FAS) period. The participant's employer is required to make contributions equal to the present value of the increase in benefits attributable to member pay increases in excess of 6% during the FAS period. These contributions are collected when the participant retires.

Values may not add due to rounding.



## **APPENDIX F**

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### **HISTORICAL SCHEDULES**



**Table 26**  
**Historical Schedule of Funding Status**  
(\$ in Thousands)

As of June 30	Actuarial Value of Assets	AAL	UAAL	Funded Ratio	Payroll/DB*	UAAL as % of Payroll
2006	\$ 14,175,147	\$ 21,688,935	\$7,513,788	65.36 %	\$3,054,100	246.02 %
2007	15,985,730	23,362,079	7,376,349	68.43	3,180,985	231.89
2008	14,586,325	24,917,678	10,331,353	58.54	3,303,220	312.77
2009	11,032,973	26,316,231	15,283,258	41.92	3,463,922	441.21
2009 **	14,281,998	26,316,231	12,034,233	54.27	3,463,922	347.42
2010 ***	13,966,643	30,120,427	16,153,784	46.37	3,491,071	462.72
2011	13,945,680	31,514,336	17,568,656	44.25	3,460,838	507.64
2012	13,949,905	33,170,216	19,220,311	42.06	3,477,166	552.76
2013	14,262,621	34,373,104	20,110,483	41.49	3,533,858	569.08
2014 ***	15,844,714	37,429,515	21,584,801	42.33	3,522,246	612.81
2015	17,104,607	39,520,687	22,416,080	43.28	3,606,537	621.54
2016	17,701,646	40,923,301	23,221,655	43.26	3,513,108	661.00
2017	18,594,326	41,853,348	23,259,022	44.43	3,458,320	672.55
2018 ***	19,347,886	45,258,751	25,910,865	42.75	3,470,226	746.66
2019	19,661,891	46,443,937	26,782,046	42.33	3,506,650	763.75
2020	20,091,675	47,580,470	27,488,795	42.23	3,642,617	754.64

AAL – Actuarial Accrued Liability.

UAAL – Unfunded Actuarial Accrued Liability.

\* Payroll is rolled forward with salary scale for one year and uses capped payroll for members hired on and after January 1, 2011.

\*\* Assets at Actuarial Value (Market Value through first 2009, then Actuarial Value).

\*\*\* Investment rate of return assumption decreased from 8.50 percent to 7.75 percent in plan year 2010, decreased from 7.75 percent to 7.25 percent in plan year 2014, and decreased from 7.25 percent to 6.75 percent in plan year 2018.



**Table 27**  
**Historical Comparison of ARC and State Contributions**  
(\$ in Millions)

Fiscal Year	(1) Total Normal Cost	(2) Amortization of UAAL	(3) (1) + (2) Total ADC	(4) Member Contributions	(5) (3) - (4) Net State ARC*	(6) Actual State Contribution	(7) (6) / (5) State Cont. as Percent of Net ARC
2003			\$ 843.8	\$ 246.3	\$ 597.5	\$ 285.3	47.74 %
2004			934.8	243.8	691.0	1,757.5	254.36
2005			859.7	251.9	607.8	285.4	46.96
2006			914.9	252.9	662.0	180.0	27.19
2007			968.3	262.4	705.9	261.1	36.99
2008			971.6	264.1	707.5	344.9	48.75
2009			1,147.3	273.3	874.0	451.6	51.67
2010 **			1,278.3	275.0	1,003.3	696.6	69.43
2011 ***	\$ 723.798	\$ 795.427	1,519.2	260.2	1,259.0	773.6	61.44
2012	700.972	1,000.612	1,701.584	258.236	1,443.348	985.815	68.30
2013	699.747	1,094.681	1,794.428	245.141	1,549.287	1,401.481	90.46
2014	698.225	1,145.380	1,843.605	283.081	1,560.524	1,502.864	96.31

\* ARC - Annual Required Contribution as defined in GASB Statements No. 25 and 27. The ARC is the Actuarially Determined Contribution ("ADC") net of member contributions.

\*\* Assets at Actuarial Value (Market Value through 2009, then Actuarial Value beginning with Fiscal Year 2010).

\*\*\* Investment rate of return assumption decreased from 8.50 percent to 7.75 percent in Fiscal Year 2011.

Beginning in Fiscal Year 2011, dollars are shown rounded to three decimal places.

Information beginning with Fiscal Year 2015 can be found in Table 11 of the report.



**Table 28**  
**Historical Schedule of Contributions**  
(\$ in Thousands)

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2011	\$ 1,259,048	\$ 773,595	\$ 485,453	\$ 3,460,838	22.35 %
2012	1,443,348	985,815	457,533	3,477,166	28.35
2013	1,549,287	1,401,481	147,806	3,533,858	39.66
2014	1,560,524	1,502,864	57,660	3,522,246	42.67
2015	1,622,656	1,528,525	94,130	3,606,537	42.38
2016	1,811,060	1,582,295	228,765	3,513,108	45.04
2017	1,864,843	1,650,551	214,292	3,458,320	47.73
2018	1,862,033	1,607,880	254,153	3,470,226	46.33
2019	2,239,366	1,642,054	597,312	3,506,650	46.83
2020	2,299,031	1,838,786	460,245	3,642,617	50.48

*For Fiscal Years 2015 and prior, the Actuarially Determined Contribution is equal to normal cost plus 30-year open period amortization of the unfunded actuarial accrued liability as a level percentage of total payroll.*

*For Fiscal Years 2016 and after, the Actuarially Determined Contribution is equal to net normal cost plus 29-year closed period amortization of the unfunded actuarial accrued liability (from June 30, 2016) as a level percentage of defined benefit plan pensionable (capped) payroll.*

*Covered employee payroll is equal to defined benefit payroll from the actuarial valuation as of the same date and rolled forward with one year of wage inflation.*



## **APPENDIX G**

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### **ACTUARIAL METHODS AND ASSUMPTIONS**

# Actuarial Methods and Assumptions

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## Projected Unit Credit Method

The Projected Unit Credit Method is mandated under Section 15-155 of the SURS Article of the Illinois Pension Code as the funding method to be used for SURS.

The concept of this method is that funding of benefits should occur as benefits are accrued (earned) by active members of SURS.

The Normal Cost ("NC") for a fiscal year under this method is the actuarial present value of all benefits expected to be accrued during the fiscal year adjusted for future expected salary increases. The Actuarial Accrued Liability ("AAL") under this method is the actuarial present value of all benefits accrued to the valuation date. To the extent that the assets of the fund are insufficient to cover the AAL, an Unfunded Actuarial Accrued Liability ("UAAL") develops. Under the classical application of this method, the contribution for a year is the NC for that year plus an amount to amortize the UAAL.

## Funding Policy to Calculate Statutory Contributions

Under Section 15-155 of the Illinois Pension Code, the employer/State contribution is determined such that the assets of SURS reach 90% of the AAL by the end of FY 2045.

This contribution is determined as a level percentage of pay for all years except that the contribution rates through 2010 shall grade in equal steps to the desired level contribution rate. *We have assumed the contribution would be based on pensionable (capped) payroll for members hired on or after January 1, 2011 ("Tier 2 members").* Pensionable pay does not include amounts in excess of the pay cap (\$115,929 in 2020 for Tier 2, increased by the lesser of 3% and 1/2 of the increase in CPI-U as measured in the preceding 12-month calendar year) that is applicable to members hired on or after January 1, 2011, participating in the defined benefit plans.

Public Act 100-0023 (Effective July 6, 2017) made the following changes to the SURS funding policy:

### State Contributions

- Requires the State to make additional contributions to SURS in FY 2018, FY 2019 and FY 2020 equal to 2 percent of the total payroll of each employee who participates in the Optional Hybrid Plan or who participates in the Tier 2 plan in lieu of the Optional Hybrid Plan.
- Requires any change in an actuarial assumption that increases or decreases the required State contribution to be implemented in equal annual amounts over a five-year period beginning in the State fiscal year in which the change first applies to the required State contribution.
  - For changes that first applied in FY 2014, FY 2015, FY 2016 or FY 2017, the impact is calculated based on a five-year period and the applicable portion is recognized during the remaining fiscal years in that five-year period.



# Actuarial Methods and Assumptions

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## Employer Contributions

- Requires employers to contribute the employer normal cost of the portion of an employee's earnings that exceeds the amount of salary set for the governor, for academic years beginning on or after July 1, 2017. (Applicable to Tier 1 and Tier 2 employees.)

Public Act 100-0587 (Effective June 4, 2018) made the following changes to the SURS funding policy:

## Employer Contributions

- For academic years beginning on or after July 1, 2018, and for earnings paid under a contract or collective bargaining agreement entered into, amended or renewed on or after the effective date of the amendatory Act (June 5, 2018), if a participant's earnings for any academic year with the same employer as the previous academic year used to determine the final average salary increased by more than 3.00%, then the participant's employer shall pay the System the present value of the increase in benefits resulting from the portion of the increase in earnings that is in excess of 3.00%. Prior to the effective date of Public Act 100-0587, the payment from employers was for pay increases in excess of 6.00%.

PA 101-0010 rescinded the change to 3% from PA 100-0587. Therefore, employers make contributions equal to the present value of the increase in benefit attributable to members who receive pay increases in excess of 6% during the final average salary (FAS) period.

The 6% employer billing rule is assumed to apply to all current and future Tier 1 and Tier 2 members.

## Statutory Contributions Related to the Optional Hybrid Plan

SURS is currently not moving forward with the implementation of the Optional Hybrid Plan (OHP) created under PA 100-0023. Additional clarifying legislation is needed for SURS to be able to do so. Therefore, contributions related to the OHP are not included in the actuarial valuation, including contributions for employer normal cost, additional 2 percent of payroll contributions and unfunded liability contributions.

## Phase In of the Financial Impact of Assumption Changes

On the following page is a table with the recognition schedule for the phase in of actuarial assumption changes required under Public Act 100-0023. The following actuarial assumption changes were made:

1. Beginning with the June 30, 2014 actuarial valuation the assumed rate of investment return was reduced to 7.25%.
2. Beginning with the June 30, 2015 actuarial valuation there were changes to the demographic assumptions.
3. Beginning with the June 30, 2018 actuarial valuation there were changes to the economic and demographic actuarial assumptions.



## Actuarial Methods and Assumptions

Valuation Year Ending 6/30	2019	2020	2021	2022	2023	2024
Applicable Fiscal Year Ending 6/30	2021	2022	2023	2024	2025	2026
	<b>\$ in Millions</b>					
	<b>After Impact of Bonds</b>					
Contribution Before Assumption Change:						
(1) Contribution Dollar	\$ 2,035.8	\$ 2,142.0				
(2) Contribution Rate	43.62%	43.78%				
Contribution After Assumption Change:						
(3) Contribution Dollar	2,035.8	2,142.0				
(4) Contribution Rate	43.62%	43.78%				
(5) Assumption Impact as Percentage of Payroll						
=(4)-(2)	0.00%	0.00%				
(6) Assumption Change Impact Recognized						
This Year (5 year recognition)						
(6a) From This Year	0.00%	0.00%				
(6b) From One Year Ago	0.67%	0.00%	0.00%			
(6c) From Two Years Ago	0.00%	0.67%	0.00%	0.00%		
(6d) From Three Years Ago	0.00%	0.00%	0.67%	0.00%	0.00%	
(6e) From Four Years Ago	0.25%	0.00%	0.00%	0.68%	0.00%	0.00%
(6f) Total Recognized Assumption Change Impact	0.92%	0.67%	0.67%	0.68%	0.00%	0.00%

### Contribution Related to Pay in Excess of Governor's Pay

Following is a table with the estimated contributions required under Public Act 100-0023 to be made by employers for pay in excess of the Governor's pay. (Information calculated and provided by SURS.)

Year	Governor's Pay	\$ in Millions					
		Pay for Preceding Fiscal Year for Affected Members		Employer Normal Cost Rate	Excess Pay * ER NC Rate	Additional Adjustments <sup>1</sup>	Estimated Employer Contributions
		Excess Pay					
July 1, 2017 - June 30, 2018	\$ 177,500	\$ 46.831	12.46%	\$ 5.835	\$ (1.579)	\$ 4.256	
July 1, 2018 - June 30, 2019	177,500	47.193	12.29%	5.800	(1.654)	4.146	
July 1, 2019 - June 30, 2020	177,500	55.726	13.02%	7.256	(2.132)	5.124	
July 1, 2020 - June 30, 2021	177,500	60.295	12.70%	7.657	(2.128)	5.529	
July 1, 2021 - June 30, 2022	181,700	58.515	12.32%	7.209	(1.840)	5.369	

<sup>1</sup> Additional adjustments for members with pay in excess of the Governor's pay whose employers' already make normal cost contributions.



# Actuarial Methods and Assumptions

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## Asset Valuation Method

Prior to the actuarial valuation as of June 30, 2009, market value of assets was used. Under Section 15-155(l) of the Illinois Pension Code, beginning with the actuarial valuation as of June 30, 2009, the asset value is the actuarial value of assets which is calculated by recognizing 20% of the investment gain or loss (the difference between the actual investment return and the expected investment return) on the market value of assets for each of the five following fiscal years. This method was not applied retroactively to recognize a portion of investment gains or losses from previous fiscal years.

Following is a table with the investment return assumption used in recent actuarial valuations.

Valuation Date	Investment Return Assumption
Prior to June 30, 2010	8.50%
June 30, 2010 through June 30, 2013	7.75%
June 30, 2014 through June 30, 2017	7.25%
June 30, 2018 and after	6.75%



# Actuarial Methods and Assumptions

## Actuarial Assumptions

### (Most Adopted Effective with the June 30, 2018, Actuarial Valuation)

Under Section 15-155(a) of the Illinois Pension Code, the Board adopts the assumptions after consultation with the actuary. All actuarial assumptions are expectations of future experience and are not market measures. The rationale for the actuarial assumptions may be found in the experience study report covering the period June 30, 2014 through June 30, 2017, issued to the Board of Trustees on February 26, 2018.

**Rate of Investment Return.** For all purposes under the system the rate of investment return is assumed to be 6.75% per annum beginning with the **June 30, 2018** actuarial valuation. This assumption is net of investment expenses.

**Price Inflation (Increase in Consumer Price Index "CPI").** The assumed rate is 2.25% per annum.

**Effective Rate of Interest.** The actuarial valuation assumed rate credited to member accounts is 6.75% per annum, beginning with the June 30, 2018 actuarial valuation.

**Cost of Living Adjustment "Automatic Annual Increase (AAI)."** The assumed rate is 3.00% per annum based on the benefit provision of 3.00% annual compound increases for members hired before January 1, 2011, who have not elected the AAI buyout and 1.50% simple (non-compound) increases for members who have elected the buyout. The assumed rate is 1.125% for members hired on or after January 1, 2011, based on the benefit provision of increases equal to ½ of the increase in CPI-U with a maximum increase of 3.00%.

**Annual Compensation Increases.** Each member's compensation is assumed to increase by 3.25% each year, 2.25% reflecting salary inflation and 1.00% reflecting standard of living increases. That rate is increased for members with less than 34 years of service to reflect merit, longevity and promotion increases. The rates are based on service at the beginning of the year and are as follows:

Service Year	Total Increase
0	12.25%
1	12.25%
2	8.75%
3	7.00%
4	6.25%
5	5.50%
6	5.50%
7	5.50%
8	4.75%
9	4.50%
10	4.50%
11-14	4.00%
15-18	3.75%
19-33	3.50%
34+	3.25%



## Actuarial Methods and Assumptions

**Payroll Growth.** The assumed rate of total payroll growth is 3.25%.

**Mortality.** The mortality assumptions are as follows:

Applicable Group	Base Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	RP-2014 White Collar Employee, sex distinct	93%	100%
Post-retirement (non-disabled)	RP-2014 White Collar Healthy Annuitant, sex distinct	96%	93%
Post-retirement (disabled)	RP-2014 Disabled Annuitant, sex distinct	112%	123%

Future mortality improvements are reflected by projecting the base mortality tables back from the year 2014 to the year 2006 using the Society of Actuaries (SOA) MP-2014 scale (referred to as the RP-2006 base mortality tables) and projecting from 2006 using the SOA MP-2017 projection scale. The assumptions are generational mortality tables and include a margin for improvement.

Age	Future Life Expectancy (years) in 2020				Future Life Expectancy (years) in 2030			
	Post-retirement		Disabled - Retiree		Post-retirement		Disabled - Retiree	
	Male	Female	Male	Female	Male	Female	Male	Female
35	52.37	54.52	32.91	38.40	53.34	55.44	34.52	39.88
40	47.17	49.32	29.30	34.08	48.12	50.23	30.74	35.45
45	42.05	44.19	26.11	30.13	42.97	45.08	27.41	31.40
50	37.01	39.09	23.04	26.33	37.91	39.97	24.26	27.51
55	32.08	34.05	20.05	22.72	32.96	34.91	21.19	23.83
60	27.28	29.13	17.15	19.42	28.12	29.95	18.16	20.40
65	22.65	24.41	14.42	16.24	23.43	25.18	15.27	17.07
70	18.25	19.90	11.81	13.09	18.96	20.61	12.51	13.81
75	14.17	15.65	9.31	10.15	14.80	16.30	9.91	10.79

## Actuarial Methods and Assumptions

**Disability.** A table of disability incidence with rates follows:

Age	Male	Female	Age	Male	Female
20	0.0247%	0.0328%	50	0.1214%	0.1360%
21	0.0253%	0.0347%	51	0.1287%	0.1401%
22	0.0259%	0.0366%	52	0.1361%	0.1442%
23	0.0265%	0.0385%	53	0.1435%	0.1483%
24	0.0271%	0.0404%	54	0.1508%	0.1524%
25	0.0277%	0.0423%	55	0.1552%	0.1565%
26	0.0283%	0.0442%	56	0.1552%	0.1565%
27	0.0289%	0.0461%	57	0.1552%	0.1565%
28	0.0295%	0.0481%	58	0.1552%	0.1565%
29	0.0300%	0.0500%	59	0.1552%	0.1565%
30	0.0315%	0.0541%	60	0.1552%	0.1565%
31	0.0330%	0.0582%	61	0.1552%	0.1565%
32	0.0345%	0.0623%	62	0.1552%	0.1565%
33	0.0359%	0.0664%	63	0.1552%	0.1565%
34	0.0374%	0.0705%	64	0.1552%	0.1565%
35	0.0395%	0.0745%	65	0.1552%	0.1565%
36	0.0415%	0.0786%	66	0.1552%	0.1565%
37	0.0436%	0.0827%	67	0.1552%	0.1565%
38	0.0457%	0.0868%	68	0.1552%	0.1565%
39	0.0477%	0.0909%	69	0.1552%	0.1565%
40	0.0536%	0.0950%	70	0.1552%	0.1565%
41	0.0595%	0.0991%	71	0.1552%	0.1565%
42	0.0654%	0.1032%	72	0.1552%	0.1565%
43	0.0713%	0.1073%	73	0.1552%	0.1565%
44	0.0772%	0.1114%	74	0.1552%	0.1565%
45	0.0845%	0.1155%	75	0.1552%	0.1565%
46	0.0919%	0.1196%	76	0.1552%	0.1565%
47	0.0993%	0.1237%	77	0.1552%	0.1565%
48	0.1066%	0.1278%	78	0.1552%	0.1565%
49	0.1140%	0.1319%	79	0.1552%	0.1565%

Disability rates apply during the retirement eligibility period.

Members are assumed to first receive disability benefits (DB) and then receive disability retirement annuity (DRA) benefits.



## Actuarial Methods and Assumptions

**Retirement.** Upon eligibility, active members are assumed to retire as follows:

Age	Members Hired Before		Non Police/Fire Members Hired on or after		Police/Fire Members Hired on or after	
	January 1, 2011, and Eligible for:		January 1, 2011, and Eligible for:		January 1, 2011, and Eligible for:	
	Normal Retirement	Early Retirement	Normal Retirement	Early Retirement	Normal Retirement	Early Retirement
Under	50.0%	-	-	-	-	-
50	50.0	-	-	-	-	-
51	40.0	-	-	-	-	-
52	40.0	-	-	-	-	-
53	35.0	-	-	-	-	-
54	35.0	-	-	-	-	-
55	35.0	7.0%	-	-	-	-
56	30.0	5.5	-	-	-	-
57	25.0	4.0	-	-	-	-
58	25.0	5.0	-	-	-	-
59	25.0	5.5	-	-	-	-
60	11.0	-	-	-	60.0%	-
61	11.0	-	-	-	25.0	-
62	12.0	-	-	25.0%	25.0	25.0%
63	12.0	-	-	10.0	25.0	10.0
64	12.0	-	-	10.0	25.0	10.0
65	15.0	-	-	10.0	15.0	10.0
66	15.0	-	-	10.0	15.0	10.0
67	15.0	-	35.0%	-	15.0	-
68	15.0	-	15.0	-	15.0	-
69	15.0	-	15.0	-	15.0	-
70-79	15.0	-	15.0	-	15.0	-
80+	100.0	-	100.0	-	100.0	-

*A rate equal to the greater of the indicated rate and 50 percent is used if a member has 40 or more years of service and is less than 80 years old. The rates shown above are for members with less than 40 years of service.*

Members who retire are assumed to elect the most valuable option on a present value basis – refund of contributions (or portable lump sum retirement, if applicable) or a retirement annuity.

For purposes of the projections in the actuarial valuation, members of the Self-Managed Plan are assumed to retire in accordance with the Tier 1 and Tier 2 retirement rates (based on hire date).



## Actuarial Methods and Assumptions

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**General Turnover.** A table of termination rates based on the most recent experience study period. The assumption is a table of turnover rates by years of service. A sample of these rates follows:

Years of Service	All Members
0	20.00%
1	20.00
2	15.00
3	14.00
4	13.00
5	12.00
6	10.00
7	9.00
8	8.00
9	7.00
10	6.00
11	5.00
12	4.50
13	4.00
14	4.00
15	4.00
16	3.50
17	3.50
18	3.50
19	3.00
20	3.00
21	3.00
22	2.50
23	2.50
24	2.50
25	2.00
26	2.00
27	2.00
28	2.00
29	2.00

A termination rate of 100 percent is assumed at three years of service for members classified as part time for valuation purposes.

Members who terminate with at least five years of service (10 years of service for Tier 2 members) are assumed to elect the most valuable option on a present value basis – refund of contributions or a deferred benefit.

Termination rate for 29 years of service used for Tier 2 members until retirement eligibility is met.



## Actuarial Methods and Assumptions

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**Operational Expenses.** The amount of operational expenses for administration incurred in the latest fiscal year are supplied by SURS staff and incorporated in the Normal Cost. Estimated administrative expenses for FY 2022 and after are assumed to increase by 3.25%.

**Marital Status.** Members are assumed to be married in the following proportions:

Age	Males	Females
20	25 %	40 %
30	70	75
40	80	80
50	85	80
60	85	70

**Spouse Age.** The female spouse is assumed to be three years younger than the male spouse.

**Benefit Commencement Age.** Inactive members eligible for a deferred benefit are assumed to commence benefits at their earliest normal retirement age. For Tier 1 members this is age 62 with at least five years of service, age 60 with at least eight years of service or immediately if at least 30 years of service. For Tier 2 members, this is age 67 with 10 or more years of service.

**Load on Final Average Salary.** No load is assumed to account for higher than assumed pay increases in final years of employment before retirement.

**Load on Liabilities for Service Retirees With Non-finalized Benefits.** A load of 10% on liabilities for service retirees whose benefits have not been finalized as of the valuation date is assumed to account for finalized benefits that on average are 10% higher than 100% of the preliminary estimated benefit. A load of 5% is used if a “best formula” benefit was provided in the data by Staff.

**Valuation of Inactives.** An annuity benefit is estimated based on information provided by staff for Tier 1 inactive members with five or more years of service and Tier 2 members with 10 or more years of service.

**Assumption for Missing Data.** Members with an unknown gender are assumed to be female. Active and inactive members with an unknown date of birth are assumed to be 37 years old at the valuation date. An assumed spouse date of birth is calculated for current service retirees in the traditional plan for purposes of calculating future survivor benefits. The female spouse is assumed to be three years younger than the male spouse. 70% of current total male retirees and 80% of current total female retirees in the traditional plan who have not elected a survivor refund are assumed to have a spouse at the valuation date.

**Reciprocal Service.** Reciprocal service is included for current inactive members for purposes of determining vesting eligibility and eligibility age to commence benefits.

The recently updated actuarial assumptions (including retirement and termination rates) were based on SURS service only. Therefore, reciprocal service was not included for current active members.



## Actuarial Methods and Assumptions

**Projection Assumptions.** The number of total active members throughout the projection period will remain the same as the total number of active members in the defined benefit plans and the SMP in the current valuation.

Future new hires are assumed to elect to participate in the offered plans as follows:

- 30% elect to participate in the Self-Managed Plan.
- 70% elect to participate in the Tier 2 Plan.
  - 76% are assumed to elect the Traditional Plan (consistent with the current election split).
  - 24% are assumed to elect the Portable Plan (consistent with the current election split).

New entrants have an average age of 37.0 and average capped pay of \$41,738 and average uncapped pay of \$43,752 (2020 dollars). These values are based on the average age and average pay of current members. The new entrant data is based on the age at hire and assumed pay at hire (using the actuarial assumptions, inflated to 2020 dollars) of current active members with service between one and four years.

Summary of New Entrants									
Age	Number Males	Average Pay		Number Females	Average Pay		Total Number	Average Pay	
		Capped Male	Uncapped Male		Capped Female	Uncapped Female		Capped Total	Uncapped Total
<20	58	\$19,207	\$19,207	67	\$19,578	\$19,578	125	\$19,406	\$19,406
20 - 24	732	31,425	31,425	1,265	29,789	29,789	1,997	30,389	30,389
25 - 29	1,550	42,292	42,864	2,309	39,882	40,231	3,859	40,850	41,289
30 - 34	1,395	50,072	53,660	2,013	44,610	46,486	3,408	46,846	49,422
35 - 39	1,062	50,820	54,536	1,551	42,902	44,411	2,613	46,120	48,526
40 - 44	747	48,732	53,330	1,162	41,683	43,390	1,909	44,441	47,279
45 - 49	611	47,138	51,802	972	39,288	41,162	1,583	42,318	45,269
50 - 54	493	47,654	52,058	758	37,912	40,190	1,251	41,751	44,867
55 - 59	391	45,518	52,074	622	34,390	36,611	1,013	38,685	42,580
60 - 64	239	37,754	42,074	259	35,105	38,835	498	36,377	40,390
65 - 69	13	28,491	38,274	11	29,111	29,111	24	28,775	34,074
<b>Total</b>	<b>7,291</b>	<b>\$45,176</b>	<b>\$48,196</b>	<b>10,989</b>	<b>\$39,456</b>	<b>\$40,804</b>	<b>18,280</b>	<b>\$41,738</b>	<b>\$43,752</b>

**SMP Contribution Assumptions.** The projected SMP contributions are equal to 7.6% of SMP payroll, plus estimated SMP expenses minus SMP employer forfeitures. Estimated SMP expenses for FY 2021 are \$1,032,960 and actual FY 2019 SMP employer forfeitures used to reduce the certified contributions for FY 2022 are \$5,671,844 (as provided by SURS). Estimated SMP expenses for FY 2022 and after are assumed to increase by 3.25%. Estimated SMP employer forfeitures used to reduce the certified contributions for FY 2023 and after are assumed to be 7.5% of the gross SMP employer contribution.

**Pensionable Earnings Greater than 6%.** The participant's employer is required to pay the present value of the increase in benefits resulting from the portion of the increase in excess of 6.00% for earnings used in the calculation of the final average salary. The projections include a component paid for by employers for earnings increases greater than 6.00% in the calculation of the final average salary.



## Actuarial Methods and Assumptions

**Governor's Pay.** The governor's pay is \$181,700 as of June 30, 2020, and is expected to increase each year by the assumed rate of increase in the Tier 2 pay cap (1/2 the increase in CPI or 1.125%).

**Buyout Election Assumption.** 0% of eligible Tier 1 active members are assumed to elect to receive a reduced and delayed AAI benefit at retirement and an accelerated pension benefit option in accordance with Public Acts 100-0587 and 101-0010. 0% of eligible inactive members are assumed to elect to receive an accelerated pension benefit option in lieu of an annuity at retirement in accordance with Public Acts 100-0587 and 101-0010.

### Statistics from June 10, 2019 through May 31, 2020 as Provided by SURS Staff

	<u>AAI</u>	<u>VIB</u>
Number Eligible for the buyout*	2,454	23,669
Buyout applications received	80	59
Buyout election forms sent	22	31
Buyout election forms approved	14	19
Application %	3.3%	0.2%
Approved %	0.6%	0.1%
Approved buyout amount	\$1,369,244	\$2,951,402

\* Number eligible for the VIB buyout is the number of vested Tier 1 inactive members included in the actuarial valuation as of June 30, 2019 who are in the Traditional or Portable Plan. Vested active Tier 1 members would also be eligible for the buyout upon termination.

**Treatment of Benefits in Excess of the Internal Revenue Code Section 415 Limits.** The benefit amounts in excess of the IRC Section 415 limits for current retirees are paid through the Excess Benefit Arrangement (EBA) and are not reported in the actuarial valuation data. Therefore, the liabilities and the required contributions for these EBA benefits are not reflected in the actuarial valuation results. The amount of the estimated EBA payments for the upcoming fiscal year are provided by SURS Staff and included in the Statutory contribution requirement. Following are the estimates used in the previous and current valuations:

Valuation Year	Applicable Fiscal Year	Estimated EBA Payments
2018	2020	\$17.065 million
2019	2021	\$18.000 million
2020	2022	\$21.500 million



## Actuarial Methods and Assumptions

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**Estimated Federal/Trust Fund Employer Contributions.** Following are the estimated employer contributions provided by SURS that reduce the estimated State contributions.

Valuation Year	Applicable Fiscal Year	Estimated Federal/Trust Fund Payments
2018	2020	\$52.0 million
2019	2021	\$52.5 million
2020	2022	\$57.0 million

## **APPENDIX H**

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### **SUMMARY OF BENEFIT PROVISIONS OF SURS**

## Summary of Benefit Provisions of SURS

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It should be noted that the purpose of this Appendix is to describe the benefit structures of SURS for which actuarial values have been generated. There is no description of the Self-Managed Plan (SMP) and many portions of the defined plans are described in a manner which may not be legally complete or precise.

It is not our intent to provide an exhaustive description of all benefits provided under SURS or the policies and procedures utilized by SURS staff. A more precise description of the provisions of SURS is contained in the Member's Guide, published by SURS staff. Of course, the statute is controlling.



# Summary of Benefit Provisions of SURS

## Plans

There are two defined benefit plans available under SURS, the Traditional Plan and the Portable Plan, and one defined contribution plan, the Self-Managed Plan (SMP). A Member must select one of these plans within the first six months of participation. If no choice is made in that time, the Traditional Plan is deemed chosen. Effective September 1, 2020 the Self-Managed Plan (SMP) has been renamed the Retirement Savings Plan (RSP).

New tiers of benefits have been established for members hired on or after January 1, 2011 (“Tier 2”). Members hired before January 1, 2011, participate in Tier 1. Members in Tiers 1 and 2 are eligible to choose either the Traditional or the Portable Plan. **SURS is currently not moving forward with the implementation of the optional hybrid plan created under PA 100-0023. Additional clarifying legislation is needed for SURS to be able to do so.**

Tier 2 members who participate in the Traditional and Portable Plans are subject to the pay caps established under Public Act 96-0889. The Tier 2 pay cap was \$106,800 in 2011 and increases by the lesser of (1) 3% and (2) ½ the increase in the Consumer Price Index-Urban (“CPI-U”) for the 12 months ending with the September proceeding each November 1.

The pay cap history is as follows:

Year	CPI-U	½ CPI-U	Tier 2 Pensionable Pay Cap
2011			\$106,800.00
2012	3.90%	1.95%	\$108,882.60
2013	2.00%	1.00%	\$109,971.43
2014	1.20%	0.60%	\$110,631.26
2015	1.70%	0.85%	\$111,571.63
2016	0.00%	0.00%	\$111,571.63
2017	1.50%	0.75%	\$112,408.42
2018	2.20%	1.10%	\$113,644.91
2019	2.30%	1.15%	\$114,951.83
2020	1.70%	0.85%	\$115,928.92

The Tier 2 pay cap is calculated annually by the Illinois Department of Insurance.

The Self-Managed Plan is a defined contribution plan under which members contribute 8.0% of compensation and the State contributes 7.6% of compensation. A portion of the employer contribution is used to fund disability benefits for SMP participants. Members hired on or after January 1, 2011, who participate in the SMP are not subject to the Tier 2 pay cap.

The provisions of the Traditional and Portable defined benefit plans are identical in many areas. The description below is primarily of the Traditional Plan. Where different, the Portable plan provisions will be described in *italics*.



# Summary of Benefit Provisions of SURS

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## Member Contributions

Most members in Tier 1 and Tier 2 contribute a total of 8% of pensionable compensation. Police officers and firefighters contribute a total of 9.5% of pensionable compensation, with the additional 1.5% allocated to the retirement annuity.

The total contribution is broken down as follows:

	Tier 1 and Tier 2	
	Police/Fire	All Others
Retirement Annuity	8.0%	6.5%
Survivor Benefits	1.0%	1.0%
Annual Increases in Retirement	0.5%	0.5%
Total Contribution	9.5%	8.0%

*Portable Plan members contribute the same percent of compensation, but the breakdown set out above does not apply.*

The retirement annuity portion of the total contribution (8.0% of compensation for police officers and firefighters and 6.5% of compensation for all others) is annuitized for the money purchase formula (Rule 2) calculation for Tier 1 members.

Contributions for Tier 2 members are assumed not to be made on pay in excess of the pay cap.

Since January 1, 1981, the member contributions under SURS have been “picked up” for IRS purposes by employers.

## Effective Rate of Interest

The Effective Rate of Interest (“ERI”) is the interest rate that is applied to member contribution balances. Effective for the 2006 fiscal year, the ERI for the purpose of determining the money purchase benefit is established by the State Comptroller annually. The ERI for other purposes such as the calculation of purchases of service credit, refunds for excess contributions, portable plan refunds and lump sum portable retirements is determined by the SURS Board annually and certified to the Governor. For purposes of the actuarial valuation, the assumed ERI is 6.75% beginning with the actuarial valuation as of June 30, 2018.

For the purposes of withdrawal of contributions at termination or death by Traditional Plan Members, this rate is not greater than 4.5% by statute.



# Summary of Benefit Provisions of SURS

## Retirement Benefits

### Final Average Salary

Final average salary is equal to:

<b>Tier 1</b>	High four consecutive year average compensation or the average of the last 48 consecutive months of employment.
<b>Tier 2</b>	High final eight consecutive year average compensation within the last 10 years or the average of the last 96 consecutive months within the last 120 months.

The Tier 2 pay cap history is shown in a table earlier in this section. We have assumed that the pay cap each year applies to the individual pay amounts that are used to develop the final average compensation.

The present value of the benefits for pay increases in excess of 6% during the final average earnings period immediately preceding retirement will be paid by the employer. The employer will pay this amount in a lump sum to the Retirement System.

### Normal Retirement

#### Eligibility

For police officers and firefighters, separation from service on or after the attainment of the earlier of:

<b>Tier 1</b>	<b>Tier 2</b>
Age 55/20 Years of Service	Age 60/20 Years of Service
Age 50/25 Years of Service	Age 67/10 Years of Service

For all other Tier 1 and Tier 2 members, separation from service on or after attainment of the earlier of:

<b>Tier 1</b>	<b>Tier 2</b>
Age 62/5 Years of Service	Age 67/10 Years of Service
Age 60/8 Years of Service	
Any age/30 Years of Service	

#### Initial Benefit Amount

There are three alternate formulae. The initial benefit is the largest produced by one of the three:

1. General Formula (Applicable to all Tiers)
2. Money Purchase Formula (Applicable to Tier 1 only, hired before July 1, 2005)
3. Minimum Benefit (Applicable to all Tiers)

Following is a description of the benefits provided under each of the three alternate formulae.



## Summary of Benefit Provisions of SURS

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1. General Formula (Applicable to all Tiers): The following percentages of final average compensation for each year of service:

Year of Service	Tier 1 and Tier 2	
	General	Police/Fire
1 <sup>st</sup> 10 Years	2.20 %	2.25 %
Next 10 Years	2.20	2.50
Over 20	2.20	2.75

2. Money Purchase Formula (Applicable to Tier 1 only, hired before July 1, 2005):
- The member contributions for retirement benefits (8.0% of compensation for police officers and firefighters and 6.5% of compensation for all others) accumulated with interest at the ERI, plus
  - An imputed employer contribution match at \$1.40 per dollar of member contribution accumulated with interest at the ERI.
  - The total of the accumulations in (a) and (b) is converted into an annuity using a life annuity factor that takes into account neither the automatic 50% spousal survivor benefit nor the automatic annual increases.

Members hired on or after July 1, 2005 no longer receive the Money Purchase Formula under the plan.

3. Minimum Benefit (Applicable to all Tiers) – A benefit for each year of service, up to 30, based on final annual pay, as follows:

Under 3,500	\$ 8
\$3,500 - \$4,500	9
\$4,500 - \$5,500	10
\$5,500 - \$6,500	11
\$6,500 - \$7,500	12
\$7,500 - \$8,500	13
\$8,500 - \$9,500	14
Over \$9,500	15

Minimum Retirement Annuity – No retiree shall receive a retirement annuity less than \$25 per month for each year of service up to 30. The comparable benefit for survivor benefit recipients is \$17.50 per month for each year of service up to 30.

### Maximum Benefit

All Tiers have a maximum benefit equal to 80% of final average compensation.

Contribution waivers are applicable to members whose benefits are capped at 80% of final



## Summary of Benefit Provisions of SURS

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average compensation. Member contributions made once the maximum benefit is achieved are refunded to the member with interest (at the Effective Rate of Interest).

### Benefit Duration

The Normal Retirement benefit is payable for the lifetime of the retired member. If the retiree under the Traditional Plan has a spouse at date of retirement and if that spouse survives the retiree the spouse will receive, upon the death of the retiree, a survivor benefit equal to the following percentage of the monthly benefit being paid to the retiree as of the date of death.

1. The survivor benefit for Tier 1 members is equal to 50% of the monthly benefit being paid to the retiree as of the date of death.
2. The survivor benefit for Tier 2 members is equal to 66 2/3% of the monthly benefit being paid to the retiree as of the date of death.

Such benefit will continue for the lifetime of the surviving spouse.

*For retirees under the Portable Plan, the normal form of benefit is a single-life annuity for unmarried participants and a reduced 50% joint and survivor benefit for married participants. With spousal consent, a member may designate a contingent annuitant to receive a joint and survivor annuity or elect a single-life annuity or lump sum distribution. Those receiving a joint and survivor annuity will have their benefit reduced to cover the cost of the option. The available joint and survivor options are 50%, 75% and 100%. A member may elect the 75% or 100% spousal joint and survivor annuity without consent.*

*Portable Plan members may also elect to receive their retirement benefit as a lump sum equal to member contributions with an equal employer match (if have the required years of service), accumulated with interest (at the Effective Rate of Interest that is certified annually by the SURS Board).*

*The required years of service is five years for all plans. (Must have 10 years if retirement age.)*

### Annual Increases

For Tier 1 members who have not elected the Automatic Annual Increase (AAI) buyout, each January 1 subsequent to retirement date, the monthly benefit being paid each retiree shall be increased by 3% (compound COLA). The adjustment for the first January after retirement shall be proportional based on the portion of the year retired. See page 76 for a description of the increase for members who have elected the AAI buyout.

For Tier 2 members, each January 1 subsequent to retirement date, the monthly benefit being paid each retiree shall be increased by fifty percent of the Consumer Price Index-Urban ("CPI-U") up to a maximum of 3% applied to the original benefit (simple COLA). The first increase will be granted upon the later of the attainment of age 67 or the first anniversary of the commencement of the annuity.





## Summary of Benefit Provisions of SURS

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The historical development of the Tier 2 Annual Increase as determined by the Illinois Department of Insurance can be found in the following table.

Year	CPI-U	½ CPI-U	Annual Increase
2011			3.00%
2012	3.90%	1.95%	1.95%
2013	2.00%	1.00%	1.00%
2014	1.20%	0.60%	0.60%
2015	1.70%	0.85%	0.85%
2016	0.00%	0.00%	0.00%
2017	1.50%	0.75%	0.75%
2018	2.20%	1.10%	1.10%
2019	2.30%	1.15%	1.15%
2020	1.70%	0.85%	0.85%

### Early Retirement

#### Eligibility

For Tier 1 members other than police and fire employees, separation from service on or after attainment of age 55 with 8 years of service, but not eligible for Normal Retirement.

For Tier 2 members, separation from service on or after attainment of age 62 with 10 years of service, but not eligible for Normal Retirement.

#### Benefits

The benefit amounts and all terms of benefit payment are the same as that for Normal Retirement, except that the benefit amounts calculated under the General Formula and the Minimum Formula shall be reduced by .5% for each month by which the retirement date precedes the 60<sup>th</sup> birthday for Tier 1 members and the 67<sup>th</sup> birthday for Tier 2 members.

## Benefits on Death before Retirement

### Survivor Benefits

#### Traditional Plan

##### Eligibility

Payable to eligible survivor(s) (spouse, child or dependent parent) for the death of an active member with at least 1.5 years of service or a terminated member with at least 10 years of service. For this purpose, service under the State Employees' Retirement System, the Teachers' Retirement System of the State of Illinois and the Public School Teachers' Pension Fund of Chicago is recognized.



# Summary of Benefit Provisions of SURS

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## Benefits

For Tier 1 members, an annuity to the eligible survivor(s) equal to the greater of:

1. 50% of the benefit accrued to the date of the death of the member, and
2. The lowest applicable benefit from the following list:
  - a) \$400 per month to a single eligible survivor or \$600 per month to two or more eligible survivors.
  - b) 30% (one survivor), or 60% (two survivors), or 80% (three or more survivors) of the member's final rate of earnings.
  - c) If member inactive, 80% of base retirement annuity.

For Tier 2 members, an annuity to the survivor(s) equal to 66 2/3% of the benefit accrued to the date of the death of the member.

Supplemental Minimum Survivor Annuity of \$17.50 per month times number of years of service credit, up to 30 years. No annual increases payable on the supplemental minimum survivor annuity.

## Benefit Duration

### *Surviving spouse*

May receive a lifetime benefit commencing at the later of the day following the member's date of death and the spouse's attainment of age 50. May be payable the day following the member's date of death if a dependent child in their care is also receiving benefits.

### *Dependent child*

Payable to unmarried child(ren) under age 18 (over 18 if disabled prior to age 18), and children age 18-22 if a qualified full-time student.

### *Dependent parent*

Payable to a parent of the member who was dependent upon the member at the time of their death. Payable at the later of the day following the member's date of death and the parent's attainment of age 55. The benefit continues until the parent dies.

## Annual Increases

For Tier 1 members, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased by 3%. The first increase begins with the first January closest to the first anniversary of the survivor annuity.

For Tier 2 members, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased fifty percent of the Consumer Price Index-Urban ("CPI-U") up to a maximum of 3% of the originally granted survivor annuity (simple COLA). The first increase will be granted upon January 1 following the first anniversary of the commencement of the survivor annuity.



# Summary of Benefit Provisions of SURS

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## Portable Plan

### Eligibility

Payable to an eligible spouse for the death of an active or inactive member with at least 1.5 years of SURS service.

### Benefits

An annuity to the eligible spouse equal to 50% of the member's earned retirement benefit after the reductions to pay for the cost of providing the pre-retirement survivor annuity. (Applicable to Tier 1 and Tier 2 members.)

### Benefit Duration

#### *Surviving spouse*

May receive a lifetime benefit commencing at the member's earliest retirement age.

### Annual Increases

For members hired before January 1, 2011 and for all members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

## Lump Sum Death Benefit

### Eligibility

Death of member prior to retirement.

## Traditional Plan

### Benefit

#### With Eligible Survivor

- 7/8<sup>ths</sup> of accumulated member contributions balance (includes all contributions and interest)

#### Without Eligible Survivor

- Refund of the total accumulated member contribution and interest; and
- An amount up to \$5,000 based on the annual final average earnings amount to a dependent beneficiary or \$2,500 to a non-dependent beneficiary. The additional death benefit is only



## Summary of Benefit Provisions of SURS

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payable if the member was active at death. If the member was inactive, this additional death benefit is not payable.

### Portable Plan

#### Benefit

##### With Eligible Spouse

- Refund of total accumulated member contributions at the full Effective Rate of Interest, plus, if the member has at least 1.5 years of service at death, a like amount of imputed employer contributions – less the actuarial equivalent of the Pre-Retirement Survivor Annuity.

##### Without Eligible Spouse

- Refund of total accumulated member contributions at the full Effective Rate of Interest, plus, if the member has at least 1.5 years of service at death, a like amount of imputed employer contributions.

## Benefits on Death after Retirement

In addition to survivor/spouse benefits payable from the System, the following death benefit is payable if a member does not have an eligible survivor/spouse/contingent annuitant:

- The greater of the total accumulated member contributions and interest minus the total retirement annuities paid to the member through the date of their death or \$1,000.

#### Eligibility

Payable to eligible survivor(s) (spouse, child or dependent parent) as long as the member did not take a refund of their survivor contributions at retirement.

### Traditional Plan

#### Benefits

For Tier 1 members, an annuity to the eligible survivor(s) equal to the greater of:

1. 50% of the annuity at the time of the member's death:
2. The lowest applicable benefit from the following list:
  - a) \$400 per month to a single eligible survivor or \$600 per month to two or more eligible survivors.
  - b) 30% (one survivor), or 60% (two survivors), or 80% (three or more survivors) of the member's final rate of earnings.
  - c) 80% of base retirement annuity.



## Summary of Benefit Provisions of SURS

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For Tier 2 members, an annuity to the survivor(s) equal to 66 2/3% of retirement annuity at the time of the member's death.

Supplemental Minimum Survivor Annuity of \$17.50 per month times number of years of service credit, up to 30 years. No annual increases payable on the supplemental minimum survivor annuity.

### Benefit Duration

#### *Surviving spouse*

May receive a lifetime benefit commencing at the later of the day following the member's date of death and the spouse's attainment of age 50. May be payable the day following the members' date of death if a dependent child in their care is also receiving benefits.

#### *Dependent child*

Payable to unmarried child(ren) under age 18 (over 18 if disabled prior to age 18), and children age 18-22 if a qualified full-time student.

#### *Dependent parent*

Payable to a parent of the member who was dependent upon the member at the time of their death. Payable at the later of the day following the member's date of death and the parent's attainment of age 55. The benefit continues until the parent dies.

## Portable Plan

### Benefits

A 50%, 75% or 100% Joint and Survivor annuity is payable to the Contingent Annuitant that the member chose at the time of retirement, if any. The member's retirement annuity is reduced to pay for the Joint and Survivor Annuity.

### Benefit Duration

#### *Surviving spouse*

May receive a lifetime benefit commencing at the member's earliest retirement age.

### Annual Increases

For members hired before January 1, 2011 and for all members hired on or after January 1, 2011,



# Summary of Benefit Provisions of SURS

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each January 1 on or after the survivor annuity shall be increased by 3% compounded. The first AAI begins with the January 1 on or after the commencement of the survivor annuity if retired January 14, 1991 or later. If the member retired prior to January 14, 1991, then January 1 on or closest to the 1st anniversary of the Survivor Annuity shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

## Benefits for Disability

### Disability Benefit

#### Eligibility

Disablement after completing two years of service. The service requirement is waived if the disablement is accidental.

Disability definition – inability to perform the duties of “own occupation.”

Pregnancy and childbirth are, by definition, disablement.

#### Benefit

The greater of 50% of the basic compensation paid at date of disablement or 50% of the average earnings for the 24 months prior to the date of disablement. This base benefit level is offset dollar for dollar by each of the following:

1. Earnings while disabled in excess of the disability benefit.
2. Other disability insurance either fully or partially employer provided.
3. Worker’s compensation benefits.

#### Duration of Benefit

Benefits become payable on the later of the termination of salary and sick leave, or the 61<sup>st</sup> day after disablement and continue to the earlier of the following:

1. Recovery or death.
2. Benefits paid equal 50% of total compensation during the period of SURS service.
3. If disablement occurs prior to age 65, the disability benefit may not continue past the August 31 following 70<sup>th</sup> birthday.
4. If disablement occurs at or after attainment of age 65, completion of five years in disablement.

Survivor and death benefits are payable if a member dies while receiving disability benefits.

If, at discontinuance of the disability benefit, the member is eligible for a retirement benefit



## Summary of Benefit Provisions of SURS

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(based on service, which includes the period of disability and may also include time receiving a disability retirement annuity), the member may retire and receive that benefit. The member may commence the retirement benefit once age and service requirements are met. The early retirement reduction does not apply for members who began first participating prior to January 1, 2011 (Tier 1). The benefit is based on the greatest of three formulas (General Formula, Money Purchase and Minimum Benefit), subject to applicable maximums. Contributions are not made during the disability period. However, accumulated contributions continue to accrue interest.

### Annual Increases

Each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

## Disability Retirement Annuity

### Eligibility

Continuing disablement after discontinuation of the disability benefit as a result of reaching the "50% of total earnings" limitation. Disability is defined in accordance with the Social Security disability definition.

### Benefit

35% of the compensation being earned at disablement.

### Duration of Benefit

Benefits become payable upon discontinuance of the disability benefit and continue to the earlier of the following:

1. Recovery or death
2. Election to receive a retirement benefit

Survivor and death benefits are payable if a member dies while receiving a disability retirement annuity.

### Annual Increases

Each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

For members hired on or after January 1, 2011, if the member converts to a service retirement annuity (item 2 above), each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased fifty percent of the Consumer Price Index ("CPI") up to a maximum of 3% of the originally granted benefit. The first increase will be granted upon the later



## Summary of Benefit Provisions of SURS

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of the attainment of age 67 or the first anniversary of the commencement of the annuity.

### Benefits for Deferred Members

#### Eligibility

For members hired before January 1, 2011, separation from employment with at least five years of service and separation from employment with at least 10 years of service for members hired on or after January 1, 2011.

#### Benefit

Benefit as defined for normal retirement purposes, but calculated based on final average compensation and service at date of termination.

#### Commencement of Benefit

Benefits commence when member reaches the age condition for either normal or early retirement.

#### Annual Increases

For members hired before January 1, 2011 who have not elected the AAI buyout, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional. See page 76 for a description of the increase for members who have elected the AAI buyout.

For members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased fifty percent of the Consumer Price Index ("CPI") up to a maximum of 3% applied to the original benefit. The first increase will be granted upon the later of the attainment of age 67 or the first anniversary of the commencement of the annuity.

### Member Refunds

Non-vested terminated members and members who elect a refund in lieu of a vested benefit receive the following amounts.

#### Traditional Plan

Refund of the total accumulated member contribution at 4.5% interest.

#### Portable Plan

Refund of total accumulated member contributions at the full Effective Rate of Interest that is





## Summary of Benefit Provisions of SURS

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certified annually by the SURS Board, plus, if the member has the required years of service, a like amount of imputed employer contributions.

The required years of service is five years for all plans. (Must have 10 years if retirement age.)

### Accelerated Pension Benefit Options

Under Public Act (PA) 100-0587 and PA 101-0010, SURS shall offer an accelerated pension benefit payment to eligible members beginning on the implementation date and until June 30, 2024.

There are two accelerated pension benefit payment options that will be offered:

1. For vested inactive members, a payment equal to 60% of the present value of the member's pension benefit in lieu of receiving any pension benefit.
2. For members eligible for retirement, a payment equal to 70% of the difference between: (i) the present value of the automatic annual increases (AAI) to a Tier 1 member's retirement and survivor's annuity under the current AAI provisions and (ii) the present value of the automatic annual increases to the Tier 1 member's retirement annuity under revised AAI provisions
  - a. The current AAI provisions are an annual 3% increase of the prior year's benefit (compound COLA) payable as of the January 1 following the annuity start date (first increase is prorated).
  - b. The revised AAI provisions are an annual 1.5% increase of the originally granted benefit (simple COLA). The delayed AAI begins the January 1 following the first anniversary of the retirement date, or the January 1 following age 67, whichever is later. The survivor AAI is first payable 1 year after the survivor annuity commences.

### Defined Contribution Plan

Public Act 100-0769, effective August 10, 2018, requires the SURS Board of Trustees, as soon as practicable after the effective date of the legislation, to establish and maintain a defined contribution plan. The defined contribution benefit must be an optional benefit to any member who chooses to participate.

Projected administrative expenses for this plan are included in the Statutory contribution. Other costs are not reflected in this valuation.



## **APPENDIX I**

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### **GLOSSARY OF TERMS**

## Glossary of Terms

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**Actuarial Accrued Liability (“AAL”).** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

**Actuarial Assumptions.** Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan. Demographic, or “people” assumptions, include rates of mortality, retirement and separation. Economic, or “money” assumptions, include expected investment return, inflation and salary increases.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

**Actuarial Present Value of Future Plan Benefits (“APV”).** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Actuarial Value of Assets (“AVA”).** Smoothed value of assets that recognizes the difference between the expected investment return using the valuation assumption of 8.0 percent and the actual investment return over a five-year period. Dampens volatility of asset value over time.

**Actuarially Determined Contribution (“ADC”).** The sum of the gross normal cost (including employee contributions) and amortization of the unfunded actuarial accrued liability over a period not to exceed 30 years.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

**Annual Required Contribution (“ARC”).** The sum of the normal cost (net of employee contributions) and amortization of the unfunded actuarial accrued liability over a period not to exceed 30 years. Was required for accounting purposes by the Governmental Accounting Standards Board (GASB) Statement Nos. 25 and 27.

**Asset Return.** The net investment return for the asset divided by the mean asset value. Example: if \$1.00 is invested and yields \$1.0675 after a year, the asset return is 6.75 percent.

**Funded Ratio.** The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.

**Market Value of Assets (“MVA”).** The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market.



## Glossary of Terms

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**Normal Cost (“NC”).** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

**Unfunded Actuarial Accrued Liability (“UAAL”).** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

## APPENDIX J

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### STRESS TESTING SCENARIOS



November 18, 2020

Board of Trustees  
State Universities Retirement System of Illinois  
1901 Fox Drive  
Champaign, Illinois 61820

**Re: Stress Testing Scenarios based on Actuarial Valuation Results as of June 30, 2020**

Dear Members of the Board:

At your request, we have performed stress testing of the required statutory contributions and funded ratio for the State Universities Retirement System of Illinois ("SURS") based on the results of the June 30, 2020 actuarial valuation. Risk measures, as illustrated in this letter, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the statutory and actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions. We have illustrated the statutory contributions and funded ratios under the stress testing scenarios. However, we are not able to opine on the sponsor's ability to pay the contribution requirements.

GRS has prepared this analysis exclusively for the Trustees of the State Universities Retirement System; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than SURS only in its entirety and only with the permission of SURS and the Board.

**Description of Stress Testing Scenarios**

**Volatile Investment Return Scenarios**

GRS recommended and performed four alternative investment return stress testing scenarios. Graphs of the total statutory contributions under each of these four scenarios can be found in Exhibits I(A) and I(B), a summary of the total statutory contributions can be found in Exhibits III(A) and III(B) and additional details of the results of these scenarios can be found in Exhibits IV(A) through V(B). The alternative investment return stress testing scenarios are based on the System earning the following rates of investment return (on average) over the period from fiscal year 2021 through 2045:

1. Scenarios 1 – 2: Volatile returns in each year from 2021 through 2045, with a 25-year geometric average of 6.75 percent
  - 6.75 percent is the investment return assumption used in the actuarial valuation as of June 30, 2020

2. Scenario 3 – 4: Volatile returns in each year from 2021 through 2045, with a 25-year geometric average of 5.24 percent
  - 5.24 percent is the 40<sup>th</sup> percentile return based on the SURS target asset allocation and capital market assumptions from 13 investment consultants as presented in our September 2020 SURS Economic Assumption Review

We have also included a baseline scenario (the basis for the June 30, 2020 actuarial valuation results) which assumes a static return of 6.75 percent each year from 2021 through 2045.

In order to demonstrate the risk and volatility of the returns, we provided results assuming volatile returns with a geometric average equal to the actuarial valuation assumption and the 40<sup>th</sup> percentile return (60 percent probability that the average return will be higher than the 40<sup>th</sup> percentile return). Please note that each volatile return scenario represents one possible trial that generates the targeted average geometric return, and that another equally likely trial that produces the same targeted average geometric return could produce significantly different contribution and funded ratio patterns.

In each investment return scenario, the discount rate used to determine liabilities remains at 6.75 percent, average future uncapped salary growth or wage inflation remains at 3.25 percent per year and the future active population remains constant at 72,315 active members (the number of combined total full-time active members as of June 30, 2020, in the SURS defined benefit plan and SMP). The assumed election percentages for future new hires are 30 percent to the SMP and 70 percent to Tier 2 for all investment return scenarios, which is the same as the baseline from the actuarial valuation as of June 30, 2020.

#### Number of Active Members Scenario

In addition to the four investment return scenarios, GRS performed sensitivity scenarios based on a 1.00 percent decrease in the number of future full-time active members for 10 years. A summary of the number of full-time active members used in this scenario and the total statutory contributions under this scenario can be found in Exhibit III(B) and additional details of the results of this scenario can be found in Exhibit VI. The alternate full-time active population scenario is based on the System earning the annual assumed rate of return of 6.75 percent in each future year and the following membership changes:

3. Scenario 5: one percent decrease in the number of full-time active members for 10 years (72,315 full-time active members in 2020 to 65,400 full-time active members in 2030)

#### Future New Hire Plan Election Scenarios

Furthermore, GRS performed sensitivity scenarios based on changes to the plan election assumption of future new hires. A summary of the total statutory contributions under these scenarios can be found in Exhibit III(B) and additional details of the results of these scenarios can be found in Exhibits VII(A) through VII(C). The alternate plan election scenarios are based on the System earning the annual assumed rate of return of 6.75 percent in each future year and the following future new hire plan election changes:



1. Scenario 6: The assumed election percentages for future new hires are 20 percent to the SMP and 80 percent to Tier 2 for all investment return scenarios
2. Scenario 7: The assumed election percentages for future new hires are 40 percent to the SMP and 60 percent to Tier 2 for all investment return scenarios
3. Scenario 8: The assumed election percentages for future new hires are 50 percent to the SMP and 50 percent to Tier 2 for all investment return scenarios

The following exhibits and graphs are included in this letter:

Exhibit	Scenario	Average of Volatile Returns	% of New Hires to SMP	Ultimate Number of Full-Time Actives	Scenario Description
I(A)	1-2	6.75%	30%	72,315	Graphs of the Projected Total Statutory Contributions and Funded Ratio
I(B)	3-4	5.24%	30%	72,315	Graphs of the Projected Total Statutory Contributions and Funded Ratio
I(C)	5-8	6.75% Static	Varies by Scenario	72,315 (65,400 Scenario 5)	Graphs of the Projected Total Statutory Contributions and Funded Ratio under the Number of Active Member Sensitivity and Future New Hire Plan Election Scenarios
II	1-4	5.24%, 6.75%	30%	72,315	Graph of the Projected Annual Rates of Return used in the Volatile Investment Return Stress Testing Scenarios
III(A)	1-8	5.24%, 6.75%	Varies by Scenario	72,315 (65,400 Scenario 5)	Comparison of Total Contributions, Unfunded Liability and Funded Ratio
III(B)	1-8	5.24%, 6.75%	Varies by Scenario	72,315 (65,400 Scenario 5)	Comparison of Number of Full Time Active Members Used in the Stress Testing Scenarios and Total Statutory Contributions
IV(A)	1	6.75%	30%	72,315	Comparison of Actuarial Valuation Results and Stress Testing Scenario
IV(B)	2	6.75%	30%	72,315	Comparison of Actuarial Valuation Results and Stress Testing Scenario
V(A)	3	5.24%	30%	72,315	Comparison of Actuarial Valuation Results and Stress Testing Scenario
V(B)	4	5.24%	30%	72,315	Comparison of Actuarial Valuation Results and Stress Testing Scenario
VI	5	6.75% Static	30%	65,400	Comparison of Actuarial Valuation Results and Number of Active Member Sensitivity Scenario
VII(A)	6	6.75% Static	20%	72,315	Comparison of Actuarial Valuation Results and Future New Hire Plan Election Scenario
VII(B)	7	6.75% Static	40%	72,315	Comparison of Actuarial Valuation Results and Future New Hire Plan Election Scenario
VII(C)	8	6.75% Static	50%	72,315	Comparison of Actuarial Valuation Results and Future New Hire Plan Election Scenario
VIII	1-4	5.24%, 6.75%	30%	72,315	Comparison of Assumed Investment Returns Used in the Stress Testing Scenarios





GRS believes that these scenarios provide a plausible illustration of the potential future volatility of investment returns and a changing workforce and the resulting statutory contribution requirements based on the current assumptions and methods (including the current plan election assumptions). These scenarios are not intended to represent the full range of all possible outcomes. Annual returns will likely be significantly different from the returns shown in Exhibit VIII and the 25-year geometric average of actual returns may be either higher or lower than the assumption of 6.75 percent. The statutory contributions shown in this analysis are the combined amounts from both the State and the employers. Under the provisions of PA 100-0023, employers make contributions beginning in fiscal year 2018 for current members in excess of the Governor’s pay, and under PA 101-0010, and employers make contributions equal to the present value of the increase in benefit attributable to member pay increases in excess of 6.00 percent during the final average salary (FAS) period.

### **Analysis of Stress Testing Scenario Results**

Under the projected results from the actuarial valuation as of June 30, 2020 in which all future actuarial assumptions are assumed to be realized, the statutory contribution gradually increases by a steady rate (once the deferred asset gains and losses are fully recognized in the actuarial value of assets and the phase-in of assumption changes). There is also an increase in the funded ratio from 42.2 percent on an actuarial value of assets basis as of June 30, 2020 to 90 percent as of June 30, 2045 with a significant portion of the increase occurring in the last five years of the projection period. The funded ratio increases from about 67.5 percent to 90 percent between 2040 and 2045.

The following table presents a summary of the combined State and employer (“statutory”) contributions (including SMP) and the present value of the total statutory contributions during the fiscal years 2021 through 2045 under the alternative stress testing scenarios. The total statutory contributions do not include excess benefit arrangement (EBA) contributions. In addition, we have summarized the unfunded actuarial accrued liability (UAAL) based on the market value of assets as of June 30, 2045, and the present value of the market value UAAL for each scenario.

	Contributions* FY 2021-2045 (\$ in Millions)		MVA Funded Ratio in 2045	MVA UAAL at 2045 (\$ in Millions)		Total PV Contributions + UAAL
	Total	PV		UAAL	PV of UAAL	
	Contributions	Contributions				
Baseline (6.75% Static)	\$72,603.178	\$32,842.824	90.00%	\$5,242.271	\$1,024.053	\$33,866.877
Scenario 1 (6.75% Volatile)	76,113.422	34,250.152	95.25%	2,492.367	486.872	34,737.024
Scenario 2 (6.75% Volatile)	75,072.532	34,051.925	95.52%	2,347.822	458.636	34,510.561
Scenario 3 (5.24% Volatile)	82,635.643	37,444.014	83.94%	8,418.234	1,644.462	39,088.476
Scenario 4 (5.24% Volatile)	75,041.592	32,799.610	66.26%	17,687.814	3,455.231	36,254.841
Scenario 5 (Decrease Actives 1% per year for 10 yrs)	71,558.685	32,708.632	90.00%	5,143.671	1,004.792	33,713.424
Scenario 6 (20% Of New Hires Elect SMP)	71,729.734	32,587.158	90.00%	5,356.197	1,046.308	33,633.466
Scenario 7 (40% Of New Hires Elect SMP)	73,269.257	33,098.492	90.00%	5,128.345	1,001.798	34,100.290
Scenario 8 (50% Of New Hires Elect SMP)	74,342.504	33,354.158	90.00%	5,014.418	979.543	34,333.701

\*Combined State and employer contributions. Includes total SMP contributions. Excludes EBA contributions.

Because of the volatility and deviation of the returns from the actuarial assumption of 6.75 percent and the fact that the statutory contribution for fiscal year 2045 is determined based on the actuarial valuation



results as of June 30, 2043, the funded ratios on both an actuarial value of assets basis and a market value of assets basis do not equal 90 percent in 2045. In Scenarios 1 and 2 the market value funded ratio is greater than 90 percent in 2045 and in Scenarios 3 and 4 the market value funded ratio is less than 90 percent. In order to better compare the future obligation between the scenarios and recognize that the unfunded liability and funded ratio as of June 30, 2045 are different under each scenario, we have included the sum of the present value of contributions between 2020 and 2045 and the present value of the market value UAAL as of June 30, 2045.

Based on the scenarios that are summarized above, the total statutory contributions and the present value of the statutory contributions and the unfunded actuarial liability (UAL) are highly dependent on both the annualized investment returns and the pattern of the investment returns. In the scenarios in which the average geometric return is 6.75 percent over the years 2021 through 2045 (Baseline and Scenarios 1-2), the amount of total statutory contributions varies up to \$3.5 billion between the scenarios and the sum of the present value of contributions and the present value of the market value UAAL at 2045 varies up to \$0.9 billion between the scenarios. In the scenarios in which the average geometric return is 5.24 percent over the years 2021 through 2045 (Scenarios 3-4), the amount of total statutory contributions varies up to \$7.6 billion between the scenarios and the sum of the present value of contributions and the present value of the market value UAAL at 2045 varies up to \$2.8 billion between the two scenarios. Although the average geometric return is 6.75 percent under Scenario 1 and 5.24 percent under Scenario 4, the sum of the present value of contributions and the present value of the market value UAAL at 2045 varies only by \$1.5 billion between the scenarios due to the patterns of the investment returns.

In each scenario, we have assumed that the State and the employers will make the statutory contribution when due. However, some scenarios result in very high contributions rates for extended periods of time and may jeopardize the sustainability of the System. We are not able to opine on the sponsor's ability to pay such high contribution requirements.

Due to the volatility of the investment returns, the minimum funded ratio during the projection period is less than 35 percent in Scenario 3. The stress testing does not take into account the implication of potential required changes in asset allocation in order to maintain sufficient liquidity to make all required benefit payments.

To the best of our knowledge, this actuarial statement is complete and accurate, fairly presents the actuarial position of SURS as of June 30, 2020 under the alternative stress testing scenarios, and has been prepared in accordance with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements



(such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions, contribution amounts or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

This letter is part of the SURS actuarial valuation as of June 30, 2020 and is subject to the same actuarial assumptions and disclosures as used in the presentation and the actuarial valuation report. The stress testing scenarios used future investment returns as shown in Exhibit VIII. All other assumptions and methods were the same as those used in the SURS actuarial valuation as of June 30, 2020 including the 6.75 percent discount rate used to determine liabilities in all stress testing scenarios and the assumed election percentages for future new hires of 30 percent elect the SMP and 70 percent elect Tier 2 for scenarios 1 through 5. The future new hire election scenarios use a static return assumption of 6.75 percent per year and vary the percentage of new hires assumed to elect the SMP and defined benefit plans.

In each projection scenario, the Statutory contribution in each year has been projected as though an actuarial valuation in each of those years was performed. The market value of assets at each projected valuation is assumed to be based on the rates of investment return and Statutory contributions in the preceding years, according to the Scenario being modeled, and the valuation interest rate going forward. At each projected actuarial valuation, an additional 20 percent of the investment gains and losses are recognized in the actuarial value of assets. The actuarial value of assets is projected to earn the actuarial valuation rate of 6.75 percent from the valuation date to 2045. This iterative process is followed for each projection year through 2045.

This analysis was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled. We are relying on the GRS actuaries and Internal Software, Training, and Processes Team who developed and maintain the model.

Numerous additional assumptions could be varied in stress testing scenarios, such as payroll growth, inflation and other member behavior. The stress testing analysis performed focused on variations in investment return, a changing workforce and new hire plan elections, which are likely three of the most significant stressors on the System. GRS can perform additional stress testing scenarios at the Board's request.

The statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution. Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved; we recommend the development and adherence to a funding policy that funds the normal cost of the plan as well as an amortization payment that would seek to pay off any unfunded accrued liability over a closed period of no less than 15 years and no longer than the period of time to attain 100 percent funding by the year 2045 (24 years remaining in the actuarial valuation as of June 30, 2020).



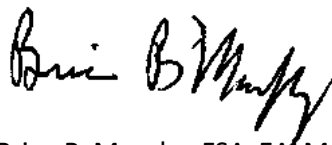
The signing actuaries are independent of the plan sponsor.

Amy Williams and Brian B Murphy are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions herein.

Sincerely,



Amy Williams, ASA, FCA, MAAA  
Senior Consultant



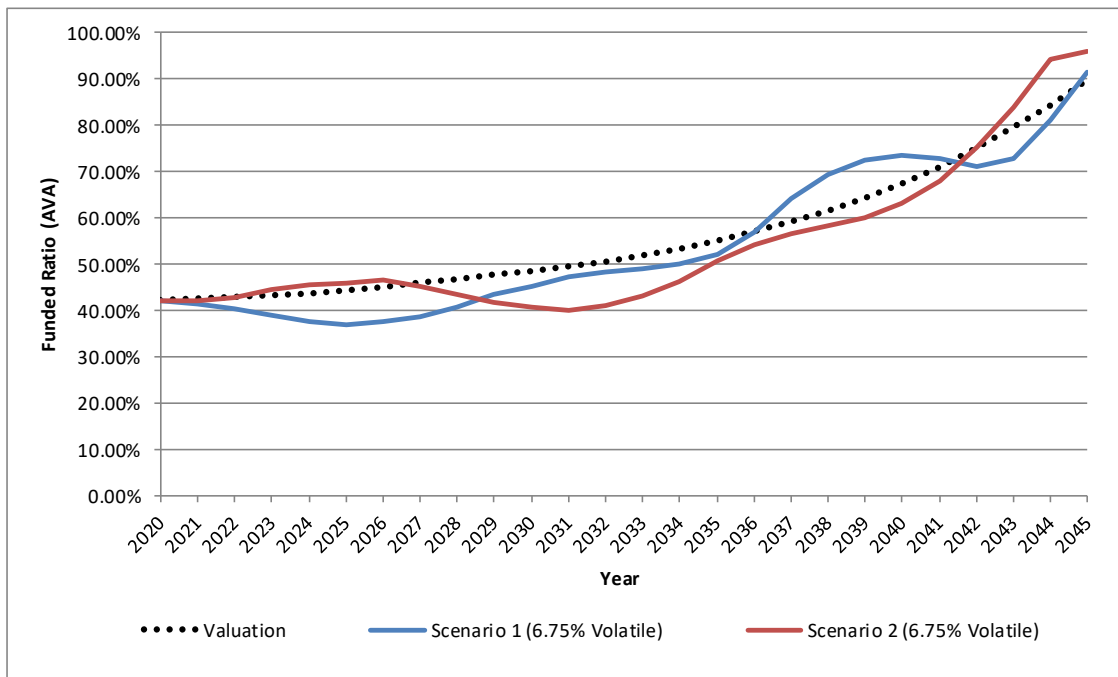
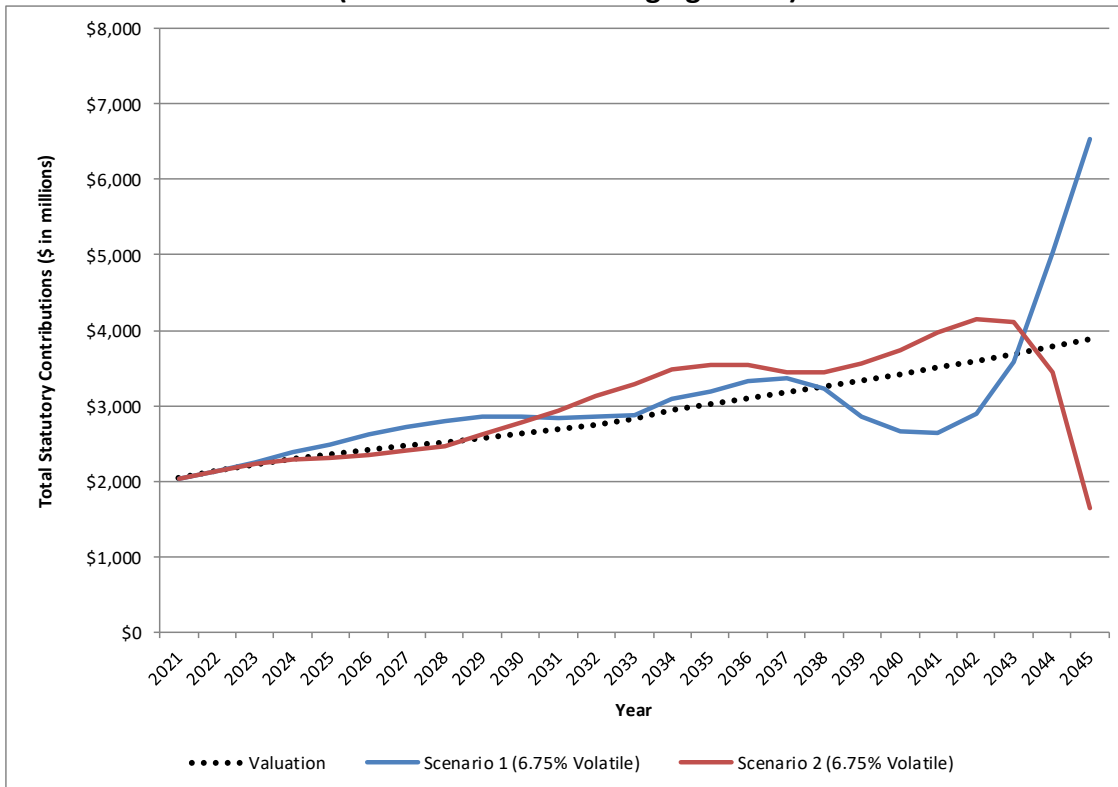
Brian B. Murphy, FSA, EA, MAAA, FCA, PhD  
Senior Consultant

AW/BBM:rl

cc: Jamal Adora, Gabriel, Roeder, Smith & Company  
Kristen Brundirks, Gabriel, Roeder, Smith & Company

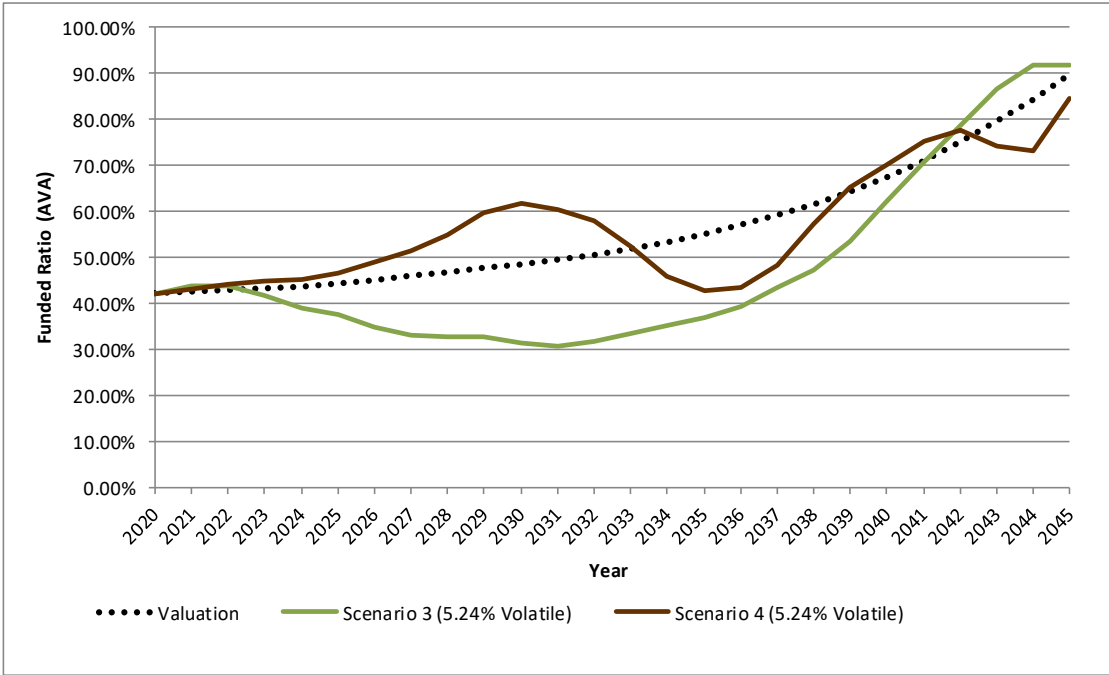
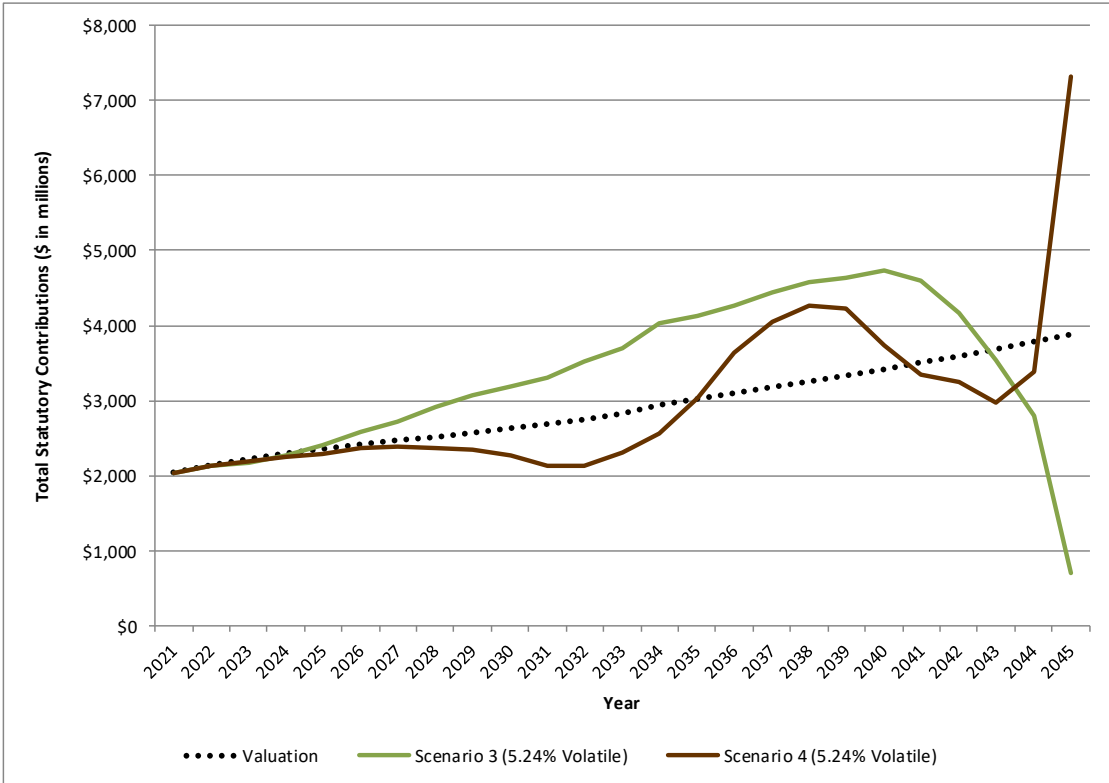


**State Universities Retirement System  
Comparison of Total Statutory Contributions and Funded Ratio  
Assuming an Annual Return of 6.75% (Valuation Assumption) and  
Rates under the Volatile Investment Return Stress Testing Scenarios  
(Volatile Returns Averaging 6.75%)**



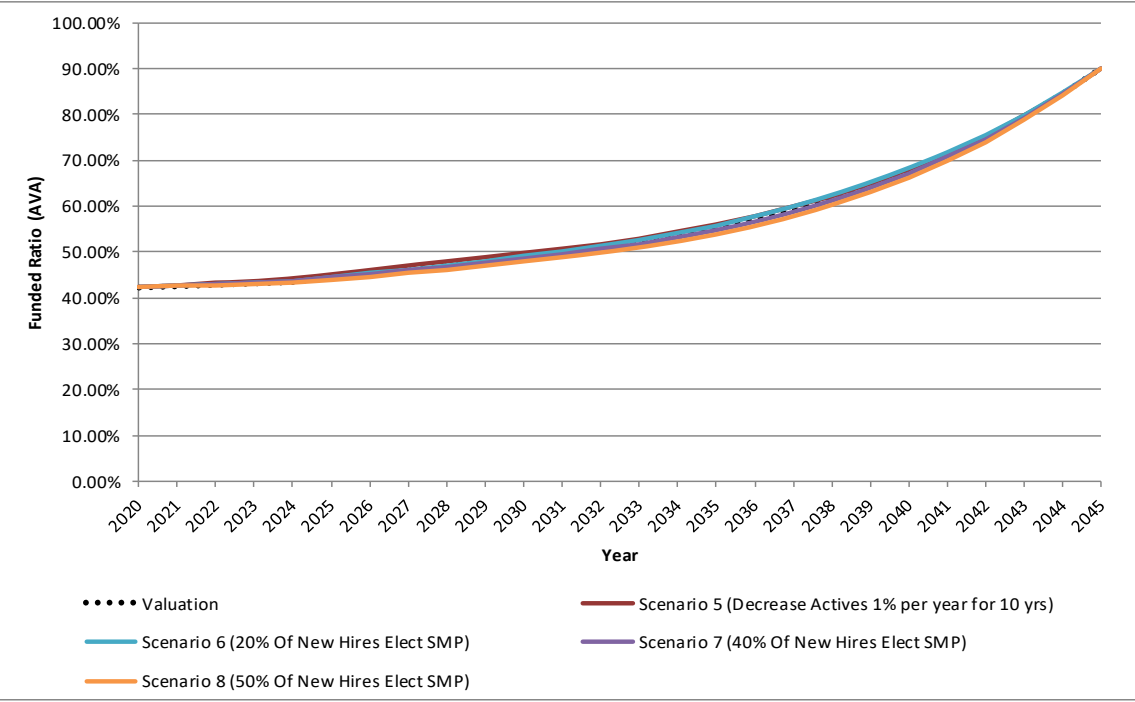
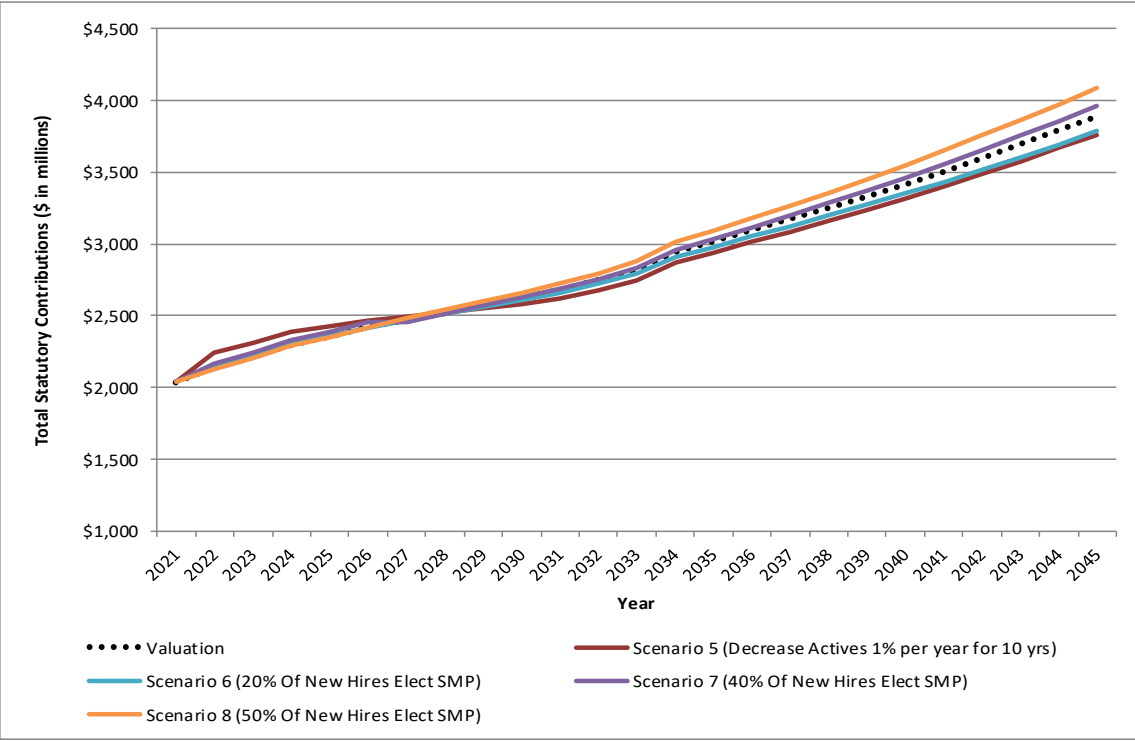
Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.

**State Universities Retirement System  
 Comparison of Total Statutory Contributions and Funded Ratio  
 Assuming an Annual Return of 6.75% (Valuation Assumption) and  
 Rates under the Volatile Investment Return Stress Testing Scenarios  
 (Volatile Returns Averaging 5.24%)**



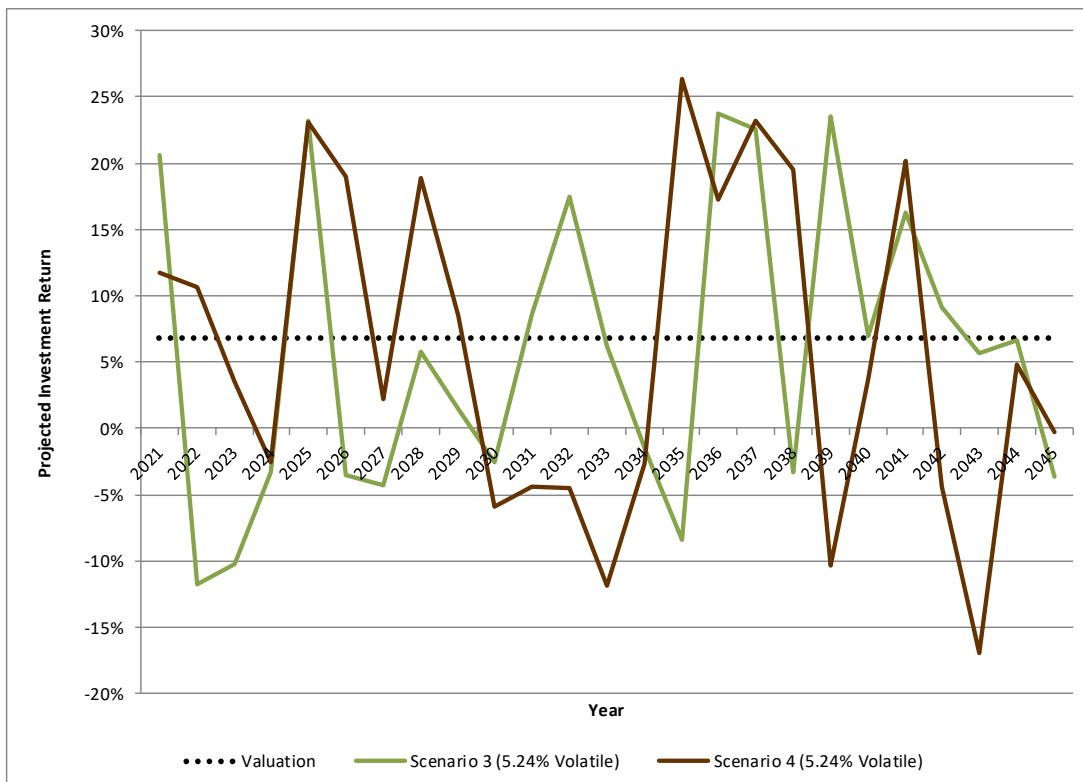
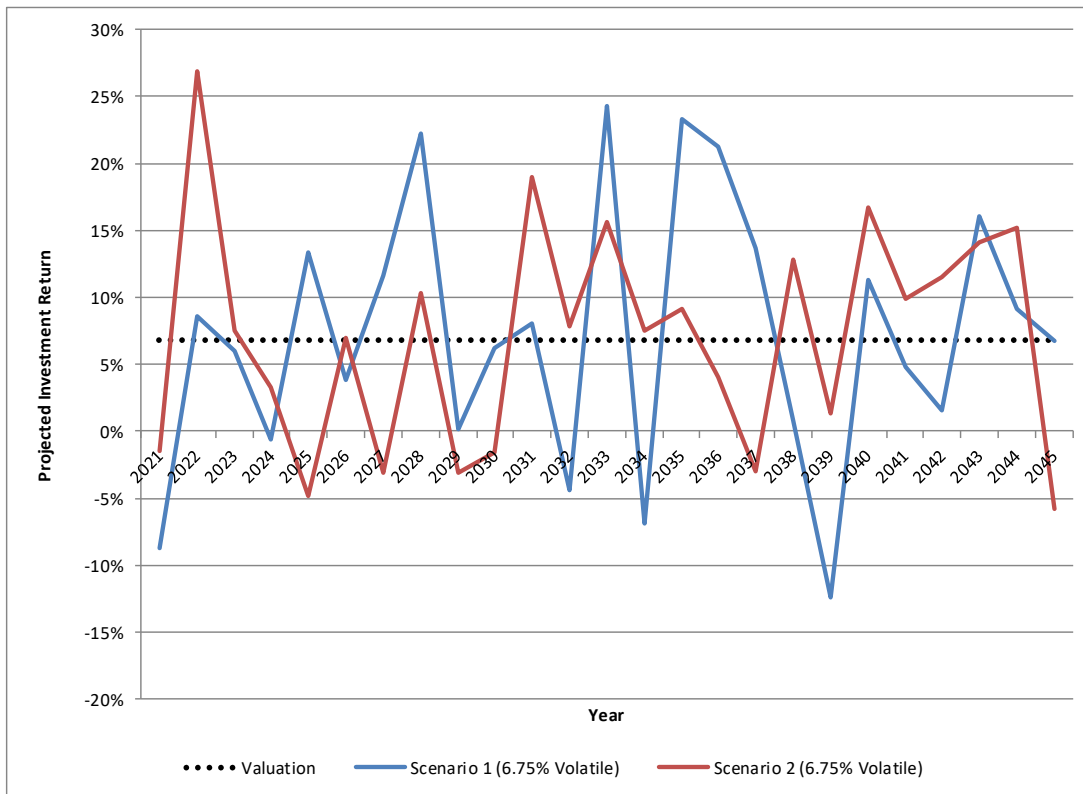
Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.

**State Universities Retirement System  
 Comparison of Total Statutory Contributions and Funded Ratio  
 Assuming an Annual Return of 6.75% (Valuation Assumption) and  
 Rates under the Number of Active Members Sensitivity and Future New Hire Election Scenarios**



Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.

### State Universities Retirement System Comparison of Projected Rates of Investment Return Assuming an Annual Return of 6.75% (Valuation Assumption) and Rates under the Stress Testing Scenarios





**State Universities Retirement System**  
**Comparison of Total Contributions, Unfunded Liability and Funded Ratio**  
**Based on Actuarial Valuation as of June 30, 2020**

	Contributions* FY 2021-2045 (\$ in Millions)			MVA UAAL at 2045 (\$ in Millions)		Total PV
	Total	PV	MVA Funded	UAAL	PV of UAAL	Contributions
	Contributions	Contributions	Ratio in 2045			+ UAAL
Baseline (6.75% Static)	\$72,603.178	\$32,842.824	90.00%	\$5,242.271	\$1,024.053	\$33,866.877
Scenario 1 (6.75% Volatile)	76,113.422	34,250.152	95.25%	2,492.367	486.872	34,737.024
Scenario 2 (6.75% Volatile)	75,072.532	34,051.925	95.52%	2,347.822	458.636	34,510.561
Scenario 3 (5.24% Volatile)	82,635.643	37,444.014	83.94%	8,418.234	1,644.462	39,088.476
Scenario 4 (5.24% Volatile)	75,041.592	32,799.610	66.26%	17,687.814	3,455.231	36,254.841
Scenario 5 (Decrease Actives 1% per year for 10 yrs)	71,558.685	32,708.632	90.00%	5,143.671	1,004.792	33,713.424
Scenario 6 (20% Of New Hires Elect SMP)	71,729.734	32,587.158	90.00%	5,356.197	1,046.308	33,633.466
Scenario 7 (40% Of New Hires Elect SMP)	73,269.257	33,098.492	90.00%	5,128.345	1,001.798	34,100.290
Scenario 8 (50% Of New Hires Elect SMP)	74,342.504	33,354.158	90.00%	5,014.418	979.543	34,333.701

	Annual Statutory Contribution \$ Change		Minimum Funded Ratio		Annual Funded Ratio (AVA) Change	
	Maximum	Maximum	(AVA)	(MVA)	Maximum	Maximum
	Increase	Decrease			Increase	Decrease
Baseline (6.75% Static)			42.64%	41.64%		
Scenario 1 (6.75% Volatile)	40.35%	-11.87%	37.02%	34.51%	10.52%	-1.77%
Scenario 2 (6.75% Volatile)	6.63%	-52.06%	40.17%	35.50%	10.31%	-1.68%
Scenario 3 (5.24% Volatile)	8.68%	-74.61%	30.69%	27.45%	8.73%	-2.76%
Scenario 4 (5.24% Volatile)	115.92%	-11.39%	42.92%	34.62%	11.50%	-6.50%
Scenario 5 (Decrease Actives 1% per year for 10 yrs)	10.38%	0.95%	42.64%	41.64%	5.48%	0.41%
Scenario 6 (20% Of New Hires Elect SMP)	6.19%	1.87%	42.65%	41.66%	5.35%	0.30%
Scenario 7 (40% Of New Hires Elect SMP)	6.36%	0.07%	42.63%	41.63%	5.73%	0.29%
Scenario 8 (50% Of New Hires Elect SMP)	6.19%	2.28%	42.62%	41.62%	6.00%	0.17%

\*Combined State and employer contributions. Includes total SMP contributions. Excludes EBA contributions.





**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 1 (Volatile Returns Averaging 6.75%)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

Year Ending June 30	June 30, 2020 Valuation Baseline								Stress Test Scenario 1							
	Projected		Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in		Annual Rate of Investment Return (from 2020)	Cumulative Geometric Return	Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in	
	Investment Return	DB Statutory Contribution	Statutory Contribution Including SMP	Statutory Contribution			Statutory Contribution	AVA Funded Ratio			AVA Funded Ratio	Statutory Contribution			Statutory Contribution	Statutory Contribution
2020		\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%			
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	-8.70%	-8.70%	1,954.566	2,035.796	41.41%	35.51%	6.19%	-0.81%	
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	8.60%	-0.42%	2,055.984	2,142.017	40.21%	36.42%	5.22%	-1.20%	
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	5.96%	1.66%	2,165.687	2,254.404	39.09%	36.57%	5.25%	-1.12%	
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	-0.67%	1.07%	2,292.171	2,384.833	37.69%	34.51%	5.79%	-1.40%	
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	13.36%	3.42%	2,391.975	2,488.629	37.02%	37.25%	4.35%	-0.68%	
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	3.82%	3.49%	2,516.981	2,617.643	37.59%	36.98%	5.18%	0.58%	
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	11.63%	4.61%	2,622.459	2,727.166	38.46%	39.60%	4.18%	0.87%	
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	22.24%	6.67%	2,684.014	2,792.805	40.75%	46.59%	2.41%	2.29%	
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	0.17%	5.93%	2,740.975	2,853.908	43.37%	45.01%	2.19%	2.62%	
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	6.20%	5.95%	2,733.325	2,850.470	45.26%	45.98%	-0.12%	1.89%	
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	8.04%	6.14%	2,714.983	2,836.488	47.38%	47.69%	-0.49%	2.13%	
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	-4.42%	5.22%	2,738.506	2,864.605	48.20%	43.69%	0.99%	0.81%	
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	24.30%	6.58%	2,754.130	2,885.009	49.03%	52.09%	0.71%	0.83%	
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	-6.88%	5.55%	2,956.411	3,092.209	49.94%	46.89%	7.18%	0.91%	
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	23.32%	6.65%	3,052.522	3,193.372	52.20%	56.09%	3.27%	2.26%	
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%	21.24%	7.51%	3,174.729	3,320.759	56.84%	66.57%	3.99%	4.63%	
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	13.72%	7.87%	3,213.194	3,364.556	64.20%	74.38%	1.32%	7.36%	
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	0.75%	7.46%	3,079.710	3,236.573	69.45%	73.45%	-3.80%	5.26%	
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	-12.42%	6.31%	2,689.973	2,852.430	72.56%	62.25%	-11.87%	3.10%	
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	11.32%	6.55%	2,484.467	2,652.698	73.53%	66.54%	-7.00%	0.98%	
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	4.78%	6.47%	2,457.597	2,631.769	72.86%	67.00%	-0.79%	-0.67%	
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	1.55%	6.24%	2,719.810	2,900.100	71.10%	65.87%	10.20%	-1.77%	
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	16.02%	6.65%	3,392.450	3,578.979	72.68%	75.52%	23.41%	1.58%	
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	9.15%	6.75%	4,830.269	5,023.174	80.98%	84.47%	40.35%	8.30%	
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	6.75%	6.75%	6,333.570	6,533.030	91.50%	95.25%	30.06%	10.52%	
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$72,750.458	\$76,113.422					
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$32,784.991	\$34,250.152					
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000							\$3,510.241	\$3,510.244					
Total Present Value FY 2021-2045		\$0.000	\$0.000							\$1,407.326	\$1,407.328					
Maximum Annual Increase														40.35%	10.52%	
Maximum Annual Decrease														-11.87%	-1.77%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.



**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 2 (Volatile Returns Averaging 6.75%)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

June 30, 2020 Valuation Baseline									Stress Test Scenario 2							
Total									Total							
Year Ending	Projected Investment Return	DB Statutory Contribution	Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio		Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	DB Statutory Contribution	Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio
2020			\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%		
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%		-1.45%	-1.45%	1,954.566	2,035.796	41.99%	38.39%	6.19%	-0.24%
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%		26.89%	11.83%	2,055.984	2,142.017	42.90%	46.27%	5.22%	0.91%
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%		7.51%	10.37%	2,147.400	2,236.117	44.37%	47.49%	4.39%	1.47%
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%		3.32%	8.56%	2,204.317	2,296.979	45.65%	46.85%	2.72%	1.27%
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%		-4.88%	5.73%	2,215.694	2,312.348	46.00%	42.40%	0.67%	0.36%
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%		6.98%	5.94%	2,243.543	2,344.205	46.63%	43.03%	1.38%	0.63%
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%		-3.07%	4.60%	2,307.262	2,411.969	45.10%	39.52%	2.89%	-1.53%
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%		10.35%	5.30%	2,358.288	2,467.079	43.59%	41.27%	2.28%	-1.52%
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%		-3.12%	4.33%	2,505.133	2,618.066	41.90%	37.97%	6.12%	-1.68%
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%		-1.63%	3.72%	2,651.984	2,769.129	40.59%	35.50%	5.77%	-1.32%
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%		18.98%	5.02%	2,821.896	2,943.401	40.17%	40.41%	6.29%	-0.42%
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%		7.84%	5.25%	2,997.152	3,123.251	41.20%	42.07%	6.11%	1.04%
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%		15.62%	6.02%	3,149.722	3,280.601	43.02%	47.29%	5.04%	1.82%
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%		7.47%	6.12%	3,347.784	3,483.582	46.34%	49.83%	6.19%	3.32%
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%		9.17%	6.32%	3,406.826	3,547.676	50.73%	53.45%	1.84%	4.39%
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%		4.09%	6.18%	3,388.739	3,534.769	54.23%	54.69%	-0.36%	3.50%
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%		-2.96%	5.62%	3,298.827	3,450.189	56.49%	51.98%	-2.39%	2.26%
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%		12.81%	6.01%	3,291.275	3,448.138	58.42%	57.42%	-0.06%	1.93%
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%		1.28%	5.75%	3,398.035	3,560.492	60.22%	57.20%	3.26%	1.80%
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%		16.73%	6.28%	3,561.495	3,729.726	63.21%	66.08%	4.75%	3.00%
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%		9.92%	6.45%	3,802.938	3,977.110	68.01%	72.50%	6.63%	4.80%
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%		11.48%	6.67%	3,965.616	4,145.906	75.38%	81.07%	4.24%	7.37%
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%		14.13%	6.98%	3,925.612	4,112.141	83.90%	92.79%	-0.81%	8.52%
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%		15.20%	7.32%	3,255.720	3,448.625	94.21%	105.91%	-16.14%	10.31%
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%		-5.86%	6.75%	1,453.760	1,653.220	96.08%	95.52%	-52.06%	1.87%
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178								\$71,709.568	\$75,072.532				
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824								\$32,586.763	\$34,051.925				
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000								\$2,469.351	\$2,469.354				
Total Present Value FY 2021-2045		\$0.000	\$0.000								\$1,209.098	\$1,209.101				
Maximum Annual Increase															6.63%	10.31%
Maximum Annual Decrease															-52.06%	-1.68%

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.



**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 3 (Volatile Returns Averaging 5.24%)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

June 30, 2020 Valuation Baseline									Stress Test Scenario 3							
Year Ending June 30	Projected		Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	DB Statutory Contribution	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio
	Investment Return	DB Statutory Contribution	Including SMP	Statutory Contribution								Statutory Contribution	Actuarial Value of Assets (AVA) Funded Ratio			
2020			\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%		
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	20.61%	20.61%	1,954.566	2,035.796	43.74%	47.15%	6.19%	1.52%	
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	-11.77%	3.15%	2,055.984	2,142.017	43.74%	39.55%	5.22%	0.00%	
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	-10.28%	-1.53%	2,083.636	2,172.352	41.82%	33.47%	1.42%	-1.92%	
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	-3.34%	-1.99%	2,180.924	2,273.586	39.06%	30.40%	4.66%	-2.76%	
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	23.18%	2.60%	2,306.966	2,403.620	37.56%	35.36%	5.72%	-1.50%	
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	-3.57%	1.54%	2,477.199	2,577.861	34.92%	32.43%	7.25%	-2.64%	
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	-4.28%	0.69%	2,609.547	2,714.254	33.16%	29.54%	5.29%	-1.76%	
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	5.73%	1.31%	2,797.070	2,905.861	32.65%	29.90%	7.06%	-0.51%	
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	1.44%	1.32%	2,960.580	3,073.513	32.67%	29.20%	5.77%	0.02%	
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	-2.55%	0.93%	3,080.826	3,197.971	31.29%	27.45%	4.05%	-1.37%	
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	8.62%	1.60%	3,192.010	3,313.515	30.69%	28.83%	3.61%	-0.61%	
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	17.44%	2.84%	3,392.705	3,518.804	31.74%	33.11%	6.20%	1.05%	
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	6.17%	3.09%	3,573.222	3,704.101	33.33%	34.68%	5.27%	1.60%	
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	-1.44%	2.76%	3,889.883	4,025.681	35.28%	34.21%	8.68%	1.95%	
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	-8.36%	1.98%	3,988.812	4,129.662	36.80%	31.48%	2.58%	1.52%	
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%	23.76%	3.22%	4,110.231	4,256.261	39.37%	39.39%	3.07%	2.57%	
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	22.60%	4.27%	4,289.806	4,441.168	43.42%	49.05%	4.34%	4.05%	
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	-3.37%	3.83%	4,423.112	4,579.975	47.40%	48.30%	3.13%	3.97%	
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	23.53%	4.78%	4,466.005	4,628.462	53.62%	60.78%	1.06%	6.22%	
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	6.98%	4.89%	4,565.809	4,734.040	61.99%	66.30%	2.28%	8.37%	
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	16.31%	5.41%	4,423.435	4,597.607	70.72%	78.23%	-2.88%	8.73%	
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	9.17%	5.58%	3,982.684	4,162.974	78.60%	85.71%	-9.45%	7.88%	
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	5.70%	5.58%	3,363.310	3,549.839	86.72%	89.77%	-14.73%	8.12%	
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	6.64%	5.63%	2,595.722	2,788.627	92.00%	93.45%	-21.44%	5.28%	
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	-3.69%	5.24%	508.636	708.096	91.85%	83.94%	-74.61%	-0.15%	
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$79,272.680	\$82,635.643					
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$35,978.853	\$37,444.014					
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000							\$10,032.463	\$10,032.465					
Total Present Value FY 2021-2045		\$0.000	\$0.000							\$4,601.188	\$4,601.190					
Maximum Annual Increase															8.68%	8.73%
Maximum Annual Decrease															-74.61%	-2.76%

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.



**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 4 (Volatile Returns Averaging 5.24%)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

June 30, 2020 Valuation Baseline									Stress Test Scenario 4						
Year Ending June 30	Projected Investment Return	DB Statutory Contribution	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	DB Statutory Contribution	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio
			Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio							Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio			
2020			\$1,838.786	\$1,917.039	42.23%	41.23%		2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%		
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	11.75%	11.75%	1,954.566	2,035.796	43.04%	43.63%	6.19%	0.81%
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	10.60%	11.17%	2,055.984	2,142.017	44.14%	45.93%	5.22%	1.10%
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	3.51%	8.56%	2,112.222	2,200.938	45.01%	45.27%	2.75%	0.87%
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	-2.61%	5.65%	2,165.916	2,258.578	45.05%	41.93%	2.62%	0.05%
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	23.10%	8.93%	2,197.463	2,294.117	46.46%	49.09%	1.57%	1.41%
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	18.93%	10.54%	2,268.020	2,368.682	49.14%	55.85%	3.25%	2.68%
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	2.22%	9.31%	2,289.088	2,393.795	51.37%	54.65%	1.06%	2.23%
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	18.87%	10.46%	2,259.160	2,367.951	54.90%	62.16%	-1.08%	3.53%
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	8.49%	10.24%	2,244.243	2,357.176	59.75%	64.60%	-0.46%	4.86%
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	-5.94%	8.50%	2,161.122	2,278.268	61.62%	57.92%	-3.35%	1.86%
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	-4.42%	7.26%	2,006.851	2,128.356	60.29%	52.18%	-6.58%	-1.33%
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	-4.47%	6.23%	2,006.549	2,132.648	57.87%	46.63%	0.20%	-2.41%
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	-11.85%	4.72%	2,176.662	2,307.541	52.43%	38.25%	8.20%	-5.44%
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	-2.65%	4.17%	2,418.462	2,554.260	45.93%	34.62%	10.69%	-6.50%
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	26.37%	5.52%	2,889.471	3,030.321	42.92%	41.65%	18.64%	-3.01%
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	1.94%	1.94%	17.21%	6.22%	3,484.125	3,630.155	43.64%	48.00%	19.79%	0.72%
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	23.15%	7.15%	3,897.687	4,049.049	48.23%	59.09%	11.54%	4.60%
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	19.54%	7.80%	4,114.810	4,271.673	57.19%	71.07%	5.50%	8.95%
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	-10.33%	6.76%	4,054.112	4,216.569	65.14%	64.01%	-1.29%	7.95%
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	3.75%	6.61%	3,567.867	3,736.098	70.01%	65.79%	-11.39%	4.87%
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	20.12%	7.21%	3,165.081	3,339.253	75.14%	77.59%	-10.62%	5.13%
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	-4.38%	6.66%	3,074.400	3,254.690	77.63%	72.78%	-2.53%	2.49%
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	-16.91%	5.51%	2,794.015	2,980.544	74.31%	58.65%	-8.42%	-3.32%
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	4.77%	5.48%	3,198.233	3,391.138	73.06%	60.17%	13.78%	-1.24%
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	-0.30%	5.24%	7,122.519	7,321.979	84.56%	66.26%	115.92%	11.50%
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$71,678.628	\$75,041.592				
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$31,334.448	\$32,799.610				
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2045		\$0.000	\$0.000							\$2,438.411	\$2,438.414				
Total Present Value FY 2021-2045		\$0.000	\$0.000							-\$43.217	-\$43.214				
Maximum Annual Increase													115.92%	11.50%	
Maximum Annual Decrease													-11.39%	-6.50%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions..



**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 5 (Decreasing Full-Time Active Members – 1%/year for 10 Years)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

June 30, 2020 Valuation Baseline									Stress Test Scenario 5								
Year Ending June 30	Projected Investment Return	DB Statutory Contribution	Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	DB Statutory Contribution	Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio
			Including SMP	Including SMP								Including SMP	Including SMP				
2020			\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%			
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	6.75%	6.75%	1,955.310	2,035.796	42.64%	41.64%	6.19%	0.41%		
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	6.75%	6.75%	2,162.720	2,247.169	43.12%	42.44%	10.38%	0.48%		
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	6.75%	6.75%	2,219.447	2,305.835	43.57%	43.26%	2.61%	0.45%		
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	6.75%	6.75%	2,293.664	2,383.060	44.17%	44.17%	3.35%	0.60%		
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	6.75%	6.75%	2,332.672	2,425.050	45.07%	45.07%	1.76%	0.91%		
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	6.75%	6.75%	2,370.433	2,465.741	45.99%	45.99%	1.68%	0.92%		
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	6.75%	6.75%	2,397.831	2,496.035	46.91%	46.91%	1.23%	0.91%		
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	6.75%	6.75%	2,422.269	2,523.339	47.82%	47.82%	1.09%	0.91%		
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	6.75%	6.75%	2,447.852	2,551.769	48.74%	48.74%	1.13%	0.92%		
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	6.75%	6.75%	2,469.314	2,576.072	49.66%	49.66%	0.95%	0.92%		
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	6.75%	6.75%	2,511.439	2,621.966	50.63%	50.63%	1.78%	0.97%		
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	6.75%	6.75%	2,563.996	2,678.554	51.69%	51.69%	2.16%	1.06%		
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	6.75%	6.75%	2,626.440	2,745.240	52.88%	52.88%	2.49%	1.18%		
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	6.75%	6.75%	2,749.155	2,872.344	54.32%	54.32%	4.63%	1.44%		
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	6.75%	6.75%	2,812.325	2,940.036	55.93%	55.93%	2.36%	1.61%		
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%	6.75%	6.75%	2,877.786	3,010.140	57.80%	57.80%	2.38%	1.87%		
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	6.75%	6.75%	2,945.294	3,082.434	59.90%	59.90%	2.40%	2.10%		
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	6.75%	6.75%	3,015.291	3,157.378	62.27%	62.27%	2.43%	2.37%		
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	6.75%	6.75%	3,087.786	3,234.903	64.95%	64.95%	2.46%	2.68%		
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	6.75%	6.75%	3,162.964	3,315.282	67.98%	67.98%	2.48%	3.03%		
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	6.75%	6.75%	3,241.625	3,399.298	71.40%	71.40%	2.53%	3.42%		
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	6.75%	6.75%	3,323.122	3,486.315	75.26%	75.26%	2.56%	3.86%		
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	6.75%	6.75%	3,407.120	3,575.940	79.62%	79.62%	2.57%	4.36%		
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	6.75%	6.75%	3,493.071	3,667.641	84.52%	84.52%	2.56%	4.90%		
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	6.75%	6.75%	3,580.864	3,761.348	90.00%	90.00%	2.55%	5.48%		
Total Contributions FY 2021-2045			\$69,240.217	\$72,603.178						\$68,469.790	\$71,558.685						
Total Present Value FY 2021-2045			\$31,377.665	\$32,842.824						\$31,347.431	\$32,708.632						
Difference from June 30, 2020 Valuation																	
Total Contributions FY 2021-2045			\$0.000	\$0.000						-\$770.427	-\$1,044.493						
Total Present Value FY 2021-2045			\$0.000	\$0.000						-\$30.234	-\$134.192						
Maximum Annual Increase															10.38%	5.48%	
Maximum Annual Decrease															0.95%	0.41%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions



**State Universities Retirement System  
Comparison of Actuarial Valuation Results and Stress Testing Scenario 6 (20% of Future New Hires Elect SMP)  
Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

June 30, 2020 Valuation Baseline										Stress Test Scenario 6						
Year Ending June 30	Projected			Total		Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Total Statutory Contribution	Increase in AVA Funded Ratio
	Investment Return	DB Statutory Contribution	Statutory Contribution Including SMP	Statutory Contribution Including SMP	Statutory Contribution Including SMP							Statutory Contribution Including SMP	Statutory Contribution Including SMP			
2020			\$1,838.786	\$1,917.039	42.23%	41.23%				2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%	
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	6.75%	6.75%	1,957.509	2,035.796	42.65%	41.66%	6.19%	0.43%	
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	6.75%	6.75%	2,070.361	2,150.669	42.95%	42.27%	5.64%	0.30%	
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	6.75%	6.75%	2,141.955	2,222.850	43.25%	42.95%	3.36%	0.30%	
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	6.75%	6.75%	2,220.492	2,302.929	43.71%	43.71%	3.60%	0.45%	
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	6.75%	6.75%	2,272.042	2,356.160	44.49%	44.49%	2.31%	0.78%	
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	6.75%	6.75%	2,329.052	2,414.929	45.32%	45.32%	2.49%	0.83%	
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	6.75%	6.75%	2,377.288	2,464.991	46.18%	46.18%	2.07%	0.86%	
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	6.75%	6.75%	2,423.676	2,513.251	47.07%	47.07%	1.96%	0.90%	
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	6.75%	6.75%	2,472.405	2,563.902	48.01%	48.01%	2.02%	0.94%	
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	6.75%	6.75%	2,518.275	2,611.748	49.00%	49.00%	1.87%	0.99%	
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	6.75%	6.75%	2,566.679	2,662.263	50.05%	50.05%	1.93%	1.05%	
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	6.75%	6.75%	2,624.303	2,722.213	51.19%	51.19%	2.25%	1.15%	
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	6.75%	6.75%	2,690.727	2,791.139	52.47%	52.47%	2.53%	1.28%	
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	6.75%	6.75%	2,807.358	2,910.389	54.00%	54.00%	4.27%	1.52%	
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	6.75%	6.75%	2,873.086	2,978.837	55.70%	55.70%	2.35%	1.70%	
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	1.94%	1.94%	6.75%	6.75%	2,940.716	3,049.279	57.66%	57.66%	2.36%	1.96%	
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	6.75%	6.75%	3,010.045	3,121.535	59.85%	59.85%	2.37%	2.19%	
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	6.75%	6.75%	3,081.436	3,195.991	62.31%	62.31%	2.39%	2.46%	
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	6.75%	6.75%	3,154.892	3,272.581	65.07%	65.07%	2.40%	2.76%	
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	6.75%	6.75%	3,230.611	3,351.588	68.16%	68.16%	2.41%	3.09%	
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	6.75%	6.75%	3,309.383	3,433.803	71.62%	71.62%	2.45%	3.46%	
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	6.75%	6.75%	3,390.571	3,518.599	75.50%	75.50%	2.47%	3.88%	
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	6.75%	6.75%	3,473.859	3,605.592	79.83%	79.83%	2.47%	4.33%	
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	6.75%	6.75%	3,558.706	3,694.244	84.65%	84.65%	2.46%	4.82%	
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	6.75%	6.75%	3,644.982	3,784.456	90.00%	90.00%	2.44%	5.35%	
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$69,140.409	\$71,729.734					
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$31,409.612	\$32,587.158					
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000							-\$99.808	-\$873.444					
Total Present Value FY 2021-2045		\$0.000	\$0.000							\$31.947	-\$255.666					
Maximum Annual Increase														6.19%	5.35%	
Maximum Annual Decrease														1.87%	0.30%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions





**State Universities Retirement System**  
**Comparison of Actuarial Valuation Results and Sensitivity Scenario 7 (40% of Future New Hires Elect SMP)**  
**Based on Actuarial Valuation as of June 30, 2020**

\$ in Millions

Year Ending June 30	June 30, 2020 Valuation Baseline								Stress Test Scenario 7							
	Projected Investment Return	DB Statutory Contribution	Total		Increase in Total Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	DB Statutory Contribution	Total		Increase in Total Contribution	Increase in AVA Funded Ratio			
			Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio						Market Value of Assets (MVA) Funded Ratio	Statutory Contribution Including SMP			Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	
2020		\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%			
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	6.75%	6.75%	1,951.622	2,035.796	42.63%	41.63%	6.19%	0.40%	
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	6.75%	6.75%	2,073.452	2,165.211	42.92%	42.23%	6.36%	0.29%	
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	6.75%	6.75%	2,147.191	2,243.727	43.21%	42.90%	3.63%	0.29%	
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	6.75%	6.75%	2,228.045	2,330.932	43.65%	43.65%	3.89%	0.44%	
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	6.75%	6.75%	2,282.162	2,391.350	44.43%	44.43%	2.59%	0.78%	
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	6.75%	6.75%	2,342.023	2,457.470	45.26%	45.26%	2.76%	0.83%	
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	6.75%	6.75%	2,337.534	2,459.243	46.01%	46.01%	0.07%	0.76%	
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	6.75%	6.75%	2,386.040	2,514.047	46.81%	46.81%	2.23%	0.79%	
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	6.75%	6.75%	2,437.198	2,571.568	47.65%	47.65%	2.29%	0.84%	
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	6.75%	6.75%	2,485.795	2,626.613	48.54%	48.54%	2.14%	0.89%	
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	6.75%	6.75%	2,537.218	2,684.644	49.48%	49.48%	2.21%	0.95%	
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	6.75%	6.75%	2,598.142	2,752.429	50.53%	50.53%	2.52%	1.05%	
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	6.75%	6.75%	2,668.161	2,829.508	51.72%	51.72%	2.80%	1.18%	
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	6.75%	6.75%	2,790.424	2,958.990	53.16%	53.16%	4.58%	1.44%	
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	6.75%	6.75%	2,860.283	3,036.233	54.77%	54.77%	2.61%	1.62%	
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%	6.75%	6.75%	2,932.490	3,115.987	56.67%	56.67%	2.63%	1.89%	
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	6.75%	6.75%	3,006.895	3,198.128	58.81%	58.81%	2.64%	2.14%	
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	6.75%	6.75%	3,083.901	3,283.073	61.23%	61.23%	2.66%	2.42%	
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	6.75%	6.75%	3,163.511	3,370.736	63.98%	63.98%	2.67%	2.75%	
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	6.75%	6.75%	3,245.945	3,461.431	67.10%	67.10%	2.69%	3.12%	
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	6.75%	6.75%	3,331.952	3,555.876	70.63%	70.63%	2.73%	3.54%	
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	6.75%	6.75%	3,420.937	3,653.490	74.64%	74.64%	2.75%	4.01%	
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	6.75%	6.75%	3,512.622	3,753.946	79.17%	79.17%	2.75%	4.53%	
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	6.75%	6.75%	3,606.530	3,856.803	84.27%	84.27%	2.74%	5.10%	
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	6.75%	6.75%	3,702.579	3,962.026	90.00%	90.00%	2.73%	5.73%	
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$69,132.652	\$73,269.257					
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$31,345.715	\$33,098.492					
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000							-\$107.565	\$666.079					
Total Present Value FY 2021-2045		\$0.000	\$0.000							-\$31.950	\$255.668					
Maximum Annual Increase														6.36%	5.73%	
Maximum Annual Decrease														0.07%	0.29%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.



### State Universities Retirement System Comparison of Actuarial Valuation Results and Sensitivity Scenario 8 (50% of Future New Hires Elect SMP) Based on Actuarial Valuation as of June 30, 2020

\$ in Millions

Year Ending June 30	June 30, 2020 Valuation Baseline								Stress Test Scenario 8							
	Projected Investment Return	DB Statutory Contribution	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Statutory Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total		Market Value of Assets (MVA) Funded Ratio	Increase in Statutory Contribution	Increase in AVA Funded Ratio		
			Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio						Statutory Contribution Including SMP	Actuarial Value of Assets (AVA) Funded Ratio					
2020		\$1,838.786	\$1,917.039	42.23%	41.23%			2.64%		\$1,838.786	\$1,917.039	42.23%	41.23%			
2021	6.75%	1,954.566	2,035.796	42.64%	41.64%	6.19%	0.41%	6.75%	6.75%	1,948.679	2,035.796	42.62%	41.62%	6.19%	0.39%	
2022	6.75%	2,055.984	2,142.017	42.90%	42.22%	5.22%	0.26%	6.75%	6.75%	2,027.758	2,125.242	42.80%	42.12%	4.39%	0.18%	
2023	6.75%	2,126.724	2,215.440	43.16%	42.85%	3.43%	0.26%	6.75%	6.75%	2,096.854	2,201.211	42.97%	42.66%	3.57%	0.17%	
2024	6.75%	2,205.973	2,298.635	43.57%	43.57%	3.76%	0.41%	6.75%	6.75%	2,177.495	2,290.607	43.29%	43.29%	4.06%	0.32%	
2025	6.75%	2,258.319	2,354.972	44.30%	44.30%	2.45%	0.74%	6.75%	6.75%	2,231.393	2,353.116	43.94%	43.94%	2.73%	0.65%	
2026	6.75%	2,316.262	2,416.924	45.08%	45.08%	2.63%	0.78%	6.75%	6.75%	2,291.160	2,421.392	44.62%	44.62%	2.90%	0.69%	
2027	6.75%	2,365.616	2,470.322	45.90%	45.90%	2.21%	0.81%	6.75%	6.75%	2,342.697	2,481.409	45.35%	45.35%	2.48%	0.72%	
2028	6.75%	2,413.260	2,522.051	46.75%	46.75%	2.09%	0.85%	6.75%	6.75%	2,392.794	2,540.015	46.10%	46.10%	2.36%	0.76%	
2029	6.75%	2,463.408	2,576.341	47.64%	47.64%	2.15%	0.90%	6.75%	6.75%	2,445.712	2,601.518	46.91%	46.91%	2.42%	0.81%	
2030	6.75%	2,510.852	2,627.998	48.59%	48.59%	2.01%	0.94%	6.75%	6.75%	2,496.231	2,660.721	47.76%	47.76%	2.28%	0.85%	
2031	6.75%	2,560.984	2,682.489	49.59%	49.59%	2.07%	1.00%	6.75%	6.75%	2,549.736	2,723.084	48.68%	48.68%	2.34%	0.92%	
2032	6.75%	2,620.489	2,746.587	50.69%	50.69%	2.39%	1.10%	6.75%	6.75%	2,612.915	2,795.392	49.70%	49.70%	2.66%	1.02%	
2033	6.75%	2,688.954	2,819.833	51.93%	51.93%	2.67%	1.24%	6.75%	6.75%	2,685.368	2,877.182	50.85%	50.85%	2.93%	1.16%	
2034	6.75%	2,808.304	2,944.102	53.42%	53.42%	4.41%	1.49%	6.75%	6.75%	2,810.022	3,011.355	52.27%	52.27%	4.66%	1.41%	
2035	6.75%	2,876.351	3,017.201	55.09%	55.09%	2.48%	1.67%	6.75%	6.75%	2,882.599	3,093.649	53.86%	53.86%	2.73%	1.60%	
2036	6.75%	2,946.531	3,092.561	57.03%	57.03%	2.50%	1.94%	6.75%	6.75%	2,957.764	3,178.729	55.75%	55.75%	2.75%	1.88%	
2037	6.75%	3,018.670	3,170.032	59.20%	59.20%	2.51%	2.18%	6.75%	6.75%	3,035.395	3,266.499	57.89%	57.89%	2.76%	2.14%	
2038	6.75%	3,093.151	3,250.014	61.65%	61.65%	2.52%	2.45%	6.75%	6.75%	3,115.916	3,357.396	60.32%	60.32%	2.78%	2.44%	
2039	6.75%	3,169.977	3,332.434	64.42%	64.42%	2.54%	2.76%	6.75%	6.75%	3,199.330	3,451.323	63.10%	63.10%	2.80%	2.78%	
2040	6.75%	3,249.359	3,417.590	67.54%	67.54%	2.56%	3.12%	6.75%	6.75%	3,285.870	3,548.610	66.27%	66.27%	2.82%	3.17%	
2041	6.75%	3,332.067	3,506.239	71.05%	71.05%	2.59%	3.52%	6.75%	6.75%	3,376.275	3,649.949	69.88%	69.88%	2.86%	3.61%	
2042	6.75%	3,417.486	3,597.776	75.01%	75.01%	2.61%	3.96%	6.75%	6.75%	3,469.960	3,754.776	74.00%	74.00%	2.87%	4.12%	
2043	6.75%	3,505.315	3,691.843	79.46%	79.46%	2.61%	4.45%	6.75%	6.75%	3,566.667	3,862.786	78.68%	78.68%	2.88%	4.69%	
2044	6.75%	3,595.045	3,787.950	84.44%	84.44%	2.60%	4.98%	6.75%	6.75%	3,665.943	3,973.584	84.00%	84.00%	2.87%	5.31%	
2045	6.75%	3,686.570	3,886.031	90.00%	90.00%	2.59%	5.56%	6.75%	6.75%	3,767.730	4,087.163	90.00%	90.00%	2.86%	6.00%	
Total Contributions FY 2021-2045		\$69,240.217	\$72,603.178							\$69,432.263	\$74,342.504					
Total Present Value FY 2021-2045		\$31,377.665	\$32,842.824							\$31,313.767	\$33,354.158					
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2045		\$0.000	\$0.000							\$192.046	\$1,739.326					
Total Present Value FY 2021-2045		\$0.000	\$0.000							-\$63.898	\$511.334					
Maximum Annual Increase														6.19%	6.00%	
Maximum Annual Decrease														2.28%	0.17%	

Total statutory contributions include contributions from both the State and employers and include total SMP contributions. Total statutory contributions exclude EBA contributions.



**State Universities Retirement System  
Comparison of Assumed Investment Returns Used in the Stress Testing Scenarios and Total Statutory Contributions  
Based on Actuarial Valuation as of June 30, 2020**

Year	Baseline	Scenario 1 (6.75% Volatile)		Scenario 2 (6.75% Volatile)		Scenario 3 (5.24% Volatile)		Scenario 4 (5.24% Volatile)	
		Nominal <sup>1</sup>	Geometric <sup>2</sup>	Nominal <sup>1</sup>	Geometric <sup>2</sup>	Nominal <sup>1</sup>	Geometric <sup>2</sup>	Nominal <sup>1</sup>	Geometric <sup>2</sup>
2021	6.75%	-8.70%	-8.70%	-1.45%	-1.45%	20.61%	20.61%	11.75%	11.75%
2022	6.75%	8.60%	-0.42%	26.89%	11.83%	-11.77%	3.15%	10.60%	11.17%
2023	6.75%	5.96%	1.66%	7.51%	10.37%	-10.28%	-1.53%	3.51%	8.56%
2024	6.75%	-0.67%	1.07%	3.32%	8.56%	-3.34%	-1.99%	-2.61%	5.65%
2025	6.75%	13.36%	3.42%	-4.88%	5.73%	23.18%	2.60%	23.10%	8.93%
2026	6.75%	3.82%	3.49%	6.98%	5.94%	-3.57%	1.54%	18.93%	10.54%
2027	6.75%	11.63%	4.61%	-3.07%	4.60%	-4.28%	0.69%	2.22%	9.31%
2028	6.75%	22.24%	6.67%	10.35%	5.30%	5.73%	1.31%	18.87%	10.46%
2029	6.75%	0.17%	5.93%	-3.12%	4.33%	1.44%	1.32%	8.49%	10.24%
2030	6.75%	6.20%	5.95%	-1.63%	3.72%	-2.55%	0.93%	-5.94%	8.50%
2031	6.75%	8.04%	6.14%	18.98%	5.02%	8.62%	1.60%	-4.42%	7.26%
2032	6.75%	-4.42%	5.22%	7.84%	5.25%	17.44%	2.84%	-4.47%	6.23%
2033	6.75%	24.30%	6.58%	15.62%	6.02%	6.17%	3.09%	-11.85%	4.72%
2034	6.75%	-6.88%	5.55%	7.47%	6.12%	-1.44%	2.76%	-2.65%	4.17%
2035	6.75%	23.32%	6.65%	9.17%	6.32%	-8.36%	1.98%	26.37%	5.52%
2036	6.75%	21.24%	7.51%	4.09%	6.18%	23.76%	3.22%	17.21%	6.22%
2037	6.75%	13.72%	7.87%	-2.96%	5.62%	22.60%	4.27%	23.15%	7.15%
2038	6.75%	0.75%	7.46%	12.81%	6.01%	-3.37%	3.83%	19.54%	7.80%
2039	6.75%	-12.42%	6.31%	1.28%	5.75%	23.53%	4.78%	-10.33%	6.76%
2040	6.75%	11.32%	6.55%	16.73%	6.28%	6.98%	4.89%	3.75%	6.61%
2041	6.75%	4.78%	6.47%	9.92%	6.45%	16.31%	5.41%	20.12%	7.21%
2042	6.75%	1.55%	6.24%	11.48%	6.67%	9.17%	5.58%	-4.38%	6.66%
2043	6.75%	16.02%	6.65%	14.13%	6.98%	5.70%	5.58%	-16.91%	5.51%
2044	6.75%	9.15%	6.75%	15.20%	7.32%	6.64%	5.63%	4.77%	5.48%
2045	6.75%	6.75%	6.75%	-5.86%	6.75%	-3.69%	5.24%	-0.30%	5.24%

<sup>1</sup>Nominal one-year rate of return.

<sup>2</sup>Cumulative average geometric return from 2021 through the current year.