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GASB STATEMENT NO. 68 REPORT

FOR THE

CONNECTICUT STATE EMPLOYEES' RETIREMENT SYSTEM

PREPARED AS OF JUNE 30, 2018 MEASUREMENT DATE

FOR JUNE 30, 2019 REPORTING DATE

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Cavanaugh Macdonald
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February 20, 2019

State of Connecticut
State Employees' Retirement Commission
55 Elm Street
Hartford, CT 06106

Members of the Commission:

Presented in this report is information to assist the Connecticut State Employees' Retirement System in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 68 and to identify the information to be provided by the actuary, Cavanaugh Macdonald Consulting (CMC). The information is presented as of the period ending June 30, 2018 (the Measurement Date) and for the financial reporting as of June 30, 2019 (the Reporting Date).

GASB Statement No. 68 establishes accounting and financial reporting requirements for governmental employers who provide pension benefits to their employees through a trust.

The annual actuarial valuation used as a basis for much of the information presented in this report was performed as of June 30, 2018. The valuation was based on data, provided by the Retirement System staff, for active, inactive and retired members along with pertinent financial information.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the calculations were completed in compliance with the laws governing the System and, in our opinion, meet the requirements of GASB 68. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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These results are only for financial reporting and may not be appropriate for funding purposes or other types of analysis. Calculations for purposes other than satisfying the requirements of GASB 67 and GASB 68 may produce significantly different results. Future actuarial results may differ significantly from the current results presented in the report due to such factors as changes in plan experience or changes in economic or demographic assumptions.

Sincerely yours,

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

Edward J. Koebel, EA, FCA, MAAA
Principal and Consulting Actuary

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REPORT OF THE ANNUAL GASB STATEMENT NO. 68
REQUIRED INFORMATION FOR THE
CONNECTICUT STATE EMPLOYEES' RETIREMENT SYSTEM

PREPARED AS OF JUNE 30, 2018

SECTION I – INTRODUCTION

The Governmental Accounting Standards Board issued Statement No. 68 (GASB 68), *"Accounting and Financial Reporting For Pensions"* in June 2012. This report, prepared as of June 30, 2018 (the Measurement Date), presents information to assist the Connecticut State Employees Retirement System (SERS) in meeting the requirements of GASB 68 for the fiscal year ending June 30, 2019 (Reporting Date). Much of the material provided in this report is based on the data, assumptions, and results of the annual actuarial valuation of SERS as of June 30, 2018. Connecticut State Employees Retirement System is a single-employer defined benefit pension plan.

Two primary GASB 68 measurements include Net Pension Liability (NPL) and the development of the annual Pension Expense (PE) for the employer's financial reporting. The NPL shown in the GASB Statement No. 67 Report for the Connecticut State Employees Retirement System Prepared as of June 30, 2018 and is the NPL used for purposes of GASB 68. Please refer to that report for the derivation of the NPL.

Pension Expense includes amounts for service cost (the Normal Cost under the Entry Age Normal actuarial cost method for the year), interest on the Total Pension Liability (TPL), changes in benefit structure, amortization of increases/decreases in liability due to actuarial experience and actuarial assumption changes, and amortization of investment gains/losses. The actuarial experience and assumption change impacts are amortized over the average expected remaining service life of the Plan membership as of the Measurement Date, and investment gains/losses are amortized over five years. The development of the PE is shown in Section IV.

The unamortized portions of each year's experience, assumption changes and investment gains/losses are used to develop deferred inflows and outflows, which also must be included in the employer's financial reporting. The development of the collective deferred inflows and outflows is shown in Section III.

Section II of this report is a summary of the principal results of the amounts under GASB 68. Section III provides the results of all the necessary calculations, presented in the order laid out in GASB 68 for note disclosure and Required Supplementary Information (RSI).

SECTION II – SUMMARY OF PRINCIPAL RESULTS
($ IN THOUSANDS)

Valuation Date (VD):	June 30, 2018
Measurement Date (MD):	June 30, 2018
Reporting Date (RD):	June 30, 2019
Membership Data:	
Retirees and Survivors	50,441
Inactive Members	1,281
Active Members	49,153
Total	100,875
Single Equivalent Interest Rate (SEIR):	
Long-Term Expected Rate of Return	6.90%
Municipal Bond Index Rate at Measurement Date	3.87%
Fiscal Year in which Plan's Fiduciary Net Position is projected to be depleted from future benefit payments for current members	N/A
Single Equivalent Interest Rate	6.90%
Net Pension Liability:	
Total Pension Liability (TPL)	$ 34,214,163
Fiduciary Net Position (FNP)	12,527,542
Net Pension Liability (NPL = TPL – FNP)	$ 21,686,621
FNP as a percentage of TPL	36.62%
Pension Expense:	$ 2,689,667
Deferred Outflows of Resources:	$ 3,128,460
Deferred Inflows of Resources:	$ 67,993

SECTION III – NOTES TO FINANCIAL STATEMENTS

The material presented herein will follow the order presented in GASB 68. Paragraph numbers are provided for ease of reference.

Paragraph 40 (c): The data required regarding the membership of the Connecticut State Employees Retirement System were furnished by the Retirement System. The following table summarizes the membership of the system as of June 30, 2018, the date of the latest valuation.

Membership

Group	Count
Retired participants and beneficiaries currently receiving benefits	50,441
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	1,281
Active Participants	49,153
Total	100,875

Paragraph 41: This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The TPL was determined based on the annual actuarial funding valuation report prepared as of June 30, 2018. The GASB 67 report for the June 30, 2018 measurement date provides the details of the development of the TPL.

The complete set of actuarial assumptions utilized in developing the TPL is outlined in Schedule C. The key actuarial assumptions are summarized below:

Inflation	2.50 percent
Salary increases	3.50 – 19.50 percent, including inflation
Investment rate of return	6.90 percent, net of pension plan investment expense, including inflation

The RP-2014 White Collar Mortality Table projected to 2020 by scale BB at 100% for males and 95% for females is used for the period after service retirement and for dependent beneficiaries. The RP-2014 Disabled Retiree Mortality Table at 65% for males and 85% for females is used for the period after disability. In our opinion, the projection of the mortality rates with Scale BB provide a sufficient margin in the assumed rates of mortality to allow for additional improvement in mortality experience.

Paragraph 42 (a)-(f): The discount rate used to measure the TPL at June 30, 2018 was the long term rate of return, 6.90 percent. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rates and that employer contributions will be made equal to the difference between the projected actuarially determined contribution and member contributions. Projected future benefit payments for all current plan members were projected through the year 2138.

Based on those assumptions, the System's FNP was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the TPL and a municipal bond rate was not used in determining the discount rate.

The long-term expected rate of return on pension plan investments was determined using a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the table below.

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Large Cap U.S. Equities	21.0%	5.8%
Developed Non-U.S. Equities	18.0	6.6
Emerging Markets (Non-U.S.)	9.0	8.3
Real Estate	7.0	5.1
Private Equity	11.0	7.6
Alternative Investment	8.0	4.1
Fixed Income (Core)	8.0	1.3
High Yield Bonds	5.0	3.9
Emerging Market Bond	4.0	3.7
Inflation Linked Bonds	5.0	1.0
Cash	4.0	0.4

Paragraph 42 (g): This paragraph requires disclosure of the sensitivity of the NPL to changes in the discount rate. The following presents NPL of the System, calculated using the discount rate of 6.90 percent, as well as what the System's NPL would be if it were calculated using a discount rate that is 1-percentage-point lower (5.90 percent) or 1-percentage-point higher (7.90 percent) than the current rate: ($ thousands)

	1% Decrease (5.90%)	Current Discount Rate (6.90%)	1% Increase (7.90%)
Net Pension Liability	$25,878,834	$21,686,621	$18,188,677

Paragraph 44: This paragraph requires a schedule of changes in the NPL. The needed information is provided in the table below.

CHANGES IN THE NET PENSION LIABILITY
($ in Thousands)

	Total Pension Liability (TPL) (a)	Fiduciary Net Position (FNP) (b)	Net Pension Liability (NPL) (a) – (b)
Balances at June 30, 2017	33,052,692	11,981,777	21,070,915
Changes for the year:			
Service cost	429,321		429,321
Interest	2,212,890		2,212,890
Change to Benefits	0		0
Difference between expected and actual experience	482,904		482,904
Changes of assumptions			
Contributions - employer		1,443,053	(1,443,053)
Contributions - employee		193,942	(193,942)
Net investment income		875,944	(875,944)
Benefit payments, including refunds of employee contributions	(1,963,644)	(1,963,644)	0
Administrative expense		(391)	391
Other changes	0	(3,139)	3,139
Net changes	1,161,471	545,765	615,706
Balances at June 30, 2018	34,214,163	12,527,542	21,686,621

Paragraph 45 (a): June 30, 2018 is the actuarial valuation date upon which the TPL is based. An expected TPL is determined as of June 30, 2018 using standard roll forward techniques. The procedure used to determine the TPL as of June 30, 2018 is shown on page 5 of the GASB 67 report for the Connecticut State Employees' Retirement System submitted on February 20, 2019.

Paragraph 45 (c): There were no changes to the actuarial assumptions since the prior measurement date.

Paragraph 45 (d): There we no changes to the benefit provisions since the prior measurement date.

Paragraph 45 (g): See Section IV for the annual Pension Expense.

Paragraph 45 (h): Since certain expense items are amortized over closed periods each year, the deferred portions of these items must be tracked annually. If the amounts serve to reduce Pension Expense they are labeled deferred inflows. If they will increase Pension Expense they are labeled deferred outflows. The amortization of these amounts is accomplished on a level dollar basis, with no interest included in the deferred amounts. Experience gains/losses and the impact of changes in actuarial assumptions, if any, are amortized over the average expected remaining service life of the active and inactive System members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five year period.

The table below provides the calculation of the annual investment gain or loss.

Investment Earnings (Gain)/Loss as of June 30, 2018 ($000)		
a.	Expected investment rate of return	6.90%
b.	Beginning of year market value assets (BOY)	11,981,777
c.	End of year market value assets (EOY)	12,527,542
d.	Expected return on BOY for plan year (a x b)	826,743
e.	External Cash Flow	
	Contributions - employer	1,443,053
	Contributions - member	193,942
	Refunds of contributions	(7,659)
	Benefits paid	(1,955,985)
	Admin expenses	(391)
	Other changes	(3,139)
	Net cash flow	(330,179)
f.	Expected return on net cash flow (a. x 0.5 x e.)	(11,378)
g.	Projected earnings for plan year (d. + f.)	815,365
h.	Net investment income (c. – b. – e.)	875,944
i.	**Investment earnings (gain)/loss (g. –h.)**	**(60,579)**
j.	Expensed portion included in Pension Expense (i. x 0.20)	(12,116)

The table below provides a summary of the deferred inflows and outflows as of June 30, 2018 with dollar amounts in thousands.

Source	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$765,459	$0
Changes of assumptions	2,363,001	0
Net difference between projected and actual earnings on Plan investments	0	67,993
Employer contributions subsequent to the measurement date	See note	0
Total	$3,128,460	$67,993

Note: The deferred outflow of resources reported by an employer should include contributions made by the employer during its fiscal year that will be reflected in the net pension liability in the next measurement period.

Paragraph 45 (i): Amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in future Pension Expense as follows:

Deferred Amounts to be recognized in future Reporting Dates

Year:	Amount
2019	1,196,217
2020	1,088,328
2021	647,617
2022	73,506
2023	5
2024	0
Thereafter	0

Amounts reported as deferred outflows of resources related to pensions resulting from employer contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ended June 30, 2018 (Reporting Date). Other amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense. The tables below now provide the details of the source and recognition of deferred amounts as of the measurement date.

Deferred Outflows and Inflows for Differences between Expected and Actual Experience ($ in thousands)

				Balances as of June 30, 2019 (Measurement Date)	
Year	Experience Losses (a)	Experience Gains (b)	Amounts Recognized in Pension Expense through 2018 (c)	Deferred Outflows (a) – (c)	Deferred Inflows (b) – (c)
2018	$482,904	$0	$85,621	$397,283	$0
2017	0	0	0	0	0
2016	772,762	0	404,586	368,176	0
2015	0	0	0	0	0
Total				$765,459	$0

Deferred Outflows and Inflows for Differences from Assumption Changes ($ in thousands)					
				Balances as of June 30, 2019 (Measurement Date)	
Year	**Assumption Losses (a)**	**Assumption Gains (b)**	**Amounts Recognized in Pension Expense through 2018 (c)**	**Deferred Outflows (a) – (c)**	**Deferred Inflows (b) – (c)**
2018	$0	$0	$0	$0	$0
2017	0	0	0	0	0
2016	4,959,705	0	2,596,704	2,363,001	0
2015	0	0	0	0	0
Total				$2,363,001	$0

Deferred Outflows and Inflows for Differences in Investment Experience ($ in thousands)					
				Balances as of June 30, 2019 (Measurement Date)	
Year	**Investment Losses (a)**	**Investment Gains (b)**	**Amounts Recognized in Pension Expense through 2018 (c)**	**Deferred Outflows (a) – (c)**	**Deferred Inflows (b) – (c)**
2018	$0	$60,579	$12,116	$0	$48,463
2017	0	781,025	312,410	0	468,615
2016	852,990	0	511,794	341,196	0
2015	539,449	0	431,560	107,889	0
Total				$449,085	$517,078
Net difference between projected and actual earnings on investments					$67,993

The tables below now provide information as of the plan's measurement dates.

Amortization of Experience (Gain)/Loss Deferrals ($ in thousands)										
	2015 Experience (Gain)/Loss		2016 Experience (Gain)/Loss		2017 Experience (Gain)/Loss		2018 Experience (Gain)/Loss		Total Deferrals	
Fiscal Year End	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**
6/30/2019	$0	$0	$134,862	$368,176	$0	$0	$85,621	$397,283	$220,483	$765,459
6/30/2020	0	0	134,862	233,314	0	0	85,621	311,662	220,483	544,976
6/30/2021	0	0	134,862	98,452	0	0	85,621	226,041	220,483	324,493
6/30/2022	0	0	98,452	0	0	0	85,621	140,420	184,073	140,420
6/30/2023	0	0	0	0	0	0	85,621	54,799	85,621	54,799
6/30/2024	0	0	0	0	0	0	54,799	0	54,799	0

Amortization of Assumption Changes (Decrease)/Increase Deferrals ($ in thousands)										
	2015 Assumption (Decrease)/Increase		2016 Assumption (Decrease)/Increase		2017 Assumption (Decrease)/Increase		2018 Assumption (Decrease)/Increase		Total Deferrals	
Fiscal Year End	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**
6/30/2019	0	0	865,568	2,363,001	0	0	0	0	865,568	2,363,001
6/30/2020	0	0	865,568	1,497,433	0	0	0	0	865,568	1,497,433
6/30/2021	0	0	865,568	631,865	0	0	0	0	865,568	631,865
6/30/2022	0	0	631,865	0	0	0	0	0	631,865	0
6/30/2023	0	0	0	0	0	0	0	0	0	0

Amortization of Investment (Gain)/Loss Deferrals ($ in thousands)												
	2014 Investment (Gain)/Loss		2015 Investment (Gain)/Loss		2016 Investment (Gain)/Loss		2017 Investment (Gain)/Loss		2018 Investment (Gain)/Loss		Total Deferrals	
Fiscal Year End	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**	**Amount Recognized**	**EOY Balance**
6/30/2015	($142,985)	($571,942)	$0	$0	$0	$0	$0	$0	$0	$0	($142,985)	($571,942)
6/30/2016	(142,985)	(428,957)	107,890	431,559	0	0	0	0	0	0	(35,095)	2,602
6/30/2017	(142,985)	(285,972)	107,890	323,669	170,598	682,392	0	0	0	0	135,503	720,089
6/30/2018	(142,985)	(142,987)	107,890	215,779	170,598	511,794	(156,205)	(624,820)	0	0	(20,702)	(40,234)
6/30/2019	(142,987)	0	107,890	107,889	170,598	341,196	(156,205)	(468,615)	(12,116)	(48,463)	(32,820)	(67,993)
6/30/2020	0	0	107,889	0	170,598	170,598	(156,205)	(312,410)	(12,116)	(36,347)	110,166	(178,159)
6/30/2021	0	0	0	0	170,598	0	(156,205)	(156,205)	(12,116)	(24,231)	2,277	(180,436)
6/30/2022	0	0	0	0	0	0	(156,205)	0	(12,116)	(12,115)	(168,321)	(12,115)
6/30/2023	0	0	0	0	0	0	0	0	(12,115)		(12,115)	0

SECTION IV – PENSION EXPENSE

As noted earlier, the Pension Expense (PE) consists of a number of different items. GASB 68 refers to the first as Service Cost which is the Normal Cost using the Entry Age Normal (EAN) actuarial funding method. The second item is interest on the beginning of year TPL and the cash flows during the year at the SEIR in effect as of the previous measurement date.

The next three items refer to any changes that occurred in the TPL due to:

- benefit changes,
- actual versus expected experience or
- changes in actuarial assumptions.

Benefit changes, which are reflected immediately in PE, can be positive, if there is a benefit improvement for existing Plan members, or negative if there is a benefit reduction.

The next item to be recognized is the portion of current year changes in TPL due to actual versus expected experience for the year. The portion to recognize in the current year is determined by spreading the total change over the average expected remaining service life of the entire Plan membership. The remaining service life of active members is the average number of years they are expected to remain active determined as of the beginning of the measurement period. For the year ended June 30, 2018 this number is 11.24. The remaining service life of the inactive members is, of course, zero. Therefore, the figure to use for the amortization is the weighted average of these two amounts, or 5.64. The table below provides the calculation of the average remaining future service life.

Category	Number (1)	Average Years of Future Service Life (2)
a. Active Members	50,019	11.24
b. Inactive Members	49,603	0.00
c. Total	99,622	
Weighted Average Years of Future Service Life [(a1 x a2) + (b1 x b2)]/c1		5.64

Member contributions for the year and projected earnings on the FNP, again at the rate used to calculate the liabilities, are subtracted from the amount determined thus far. The current year portions of previously determined experience, assumption, and investment earnings amounts, recognized as deferred inflows and outflows (see Section IV) are included next. Deferred inflows are subtracted from the PE while deferred outflows are added to the PE. Finally, administrative expenses and other miscellaneous items are included.

The calculation of the Pension Expense is shown in the following table.

Pension Expense
Determined as of the Measurement Date
($ thousands)

Service Cost	$429,321
Interest	2,212,890
Current-period benefit changes	0
Expensed portion of current-period difference between expected and actual experience in the total pension liability	85,621
Expensed portion of current-period changes of assumptions	0
Member contributions	(193,942)
Projected earnings on plan investments	(815,365)
Expensed portion of current-period differences between actual and projected earnings on plan investments	(12,116)
Administrative expense	391
Other	3,139
Recognition of beginning deferred outflows of resources as pension expense	1,000,430
Recognition of beginning deferred inflows of resources as pension expense	(20,702)
Pension Expense	**$2,689,667**

SECTION V – REQUIRED SUPPLEMENTARY INFORMATION

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements.

Paragraph 46: The required tables are provided in Schedule A.

Paragraph 47: In addition the following should be noted regarding the RSI:

Changes of benefit terms:

- 2017
  - A 3-year freeze on all salary increases for fiscal years ending 2017, 2018 and 2019.
  - The annual COLA for those retiring on or after July 1, 2022 is based on the annual rate of increase in CPI-W from 0.0% to 2.0%, plus 60% of the annual rate of increase in CPI-W from 3.33% to 6.0%, plus 75% of the annual rate of increase in CPI-W above 6.0% and with a cap on the COLA rate of 7.5%.
  - A COLA moratorium for those retiring on or after July 1, 2022 for the first 30 months of retirement benefits. If rate of increase in CPI-W exceeds an annualized rate of 5.5% during the initial 18 month period of receiving retirement benefits, the COLA provided beginning with the 31st monthly benefit includes an additional adjustment based on the annual COLA rate as determined above using the annualized rate over the 18 month period. The COLA rate applied is reduced by 2.5% and then multiplied by 1.5 to reflect the 18 month period.
  - Increase to all non-Tier IV members' contribution rates by 1.5% of compensation effective July 1, 2017 and an additional 0.5% of compensation effective July 1, 2019.
  - In years where employer contribution increase due to poor asset returns, half the increase is applied to Tier IV member contribution rate of up to 2% in total.
  - Tier IV Hybrid Plan Structure for All New Hires (Non-Hazardous and Hazardous) after July 1, 2017:

i. Non-Hazardous has same retirement eligibility as Tier III
ii. Non-hazardous benefit multiplier is 1.30% with no breakpoint
iii. Hazardous duty requires 25 years of service to retire
iv. Employees contribute 3% more than Tier III employees into the DB Plan.
v. Employers contribute 1% and employees must contribute at least 1% to DC portion of Hybrid Plan.

Method and assumptions used in calculations of actuarially determined contributions. The actuarially determined contributions in the schedule of employer contributions are calculated as of June 30 each biennium for the fiscal years ending two after the valuation date (fiscal year ending June 30, 2018 contributions are based on June 30, 2016 valuation). The following actuarial methods and assumptions were used to determine the most recent contributions reported in that schedule:

Actuarial cost method	Entry Age Normal
Amortization method	Level percent of pay, closed 5 year phase into level dollar
Single equivalent amortization period	25.1 years
Asset valuation method	5-year smoothed market
Inflation	2.50 percent
Salary increase	3.50 -19.50 percent, including inflation
Investment rate of return	6.90 percent, net of investment related expense

SCHEDULE A

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY
($ in Thousands)

Fiscal Year Ending June 30	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total pension liability										
Service Cost	$ 287,473	$ 310,472	$ 322,114	$ 480,350	$ 429,321					
Interest	1,998,736	2,052,651	2,105,947	2,255,533	2,212,890					
Benefit changes	0	0	0	(1,444,220)	0					
Difference between expected and actual experience	0	0	772,762	0	482,904					
Changes of assumptions	0	0	4,959,705	0	0					
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)	(1,847,715)	(1,955,985)					
Refunds of contributions	(3,935)	(7,124)	(7,098)	(7,972)	(7,659)					
Net change in total pension liability	719,245	705,534	6,424,249	(564,024)	1,161,471					
Total pension liability - beginning	25,767,688	24,486,933	27,192,467	33,616,716	33,052,692					
Total pension liability - ending (a)	$26,486,933	$27,192,467	$33,616,716	$33,052,692	$34,214,163					
Plan net position										
Contributions - employer	$ 1,268,890	$ 1,371,651	$ 1,501,805	$ 1,542,298	$ 1,443,053					
Contributions - member	144,807	187,339	135,029	132,557	193,942					
Net investment income	1,443,391	294,412	(100)	1,509,862	875,944					
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)	(1,847,715)	(1,955,985)					
Administrative expense	0	0	(651)	(674)	(391)					
Refunds of contributions	(3,935)	(7,124)	(7,098)	(7,972)	(7,659)					
Other	0	0	85,608*	(371)	(3,139)					
Net change in plan net position	1,290,124	195,813	(14,588)	1,327,985	545,765					
Plan net position - beginning	9,182,443	10,472,567	10,668,380	10,653,792	11,981,777					
Plan net position - ending (b)	$10,472,567	$10,667,380	$10,653,792	$11,981,777	$12,527,542					
Net pension liability - ending (a) - (b)	$16,014,366	$16,524,087	$22,962,924	$21,070,915	$21,686,621					

SCHEDULE OF THE NET PENSION LIABILITY
($ in Thousands)

Fiscal Year Ending June 30	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total pension liability	$ 26,486,933	$ 27,192,467	$33,616,716	$33,052,692	$34,214,163					
Plan net position	10,472,567	10,668,380	10,653,792	11,981,777	12,527,542					
Net pension liability	$ 16,014,366	$ 16,524,087	$22,962,924	$21,070,915	$21,686,621					
Ratio of plan net position to total pension liability	39.54%	39.23%	31.69%	36.25%	36.62%					
Covered payroll	$ 3,487,577	$ 3,618,361	$ 3,720,751	$ 3,850,978	$ 3,428,068					
Net pension liability as a percentage of covered payroll	459.18%	456.67%	617.16%	547.16%	632.62%					

* Covered payroll equals the total active annual compensation from each year's valuation report.

SCHEDULE OF EMPLOYER CONTRIBUTIONS
($ in Thousands)

Fiscal Year Ending June 30	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined employer contribution	$1,443,110	$1,569,142	$1,514,467	$1,379,189	$1,268,935	$1,059,652	$ 926,372	$ 944,077	$ 897,428	
Actual employer contributions	1,443,053	1,542,298	1,501,805	1,371,651	1,268,890	1,058,113	926,343	825,801	720,527	
Annual contribution deficiency (excess)	$ 57	$ 26,844	$ 12,662	$ 7,538	$ 45	$ 1,539	$ 29	$ 118,276	$ 176,901	
Covered payroll*	$3,428,068	$3,850,978	$3,720,751	$3,618,361	$3,487,577	$3,480,483	$3,354,682	$3,210,666	$3,295,666	
Actual contributions as a percentage of covered payroll	42.10%	40.05%	40.36%	37.91%	36.38%	30.40%	27.61%	25.72%	21.86%	

* Covered payroll equals the total active annual compensation from each year's valuation report.

SCHEDULE B

SUMMARY OF BENEFIT PROVISIONS EVALUATED

The Connecticut State Employees Retirement System (CT SERS) is a defined benefit pension plan established by the Connecticut General Assembly for the purpose of providing retirement allowances and other benefits for State employees in Connecticut, and their survivors and other beneficiaries.

Eligibility Requirements

Tier I	All State Employees, Elected Officials and their Appointees hired prior to July 1, 1984. Those employees hired between July 1, 1982 and January 1, 1984 could elect to move to Tier II.
Tier II	All State Employees, Elected Officials and their Appointees hired on or after July 1, 1984.
Tier IIA	All State Employees, Elected Officials and their Appointees hired on or after July 1, 1997.
Tier III	All State Employees, Elected Officials and their Appointees hired on or after July 1, 2011.
Tier IV	All State Employees, Elected Officials and their Appointees hired on or after July 1, 2017.

Final Average Earnings (FAE)

Tier I, II, and IIA	Average Salary of the three highest paid years of service. Effective January 1, 1986, no one year's earnings can be greater than 130% of the average of the two preceding years in calculating the Final Average Earnings.
Tier III and IV	Average Salary of the five highest paid years of service. No one year's earnings can be greater than 130% of the average of the two preceding years in calculating the Final Average Earnings.

Normal Retirement Benefit

Eligibility	*Tier I Hazardous* – 20 years of credited service.

Tier I Plans B and C – Earliest of age 55 with 25 years of service, age 60 with 10 years of service, or age 70 with 5 years of service.

Tier II Hazardous – 20 years of credited service.

Tier II and IIA – For those who will be eligible for retirement on or before July 1, 2022, the earliest of age 62 with 10 years of vesting service (effective July 1, 1992), age 60 with 25 years of vesting service, age 70 with 5 years of vesting service, or age 62 with 5 years of actual state service for terminations on or after July 1, 1997.

For those who will not be eligible for retirement on or before July 1, 2022, the earliest of age 65 with 10 years of vesting service, age 63 with 25 years of vesting service, age 70 with 5 years of vesting service.

Tier III Hazardous – Earlier of Age 50 and 20 years of benefit service or 25 years of benefit service.

Tier III and IV – Age 63 and 25 years of benefit service or Age 65 and 10 years of benefit service.

Tier IV Hazardous – 25 years of benefit service.

Benefit

Tier I Hazardous – 50% of FAE plus 2% for each year of service in excess of 20.

Tier I Plan B – 2% of FAE times years of service up to age 65. Thereafter, 1% of FAE up to $4,800, plus 2% of FAE in excess of $4,800 times years of service. At age 70, greater of 1.25% of FAE up to $4,800 plus 2.5% of FAE in excess of $4,800 times years of service (maximum 20 years) or 1.0% of FAE up to $4,800 plus 2% of FAE in excess of $4,800 times year of service. Minimum benefit with 25 years is $833.34 per month.

Tier I Plan C – 2% of FAE times years of service. At age 70, greater of 2.5% of FAE times years of service (maximum 20 years) or 2.0% of FAE times years of service. Minimum benefit with 25 years is $833.34 per month.

Tier II,IIA, III and IV Hazardous – 2.5% of FAE times years of service up to 20 years plus 2.0% of FAE times years of service in excess of 20 years, if any. Minimum benefit with 25 years is $360 per month.

Tier II, IIA and III All Others – 1.40% of FAE plus 0.433% of FAE in excess of year's breakpoint*, times years of service from October 1, 1982 up to 35 years plus 1.625% of FAE times years of service in excess of 35 years, if any. Minimum benefit with 25 years if $360 per month.

* $10,700 increased by 6% each year after 1982, rounded to nearest $100 but not greater than Social Security Covered Compensation.

Tier IV All Others – 1.30% of FAE times years of service. Minimum benefit with 25 years if $360 per month.

Early Retirement Benefit

Eligibility

Hazardous – None.

Tier I – Age 55 with 10 years of service.

Tier II and IIA – Age 55 with 10 years of service.

Tier III and IV – Age 58 with 10 years of service.

Benefit

Tier I – Benefit is Normal Retirement Benefit reduced for retirement prior to age 60 with less than 25 years of service.

Tier II, IIA, III and IV – Benefit is Normal Retirement Benefit reduced 0.25% (effective July 1, 1991) for each month prior to age 60 if at least 25 years of service or age 62 if at least 10 but less than 25 years of service.

For those who retire on or after October 2, 2011 but prior to meeting the age and service requirements for a normal retirement, will be subject to a benefit reduced by 0.50% for each month prior to Normal Retirement.

Disability Retirement Benefit

Tier I	For non-service disabilities occurring prior to age 60 with at least 5 years of service, benefit is 3% of FAE times years of service; maximum benefit is 1.667% of FAE times year of service projected to age 65. For service disabilities occurring prior to age 60, benefit is 1.667% of Salary times years of service projected to age 65 (maximum 30 years). Exception: State Police benefit is equal to the normal retirement benefit if more than 20 years of service. State Police also receives an additional benefit of $360 per month plus $300 to spouse plus $300 to a surviving dependent child.
Tier II, IIA, III and IV	Prior to age 65 for service related disability or at any age with at least 10 years of service, benefit is 1.333% of FAE plus 0.50% of FAE in excess of the year's breakpoint, times service projected to age 65 (maximum 30 years).

Deferred Vested Retirement Benefit

Eligibility	*<u>Tier I</u>* - 10 years of service.
	<u>Tier II and IIA</u> – Effective July 1, 1997, 5 years of actual state service, 10 years of vesting service, or age 70 with 5 years of service.
	<u>Tier III and IV</u> – 10 years of benefit service.
Benefit	*<u>Tier I</u>* – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 55.
	<u>Tier II and IIA</u> – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 55.
	<u>Tier III and IV</u> – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 58.

Pre-Retirement Spouse's Benefit

Tier I	State Police – Survivor benefits to spouse of $670 per month plus $300 to a surviving dependent child.
	If eligible for early or normal retirement, 50% of the average of the Life Benefit and the 50% Joint & Survivor Benefit the member would have received.
	If not eligible for retirement but with 25 years of service, the same benefit calculated as though age 55 using service and earnings at death.
	If not eligible for retirement, return of contributions (5% interest).
Tier II, IIA, III and IV	If eligible for early or normal retirement, 50% of the 50% Joint & Survivor Benefit the member would have received.
	If not eligible for retirement but with 25 years of service, the same benefit calculated as though age 55 using service and earnings at death.

	If not eligible for retirement, return of contributions (5% interest).
Tiers I, II, IIA, III and IV	If death is due to employment and there are dependent children under age 18, spouse will be paid $100,000 in 10 annual installments while living and not remarried. In addition, $50 per month will be paid to each child while under age 18. If death is due to employment and there are no dependent children under age 18, spouse will be paid $50,000 in not less than 10 annual installments.
Payment Options	50% or 100% Joint and Survivor (Normal Form if married). Straight life annuity (Normal Form if not married). 10 or 20 year certain and life annuity.
Cost of Living Adjustments (COLA)	Annual adjustments each July 1 of up to 5% for retirements prior to July 1, 1980; 3% for retirements after July 1, 1980. For members (and beneficiaries) not covered by Social Security and age 62 and over, the maximum increase is 6%. For employees retiring after June 30, 1999, the annual adjustment will be 60% of the increase in CPI up to 6% and 75% of the increase in the CPI over 6%. This adjustment will be no less than 2.5% and no greater than 6%. Employees retiring between July 1, 1997 and June 30, 1999 made an irrevocable choice between the above formula and a fixed 3% annual adjustment. An employee from Tier IIA must have at least 10 years of actual state service or directly make the transition into retirement in order to be eligible for annual adjustments. For employees retiring on or after October 2, 2011, the minimum COLA shall be 2.0% and the maximum COLA shall be 7.5%.

For employees retiring on or after July 1, 2022, the annual rate of increase will be the CPI-W from 0.00% to 2.00%, plus 60% of the annual rate of increase in CPI-W from 3.33% to 6.00%, plus 75% of the annual rate of increase in CPI-W above 6.00%, with a cap on the COLA rate of 7.50%. In addition, a COLA moratorium for those retiring on or after July 1, 2022 will be on the first 30 months of retirement. If rate of increase in CPI-W exceeds an annualized rate of 5.5% during the initial 18 month period of receiving retirement benefits, the COLA provided beginning with the 31st monthly benefit includes an additional adjustment based on the annual COLA rate as determined above using the annualized rate over the 18 month period. The COLA rate applied would but reduced by 2.5% and then multiplied by 1.5 to reflect the 18 month period.

Member Contributions*

Tier I – Hazardous	5.5% of earnings up to Social Security Taxable Wage Base plus 6.5% of earnings above that level.
Tier I – Plan B	3.5% of earnings up to Social Security Taxable Wage Base plus 6.5% of earnings above that level.
Tier I – Plan C	6.5% of earnings.
Tier II – Hazardous	5.5% of earnings.
Tier II – All Others	None.
Tier IIA & III – Hazardous	6.5% of earnings.
Tier IIA & III – All Others	3.5% of earnings.
Tier IV – Hazardous	8% of earnings.
Tier IV – All Others	5% of earnings.

* Increased for anyone electing to maintain retirement eligibility. An increase to all non-Tier IV members contribution rates of 1.5% of earnings became effective July 1, 2017 and an additional 0.5% of earnings will be effective July 1, 2019. In years where asset losses require further increases in contributions, Tier IV employees' contributions may increase by half the necessary increase in rates (up to 2.0%). Finally, all Tier IV employees must contribute 1% to the Defined Contributions (DC) portion of the Hybrid Plan and may elect additional contribution of up to 3% of salary to the DC portion.

Hybrid Defined Benefit/Defined Contribution Plan for Employees of Higher Learning

Individuals hired on or after July 1, 2011 otherwise eligible for the Alternate Retirement Plan ("ARP") shall be eligible to be members of the new Hybrid Plan in addition to their existing choices. Individuals who are currently members of the ARP shall be eligible to join the Hybrid Plan on a one time option at the full actuarial cost. The Hybrid Plan shall have defined benefits identical to Tier II/IIA and Tier III for individuals hired on or after July 1, 2011, but shall require employee contributions 3% higher than the contribution required from the Applicable Tier II/IIA/III Plan. An employee shall have the option, upon leaving state service, of accepting the defined benefit amount, or electing to receive a return of his/her contributions to the Hybrid Plan, plus a 5% employer match, plus 4% interest ("cash out option"). In the event the employee elects the cash out option, he/she shall permanently waive any entitlement they may have to health insurance as a retired state employee unless they convert the cash out option to a periodic payment as would be required under the current ARP Plan.

SCHEDULE C

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

Adopted or reaffirmed by the Commission for the June 30, 2016 and later valuations.

VALUATION INTEREST RATE: 6.90% per annum, compounded annually, net of expenses.

SALARY INCREASES: From the Framework Document between the State and SEBAC, we have assumed the rate of wage inflation is 0.00% for fiscal years ending June 30, 2017, 2018 and 2019 for each active member. In addition, we have reduced the rate of increase by one half due to promotion and merit over this same three-year period. Once this three-year period is complete, the assumptions for salary increases are as follows:

Years of Service	Rate*
0	9.50%
1	19.50%
2	9.50%
3	5.75%
4	5.50%
5	5.25%
6	5.00%
7	5.00%
8	5.00%
9	5.00%
10	4.50%
11	4.50%
12	4.50%
13	4.50%
14	4.50%
15+	3.50%

*includes Wage Inflation of 3.50%

COST OF LIVING ADJUSTMENTS (COLA):

Group	Rate
Pre July 1, 1980 Retirees	3.25%
July 1, 1980 – June 30, 1997 Retirees	3.00%
July 1, 1997 – October 1, 2011 Retirees	2.60%
Post October 1, 2011 Retirees	2.25%
Post July 1, 2022 Retirees	1.95%

We have also assumed a COLA moratorium for those retiring on or after July 1, 2022 for the first 30 months of retirement. We assume the first COLA received is increased by 0.15% to reflect the possible additional COLA in the event the annualized rate of increase in the CPI-W is greater than 5.5% during the first 18 months of retirement.

SOCIAL SECURITY WAGE BASE INCREASES: 3.50% per annum.

PAYROLL GROWTH ASSUMPTION: 3.50% per annum.

SEPARATIONS BEFORE SERVICE RETIREMENT: Representative values of the assumed annual rates of separation before service retirement are as follows:

WITHDRAWAL

Annual Rates of Withdrawal								
	Years of Service							
Age	0	1	2	3	4	5	6-9	10+
Hazardous Males								
20	6.00%	3.00%	6.00%	3.00%	2.75%	2.00%	1.25%	1.25%
25	6.00	3.00	6.00	3.00	2.75	2.00	1.25	1.25
30	6.00	3.00	4.00	3.00	2.75	2.00	1.25	1.25
35	6.00	3.00	4.00	3.00	2.00	2.00	1.25	1.25
40	8.75	3.00	4.00	3.50	2.00	2.50	1.25	1.25
45	8.75	4.00	4.00	3.50	2.00	2.50	1.25	1.25
50	8.75	5.50	4.00	3.50	2.00	2.50	1.25	1.25
55+	8.75	6.00	4.00	3.50	2.00	2.50	1.25	1.25
Hazardous Females								
20	10.00%	10.00%	5.00%	2.50%	3.00%	3.50%	2.50%	1.25%
25	10.00	10.00	5.00	2.50	3.00	3.50	2.50	1.25
30	12.00	6.00	5.00	2.50	3.00	3.50	2.50	1.25
35	12.00	5.00	6.00	2.50	4.00	3.50	2.50	1.25
40	12.00	5.00	6.00	2.00	4.00	3.50	2.50	1.25
45	12.00	5.00	5.00	2.00	4.00	3.50	2.50	1.25
50	12.00	8.00	5.00	2.00	4.00	3.50	2.50	1.25
55+	12.00	8.00	5.00	2.00	4.00	3.50	2.50	1.25
Nonhazardous Males								
20	45.0%	40.0%	40.0%	20.0%	20.0%	10.0%	6.0%	5.0%
25	30.0	28.0	19.0	10.0	7.0	10.0	6.0	5.0
30	22.0	20.0	14.0	9.0	6.0	7.0	4.5	5.0
35	20.0	15.0	14.0	8.0	6.0	4.0	4.0	3.0
40	20.0	15.0	10.0	8.0	6.0	4.0	4.0	2.5
45	22.0	12.0	10.0	8.0	6.0	4.0	4.0	2.0
50	22.0	12.0	10.0	8.0	5.0	4.0	4.0	2.0
55+	25.0	19.0	10.0	8.0	4.0	4.0	3.5	2.0
Nonhazardous Females								
20	45.0%	45.0%	45.0%	20.0%	8.0%	10.0%	6.0%	4.0%
25	25.0	23.0	15.0	12.0	8.0	10.0	6.0	4.0
30	20.0	19.0	12.0	9.0	7.0	6.0	5.0	4.0
35	18.0	13.0	11.0	8.0	6.0	5.0	4.0	3.0
40	18.0	13.0	10.0	8.0	5.5	4.0	3.5	2.5
45	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.5
50	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.0
55+	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.0

DISABILITY

Annual Rates of Disability		
Age	**Hazardous**	**Non-Hazardous**
30	0.05%	0.04%
35	0.12	0.05
40	0.18	0.10
45	0.35	0.12
50	0.40	0.20
55	0.50	0.40
60	0.65	0.50
65	0.80	0.60
70	1.35	0.60

RETIREMENT: The assumed annual rates of retirement are shown below.

Annual Rates of Retirement			
Hazardous			
	Tier I, II & IIA		
Age	First Year Eligible	All Years After	Tier III
40	50%	50%	20%
41	30	40	20
42	30	35	20
43	30	30	20
44	30	25	20
45	40	25	20
46	40	25	20
47	40	25	20
48	40	15	20
49	40	15	20
50	40	20	20
51	40	20	20
52	40	20	20
53	40	25	20
54	40	25	20
55	40	25	20
56	40	25	20
57	40	15	20
58	40	25	20
59	40	20	20
60-64	50	30	20
65-69	50	50	20
70-79	100	30	20
80	100	100	100

Annual Rates of Retirement									
Nonhazardous									
Age	Tier I			Tier II & IIA			Tier III		
	Early	First Year	Other Years	Early	First Year	Other Years	Early	First Year	Other Years
55	6.0%	28.0%		4.5%					
56	6.0	10.0	15.0%	4.0					
57	6.0	10.0	12.5	4.0					
58	6.0	10.0	10.0	4.0			5.0%		
59	6.0	10.0	10.0	4.0			7.0		
60		12.5	12.5	4.0	13.5%		9.0		
61		15.0	12.5	4.0	15.0	13.0%	10.0		
62		10.0	20.0		15.0	24.0	12.0		
63		35.0	15.0		15.0	15.0	12.0	32.0%	
64		45.0	10.0		15.0	15.0	12.0	30.0	30.0%
65		65.0	15.0		25.0	15.0		28.0	25.0
66		65.0	20.0		25.0	21.0		25.0	35.0
67		65.0	22.0		25.0	24.0		25.0	35.0
68		65.0	15.0		25.0	18.0		25.0	35.0
69		65.0	15.0		25.0	18.0		25.0	30.0
70		100.0	15.0		50.0	20.0		50.0	30.0
71		100.0	15.0		50.0	24.0		50.0	30.0
72		100.0	15.0		50.0	22.0		50.0	30.0
73		100.0	15.0		50.0	22.0		50.0	30.0
74		100.0	15.0		50.0	22.0		50.0	30.0
75		100.0	15.0		100.0	22.0		100.0	30.0
76		100.0	15.0		100.0	25.0		100.0	30.0
77		100.0	15.0		100.0	22.0		100.0	30.0
78		100.0	15.0		100.0	25.0		100.0	30.0
79		100.0	15.0		100.0	22.0		100.0	30.0
80		100.0	100.0		100.0	100.0		100.0	100.0

We have assumed that the assumed rate of retirement will increase by 20% of the current assumed rates in the year before July 1, 2022 to reflect the potential behavior of future eligible members to avoid the July 1, 2022 COLA change and moratorium.

DEATHS AFTER RETIREMENT: The RP-2014 White Collar Mortality Table projected to 2020 by Scale BB at 100% for males and 95% for females is used for the period after retirement and for dependent beneficiaries. Representative values of the assumed annual rates of mortality are as follows:

Age	Males	Females	Age	Males	Females
40	0.043%	0.031%	65	0.705%	0.579%
45	0.067	0.052	70	1.133	0.933
50	0.272	0.194	75	1.943	1.553
55	0.384	0.250	80	3.407	2.688
60	0.501	0.348	85	6.247	4.826

In our opinion, the projection of the mortality rates with Scale BB provide a sufficient margin in the assumed rates of mortality to allow for additional improvement in mortality experience.

The RP-2014 Disabled Retiree Mortality Table at 65% for males and 85% for females is used for the period after disability.

ASSET METHOD: Market Value of Assets

VALUATION METHOD: Entry Age Normal cost method.

IMPACT OF LONGLEY DECISION: Benefits for members retiring from service on or after the *Longley* decision date are assumed to increase by 0.084% as a result of the revised treatment of longevity pay. Retroactive application of *Longley* has been reflected in this valuation to the extent impacted retiree benefits have been recalculated.

SPOUSES: For members who have elected spouse coverage, husbands are assumed to be three years older than their wives.

PERCENT MARRIED: 80% of active members are assumed to be married with an average of two children who are on average age 12.

OTHER ASSUMPTIONS:

- 20% of Pre-Retirement deaths are assumed to be service related,
- 50% of Tier I Hazardous Employees are assumed to be State Police,
- To take into account State Police Supplemental Benefits and the offset of Workers Compensation, Social Security, and Non-Rehabilitation Earnings, the following minimum and maximum benefits as a percent of salary are assumed for disability benefits:

	Minimum	Maximum
Tier I State Police	60%	80%
All Other Members	40%	60%