



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve



GASB STATEMENT NO. 68 REPORT
FOR THE
CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM
PREPARED AS OF JUNE 30, 2019



www.CavMacConsulting.com



Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

February 19, 2020

Board of Directors
Connecticut State Teachers' Retirement System
765 Asylum Avenue
Hartford, CT 06105

Members of the Board:

Presented in this report is information to assist the Connecticut State Teachers' 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 for the period ending June 30, 2019 (the Measurement Date).

GASB Statement Number 68 establishes accounting and financial reporting requirements for governmental employers that 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, including the Net Pension Liability, was performed as of June 30, 2018. The valuation was based upon data, furnished by the Retirement System staff, for active, inactive and retired members along with pertinent financial information. The liabilities of the June 30, 2018 actuarial valuation were rolled forward to the measurement date of June 30, 2019. The schedules contained within this report for participating employers are based on the expected contribution effort as measured June 30, 2018, the date of the latest biennial valuation.

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 internally consistent and individually reasonable 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 opinion contained herein.



Board of Directors
February 19, 2020
Page 2

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 this report due to such factors as changes in plan experience or changes in economic or demographic assumptions.

Sincerely yours,

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

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

A handwritten signature in blue ink that reads 'Ben Mobley'.

Ben Mobley ASA, FCA, MAAA
Senior Actuary



TABLE OF CONTENTS

<u>Section</u>	<u>Item</u>	<u>Page No.</u>
I	Introduction	1
II	Summary of Collective Amounts	3
III	Notes to Financial Statements	4
IV	Collective Pension Expense	10
V	Required Supplementary Information	12
<u>Schedule</u>		
A	Schedule of Employer Allocations	14
B	Schedule of Pension Amounts by Employer	20
C	Summary of Benefit Provisions Evaluated	26
D	Statement of Actuarial Assumptions and Methods	29



**REPORT OF THE ANNUAL GASB STATEMENT NO. 68
REQUIRED INFORMATION FOR THE
EMPLOYERS PARTICIPATING IN THE
CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM**

PREPARED AS OF JUNE 30, 2019

SECTION I – INTRODUCTION

The Governmental Accounting Standards Board issued Statement No. 68 (GASB 68), “*Accounting and Financial Reporting For Pensions*” in June 2012. GASB 68’s effective date is for an employer’s fiscal year beginning after June 15, 2014. The Connecticut State Teachers’ Retirement System (System) is a cost-sharing multiple employer defined benefit pension plan with a special funding situation.

This report, prepared as of June 30, 2019 (the Measurement Date), presents information to assist the employers participating in System in meeting the requirements of GASB 68 for the fiscal year ending June 30, 2020 (Reporting Date). Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of the System as of June 30, 2018. The results of that valuation were revised to reflect changes contained in the enactment of House Bill 7424 (HB 7424) and detailed in a report dated June 18, 2019.

The Net Pension Liability (NPL) shown in the GASB Statement No. 67 Report for the Connecticut State Teachers’ Retirement System prepared as of June 30, 2019 and submitted February 19, 2020 is the collective NPL used for purposes of GASB 68. Please refer to that report for the derivation of the collective NPL.

Pension Expense (PE) 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 collective 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 and non-employer contributing entities’ financial statements. The development of the collective deferred inflows and outflows is shown in Section III.



The State makes all contributions to the System on behalf of employees of the participating districts. Therefore, participating employers are considered to be in a special funding situation as defined by GASB 68 and the State is treated as a non-employer contributing entity in the System. Since the districts do not contribute directly to the System, there is no NPL or deferred inflows or outflows to report in the financial statements of the districts. However, the notes to the financial statements must disclose the portion of the non-employer contributing entities' total proportionate share of the collective NPL that is associated with the employer. In addition, each district must recognize the total PE associated with the district as well as revenue in an amount equal to the non-employer contributing entities' total proportionate share of the collective PE associated with the district. The State, as a non-employer contributing entity, would report the entire collective amounts of the NPL, Deferred Inflows and Outflows and PE.

Schedule A of this report shows the total amount of employer contributions from the State as support provided to the districts for the year ending June 30, 2019. Schedule A also shows the proportionate share percentages that have been determined based on these contributions.

Based on these percentages we have determined the proportionate share amounts of the NPL associated with each participating employer and the employer PE and revenue for State support for each participating employer. These amounts are shown in Schedule B.

Section II of this report is a summary of the principal results of the collective 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 Section V shows the Required Supplementary Information (RSI).



SECTION II - SUMMARY OF COLLECTIVE AMOUNTS
(\$ IN THOUSANDS)

Valuation Date (VD):	June 30, 2018
Measurement Date (MD):	June 30, 2019
Reporting Date (RD):	June 30, 2020
Single Equivalent Interest Rate (SEIR):	
Long-Term Expected Rate of Return	6.90%
Municipal Bond Index Rate at Measurement Date	3.50%
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%
Collective Net Pension Liability:	
Total Pension Liability (TPL)	\$ 35,566,175
Fiduciary Net Position (FNP)	<u>18,493,455</u>
Net Pension Liability (NPL = TPL – FNP)	\$ 17,072,720
FNP as a percentage of TPL	52.00%
Collective Pension Expense (PE):	\$2,096,821
Collective Deferred Outflows of Resources:	\$4,468,102
Collective Deferred Inflows of Resources:	\$425,400



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. Amounts are shown in aggregate. Please refer to Schedule B of this report for the proportionate share of certain pension amounts as required by GASB 68.

Paragraphs 77 and 78(a)-(f): These paragraphs require information to be disclosed regarding the actuarial assumptions used to measure the TPL. The actuarial demographic assumptions used in the June 30, 2018 valuation were based on the results of an actuarial experience study for the period July 1, 2010 – June 30, 2015. The actuarial economic assumptions used in the June 30, 2018 valuation were based on the results of a study of economic assumptions for use in actuarial valuations report dated April 24, 2019. The complete set of actuarial assumptions utilized in developing the TPL are outlined in Schedule D. The TPL was determined by an actuarial valuation as of June 30, 2018, using the following key actuarial assumptions:

Inflation	2.50 percent
Salary increases	3.25 – 6.50 percent, including inflation
Investment rate of return	6.90 percent, net of pension plan investment expense, including inflation

Mortality rates were based on the RPH-2014 White Collar table with employee and annuitant rates blended from ages 50 to 80, projected to the year 2020 using the BB improvement scale, and further adjusted to grade in increases (5% for females and 8% for males) to rates over age 80 for the period after service retirement and for dependent beneficiaries as well as for active members. The RPH-2014 Disabled Mortality Table projected to 2017 using the MP-2014 improvement scale is used for the period after disability retirement.

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 current capital market assumptions and the target asset allocation as provided by the Treasurer’s Office are shown in the following table:



Capital Market Assumptions			
Asset Class	Expected Return	Target Allocation	Standard Deviation
Public Equity - US Equity	8.1%	20.0%	17.0%
Public Equity - International Developed Equity	8.5%	11.0%	19.0%
Public Equity - Emerging Markets Equity	10.4%	9.0%	24.0%
Fixed Income - Core Fixed Income	4.6%	16.0%	7.0%
Fixed Income - Inflation Linked Bonds	3.6%	5.0%	7.0%
Fixed Income - High Yield	6.5%	6.0%	11.0%
Fixed Income - Emerging Market Debt	5.2%	5.0%	11.0%
Private Equity	9.8%	10.0%	23.0%
Real Estate	7.0%	10.0%	15.0%
Alternative Investments - Real Assets	8.2%	4.0%	17.0%
Alternative Investments - Hedge Funds	5.4%	3.0%	7.0%
Liquidity Fund	2.9%	1.0%	1.0%

The geometric rates of expected return shown in the table above are nominal returns net of investment expenses.

Discount rate. The discount rate used to measure the total pension liability was 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 rate and that State contributions will be made at the actuarially determined rates in future years. Based on those assumptions, the pension plan's fiduciary net position 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 total pension liability.



Paragraph 78 (g): This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of 6.90 percent, as well as what the System’s net pension liability 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%)
Collective net pension liability	\$21,296,573	\$17,072,720	\$13,521,724

Paragraph 80(a): This paragraph requires disclosure of the employer’s proportionate share of the collective NPL and if an employer has a special funding situation the portion of the non-employer contributing entities’ proportional share of the collective NPL that is associated with the employer. These amounts are shown in Schedule B.

Paragraph 80(b): This paragraph requires disclosure of the employer’s proportion (percentage) of the collective NPL and the changes in proportion since the prior measurement date. 100% of the collective NPL is allocated to the State.

Paragraph 80(c): June 30, 2018 is the actuarial valuation date upon which the TPL is based.

Paragraph 80(d): Since the prior valuation, the Board adopted new assumptions in conjunction with HB 7424. The changes in assumptions are summarized below:

- Reduce the inflation assumption from 2.75% to 2.50%.
- Reduce the real rate of return assumption from 5.25% to 4.40% which, when combined with the inflation assumption change results in a decrease in the investment rate of return assumption from 8.00% to 6.90%.
- Increase the annual rate of wage increase assumption from 0.50% to 0.75%.
- Phase in to a level dollar amortization method for the June 30, 2024 valuation.



Paragraph 80(e): Since the prior valuation, HB 7424 made the following provision changes:

- Beginning July 1, 2019, annual interest credited on mandatory contributions set at 4.0%.
- For members retiring on or after July 1, 2019 with a partial refund option election, if 50% of the benefits paid prior to death do not exceed the Member's mandatory contributions plus interest frozen at the date of the benefit commencement, the difference is paid to the Member's beneficiary.

Paragraph 80(f): Not applicable.

Paragraph 80(g): Please see Section IV of this report for the development of the collective pension expense. The PE for each employer is shown in Schedule B.

Paragraph 80(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 collective pension expense they are labeled deferred inflows. If they will increase collective 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 Plan members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five year period.



The table below provides a summary in the difference between projected and actual earnings on plan investments.

Investment Earnings (Gain)/Loss as of June 30, 2019		
(\$ thousands)		
a	Expected asset return rate	8.00%
b	Beginning of year market value assets (BOY)	\$17,946,839
c	End of year market value assets (EOY)	18,493,455
d	Expected return on BOY for plan year (a x b)	1,435,747
	External Cash Flow	
	Contributions - employer	1,292,672
	Contributions - member	309,333
	Refunds of contributions	0
	Benefits paid	(2,066,641)
	Admin expenses	0
	Other changes	<u>(837)</u>
e	Net cash flow	(465,473)
f	Expected return on net cash flow (a x 0.5 x e)	(18,619)
g	Projected earnings for plan year (d + f)	1,417,128
h	Net investment income (c - b - e)	1,012,089
	Investment earnings (gain)/loss (g -h)	405,039

*Other changes are comprised of participating employer contributions for Early Retirement Incentive Plans, service purchases, etc.

The table below provides a summary of the determination of the average expected remaining service life for the entire Plan membership determined at the beginning of the year.

Category	Number (1)	Average Years of Working Lifetime (2)
a. Active Members	50,594	12.60
b. Inactive Members	48,931	0.00
c. Total	99,525	
Weighted Average Years of Working Lifetime [(a1 * a2) + (b1 * b2)]/c1		6.41



The table below provides a summary of the collective deferred inflows and outflows as of the Measurement Date. 100% of these amounts are allocated to the State.

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$0	\$425,400
Changes of assumptions	4,184,542	0
Net difference between projected and actual earnings on plan investments	283,560	0
Employer contributions subsequent to the Measurement Date	<u>0</u>	<u>0</u>
Total	<u>\$4,468,102</u>	<u>\$425,400</u>

Paragraph 80(i): Collective amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in the collective pension expense as follows. 100% of these amounts are allocated to the State.

Deferred Amounts to be Recognized in Fiscal Years Following the Reporting Date:	
Year 1	\$996,173
Year 2	722,748
Year 3	867,225
Year 4	622,819
Year 5	585,821
Year 6	247,916
Year 7	0
Thereafter	0

Paragraph 80(j): The amount of revenue recognized for the support provided by non-employer contributing entities for the participating employers is provided in Schedule B.



SECTION IV – COLLECTIVE PENSION EXPENSE

As noted earlier, the collective 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 actuarial funding method. The second item is interest on the beginning Total Pension Liability (TPL) and the cash flow during the year at the 6.90% rate of return 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, or
- 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. For the year ended June 30, 2019, there was a benefit change to be recognized as a result of the changes made by HB 7424.

The next item to be recognized is the portion of current year changes in TPL due to actual versus expected Plan 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 determined at the beginning of the year. The average expected remaining service life of active members is the average number of years the active members are expected to remain active. For the year ended June 30, 2019 this number of years for the active members is 12.60. The average expected remaining service life of the inactive members is, of course, zero. Therefore, the number of years to use for the amortization is the weighted average for all active and inactive members, or 6.41 years.

The last item under changes in TPL are changes in actuarial assumptions. There were no changes in assumptions since the last measurement date. If there was a change in TPL due to changes in actuarial assumptions, recognition of the change would also be spread over the average expected remaining service life of the plan membership.

Member contributions for the year and projected earnings on the Fiduciary Net Position (FNP), again at the discount rate used to calculate the liabilities, are subtracted from the amount determined thus far. One-fifth of current period differences between projected and actual investment earnings on the FNP are recognized in the pension expense.



The current year portions of previously determined experience, assumption and earnings amounts, recognized as deferred outflows and inflows (see Section III) are included also. Deferred outflows are added to the PE while deferred inflows are subtracted from the PE. Finally, administrative expenses and other miscellaneous items are included.

The calculation of the Collective Pension Expense determined as of the measurement date is shown in the following table:

Collective Pension Expense Determined as of the Measurement Date (\$ thousands)	
Service Cost at end of year	\$463,997
Interest on the TPL and net cash flow	2,406,206
Current-period benefit changes	(224,281)
Expensed portion of current-period difference between expected and actual experience in the total pension liability	0
Expensed portion of current-period changes of assumptions	604,680
Member contributions	(309,333)
Projected earnings on plan investments	(1,417,128)
Expensed portion of current-period differences between projected and actual earnings on plan investments	81,008
Administrative expense	0
Other	837
Recognition of beginning deferred outflows of resources as pension expense	608,887
Recognition of beginning deferred inflows of resources as pension expense	<u>(118,052)</u>
Collective Pension Expense	<u>\$2,096,821</u>



SECTION V – REQUIRED SUPPLEMENTARY INFORMATION

Paragraphs 81(a)-(b): CMC was not required to supply this information.

Paragraph 82:

Changes of benefit terms:

- 2019
 - HB 7424 made the following provision changes:
 - Beginning July 1, 2019, annual interest credited on mandatory contributions set at 4.0%.
 - For members retiring on or after July 1, 2019 with a partial refund option election (Plan N), if 50% of the benefits paid prior to death do not exceed the Member's mandatory contributions plus interest frozen at the date of the benefit commencement, the difference is paid to the Member's beneficiary.
- 2018
 - Beginning January 1, 2018, member contributions increased from 6% to 7% of salary.

Changes of assumptions:

- 2019
 - The Board adopted new assumptions in conjunction with HB 7424. The changes in assumptions are summarized below:
 - Reduce the inflation assumption from 2.75% to 2.50%.
 - Reduce the real rate of return assumption from 5.25% to 4.40% which, when combined with the inflation assumption change results in a decrease in the investment rate of return assumption from 8.00% to 6.90%.
 - Increase the annual rate of wage increase assumption from 0.50% to 0.75%.
 - Phase in to a level dollar amortization method for the June 30, 2024 valuation.
- 2016
 - Rates of withdrawal, disability, retirement, mortality, and assumed rates of salary increase were adjusted to more closely reflect actual and anticipated experience. These assumptions were recommended as part of the Experience Study for the System for the five year period ended June 30, 2015.



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 and three years after the valuation date. The following actuarial methods and assumptions were used to determine the most recent contributions reported in that schedule:

Actuarial cost method	Entry age
Amortization method	Level percent of pay, closed
Single equivalent amortization period	17.6 years
Asset valuation method	4-year smoothed market
Inflation	2.75 percent
Salary increase	3.25-6.50 percent, including inflation
Investment rate of return	8.00 percent, net of investment related expense



SCHEDULE A

CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM
Schedule of Employer Allocations as of June 30, 2019

Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
Andover	\$ 586,446	0.045380%
Ansonia	4,258,986	0.329563%
Ashford	988,724	0.076508%
Avon	8,811,273	0.681821%
Barkhamsted	520,161	0.040250%
Berlin	6,893,243	0.533403%
Bethany	991,823	0.076748%
Bethel	6,469,503	0.500614%
Highville Chtr	590,897	0.045724%
Bloomfield	4,649,366	0.359771%
Bolton	2,124,219	0.164373%
Bozrah	592,280	0.045831%
Branford	8,282,573	0.640910%
Bridgeport	38,038,733	2.943459%
Bristol	17,778,524	1.375712%
Brookfield	6,302,897	0.487722%
Brooklyn	1,798,194	0.139145%
Cldrn Ctr Com Prog	94,098	0.007281%
Canaan	277,246	0.021453%
Canterbury	1,111,909	0.086040%
Canton	3,750,238	0.290196%
Chaplin	468,914	0.036285%
Cheshire	10,622,247	0.821956%
Chester	476,404	0.036864%
Clinton	5,041,563	0.390119%
Colchester	5,839,223	0.451842%
Amistad Acd	810,161	0.062691%
Colebrook	295,254	0.022847%
Columbia	1,329,786	0.102900%
Cornwall	320,847	0.024827%
Coventry	4,107,502	0.317841%
Cromwell	4,452,343	0.344525%
Danbury	23,973,301	1.855068%
Darien	14,409,256	1.114997%
Deep River	522,280	0.040414%
Derby	2,960,569	0.229091%
Eastford	410,635	0.031775%
East Granby	2,583,017	0.199875%



Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
East Haddam	\$ 2,992,790	0.231584%
East Hampton	4,978,983	0.385277%
East Hartford	17,031,745	1.317926%
East Haven	6,338,693	0.490492%
East Lyme	6,726,547	0.520504%
Easton	2,337,985	0.180915%
East Windsor	3,399,482	0.263054%
Ellington	5,976,062	0.462431%
Enfield	11,861,146	0.917822%
Essex	684,021	0.052930%
Fairfield	27,251,773	2.108758%
Farmington	10,426,511	0.806809%
Franklin	408,823	0.031635%
Glastonbury	14,946,709	1.156585%
Granby	4,422,470	0.342213%
Greenwich	30,779,115	2.381706%
Griswold	3,981,293	0.308075%
Groton	11,605,121	0.898011%
Guilford	8,358,024	0.646749%
Hamden	14,787,708	1.144281%
Hampton	340,833	0.026374%
Hartford	43,748,665	3.385297%
Hartland	503,258	0.038942%
Hebron	1,745,378	0.135058%
Kent	620,852	0.048042%
Killingly	5,064,521	0.391896%
Lebanon	2,579,561	0.199608%
Ledyard	5,639,874	0.436417%
Lisbon	986,305	0.076321%
Litchfield	2,721,111	0.210561%
Madison	7,765,858	0.600927%
Manchester	16,254,929	1.257816%
Mansfield	3,592,709	0.278006%
Marlborough	1,268,085	0.098125%
Meriden	17,656,680	1.366284%
Middletown	11,482,758	0.888542%
Milford	16,196,586	1.253301%
Monroe	8,690,107	0.672445%
Montville	5,875,357	0.454638%
Naugatuck	9,306,242	0.720122%
New Britain	23,056,309	1.784110%
New Canaan	13,148,343	1.017426%
New Fairfield	6,228,033	0.481929%



Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
New Hartford	\$ 1,016,904	0.078689%
New Haven	47,270,760	3.657839%
Newington	10,221,403	0.790938%
New London	7,146,676	0.553014%
New Milford	8,773,710	0.678915%
Newtown	10,922,616	0.845198%
Norfolk	265,354	0.020533%
North Branford	4,301,120	0.332823%
North Canaan	629,053	0.048676%
North Haven	8,054,665	0.623275%
No.Stonington	1,989,263	0.153930%
Norwalk	29,169,572	2.257158%
Norwich	6,209,024	0.480458%
NFA	5,119,660	0.396162%
Old Saybrook	3,834,756	0.296736%
Orange	3,080,643	0.238382%
Oxford	4,083,519	0.315985%
Plainfield	4,572,176	0.353798%
Plainville	5,543,842	0.428986%
Plymouth	3,174,273	0.245627%
Pomfret	889,170	0.068804%
Portland	3,055,546	0.236440%
Preston	1,113,802	0.086187%
Putnam	2,754,487	0.213144%
Redding	3,172,707	0.245506%
RSD 1	2,077,218	0.160736%
RSD 4	2,254,277	0.174437%
RSD 5	6,176,437	0.477936%
RSD 6	2,502,499	0.193645%
RSD 7	2,505,536	0.193880%
RSD 8	3,657,073	0.282986%
Ridgefield	13,667,016	1.057562%
Rocky Hill	6,587,307	0.509730%
Salem	985,951	0.076293%
Salisbury	785,730	0.060800%
Scotland	340,920	0.026381%
Seymour	5,080,455	0.393129%
Sharon	533,966	0.041319%
Shelton	11,721,693	0.907031%
Sherman	1,060,632	0.082072%
Simsbury	10,897,090	0.843223%
Somers	3,570,030	0.276251%
Southington	13,918,417	1.077015%



Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
S. Windsor	\$ 10,753,391	0.832104%
Sprague	613,033	0.047437%
Stafford	3,597,416	0.278370%
Stamford	43,868,549	3.394574%
SDE	11,037,109	0.854058%
DCF Recq Home	487,283	0.037706%
Sterling	716,167	0.055417%
Stonington	5,148,074	0.398361%
Stratford	16,751,121	1.296211%
Suffield	5,695,683	0.440735%
Thomaston	2,085,231	0.161356%
Thompson	2,341,982	0.181224%
Tolland	5,154,314	0.398844%
Torrington	9,133,592	0.706763%
Trumbull	17,168,514	1.328510%
Union	190,962	0.014777%
Vernon	7,887,966	0.610375%
Voluntown	726,263	0.056199%
Wallingford	16,250,488	1.257472%
Waterbury	36,618,648	2.833572%
Waterford	7,342,992	0.568205%
Watertown	5,597,129	0.433109%
Westbrook	2,518,569	0.194888%
W.Hartford	23,927,392	1.851515%
West Haven	13,514,875	1.045789%
Weston	7,193,053	0.556603%
Westport	17,696,750	1.369385%
Wethersfield	8,492,344	0.657142%
Willington	1,177,752	0.091135%
Wilton	11,846,765	0.916709%
Winchester	1,585,304	0.122672%
Windham	7,818,725	0.605017%
Windsor	9,826,537	0.760383%
Windsor Locks	5,010,581	0.387722%
Winsted/Gilbert	1,265,573	0.097931%
Wolcott	5,132,439	0.397151%
Woodbridge	2,070,210	0.160194%
Woodstock	1,538,327	0.119037%
Woodstock Ad	2,449,954	0.189579%
UCONN	466,158	0.036072%
RSD 9	2,920,810	0.226014%
CCI Somers	-	0.000000%
RSD 10	5,594,706	0.432922%



Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
Supervision District	\$ 1,073,396	0.083060%
NWCTC	124,851	0.009661%
MCTC	334,918	0.025916%
Norwalk CTC	193,828	0.014999%
WCSU	383,320	0.029661%
CCSU	943,392	0.073000%
ESCU	273,257	0.021145%
SCSU	831,643	0.064353%
RSD 11	713,709	0.055227%
CCTC	37,391	0.002893%
Hou CTC	343,550	0.026584%
Naug CTC	396,965	0.030717%
MCTC	109,950	0.008508%
Ed Connection	797,339	0.061699%
RSD 12	2,615,754	0.202409%
Gateway CTC	536,877	0.041544%
RSD 13	4,850,534	0.375337%
RSD 14	4,623,201	0.357746%
CCI Cheshire	17,352	0.001343%
Shared Svcs	496,994	0.038458%
CREC	24,920,059	1.928329%
RSD 15	9,039,573	0.699487%
RSD 16	4,961,680	0.383938%
TRCC (Mohegan)	142,916	0.011059%
Tunxis CTC	161,033	0.012461%
QVCC	46,645	0.003609%
Odyssey	581,237	0.044976%
CES	3,680,915	0.284831%
ACES	6,877,731	0.532203%
Project Learn	4,918,785	0.380618%
RSD 17	5,033,807	0.389519%
Asnun CTC	50,666	0.003921%
Project O	-	0.000000%
RSD 18	3,908,055	0.302408%
DCF Mental Health	-	0.000000%
EASTCONN	2,224,634	0.172143%
BSBE	339,409	0.026264%
RSD 19	3,057,406	0.236584%
UConn Health	338,317	0.026179%
CCI Suffield	-	0.000000%
CCI Niantic	21,639	0.001674%
Children's CTR	341,016	0.026388%
Bridges Academy	462,216	0.035767%



Employers	2019 Expected Employer Contribution Effort for Allocation Purposes	Employer Allocation Percentage
Common Ground	\$ 413,228	0.031976%
Explorations	301,518	0.023332%
Intergrated Day	551,575	0.042681%
Isaac	502,337	0.038871%
Jumoke Academy	967,061	0.074832%
Side by Side	356,637	0.027597%
Trailblazers Academy	300,810	0.023277%
New Beginnings	700,707	0.054221%
Elm City CP	498,504	0.038574%
Stamford Academy	192,147	0.014868%
Park City	509,577	0.039431%
AF Bridgeport Academy	473,725	0.036657%
SERC	32,483	0.002514%
AF Hartford Acad	1,071,026	0.082877%
Brass City	199,803	0.015461%
Path Academy	183,470	0.014197%
Great Oaks Charter	203,362	0.015736%
Booker T. Washington(BTW)	316,672	0.024504%
Capitol Prep Harbor	331,567	0.025657%
Stamford Charter Excellance	200,159	0.015488%
Total	\$ 1,292,314,000	100.000000%



SCHEDULE B

**CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM
Schedule of Pension Amounts by Employer as of June 30, 2019**

Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
Andover	\$ 7,747,521	\$ 951,528
Ansonia	56,265,332	6,910,342
Ashford	13,062,008	1,604,237
Avon	116,405,455	14,296,574
Barkhamsted	6,871,833	843,978
Berlin	91,066,420	11,184,508
Bethany	13,102,943	1,609,265
Bethel	85,468,406	10,496,977
Highville Chtr	7,806,317	958,749
Bloomfield	61,422,629	7,543,746
Bolton	28,062,991	3,446,614
Bozrah	7,824,588	960,993
Branford	109,420,810	13,438,740
Bridgeport	502,528,522	61,719,068
Bristol	234,871,528	28,846,227
Brookfield	83,267,380	10,226,653
Brooklyn	23,755,883	2,917,627
Cldrn Ctr Com Prog	1,243,121	152,676
Canaan	3,662,689	449,841
Canterbury	14,689,389	1,804,107
Canton	49,544,282	6,084,882
Chaplin	6,194,807	760,828
Cheshire	140,330,173	17,234,937
Chester	6,293,759	772,981
Clinton	66,603,926	8,180,097
Colchester	77,141,798	9,474,328
Amistad Acd	10,703,014	1,314,513
Colebrook	3,900,586	479,058
Columbia	17,567,758	2,157,620
Cornwall	4,238,701	520,585
Coventry	54,264,077	6,664,554
Cromwell	58,819,764	7,224,070
Danbury	316,710,533	38,897,451
Darien	190,360,237	23,379,482
Deep River	6,899,827	847,416
Derby	39,111,989	4,803,619
Eastford	5,424,890	666,269
East Granby	34,124,153	4,191,028



Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
East Haddam	\$ 39,537,660	\$ 4,855,899
East Hampton	65,777,196	8,078,561
East Hartford	225,005,852	27,634,554
East Haven	83,740,282	10,284,734
East Lyme	88,864,208	10,914,039
Easton	30,887,051	3,793,456
East Windsor	44,910,454	5,515,769
Ellington	78,949,572	9,696,353
Enfield	156,697,228	19,245,090
Essex	9,036,579	1,109,846
Fairfield	360,022,323	44,216,877
Farmington	137,744,312	16,917,349
Franklin	5,400,946	663,328
Glastonbury	197,460,513	24,251,517
Granby	58,425,114	7,175,600
Greenwich	406,621,933	49,940,104
Griswold	52,596,737	6,459,776
Groton	153,314,894	18,829,682
Guilford	110,417,597	13,561,163
Hamden	195,359,950	23,993,532
Hampton	4,502,740	553,013
Hartford	577,962,248	70,983,615
Hartland	6,648,520	816,552
Hebron	23,058,134	2,831,932
Kent	8,202,057	1,007,352
Killingly	66,907,234	8,217,349
Lebanon	34,078,497	4,185,420
Ledyard	74,508,198	9,150,877
Lisbon	13,030,038	1,600,311
Litchfield	35,948,513	4,415,090
Madison	102,594,513	12,600,355
Manchester	214,743,358	26,374,144
Mansfield	47,463,161	5,829,285
Marlborough	16,752,634	2,057,509
Meriden	233,261,847	28,648,530
Middletown	151,698,358	18,631,144
Milford	213,972,588	26,279,481
Monroe	114,804,732	14,099,978
Montville	77,619,156	9,532,955
Naugatuck	122,944,478	15,099,677
New Britain	304,596,175	37,409,602
New Canaan	173,702,347	21,333,609
New Fairfield	82,278,348	10,105,183



Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
New Hartford	\$ 13,434,289	\$ 1,649,960
New Haven	624,492,535	76,698,327
Newington	135,034,640	16,584,555
New London	94,414,517	11,595,712
New Milford	115,909,211	14,235,627
Newtown	144,298,337	17,722,295
Norfolk	3,505,583	430,545
North Branford	56,821,962	6,978,705
North Canaan	8,310,399	1,020,659
North Haven	106,409,929	13,068,953
No.Stonington	26,280,093	3,227,643
Norwalk	385,358,313	47,328,569
Norwich	82,027,227	10,074,342
NFA	67,635,668	8,306,813
Old Saybrook	50,660,836	6,222,014
Orange	40,698,277	4,998,442
Oxford	53,947,241	6,625,641
Plainfield	60,402,877	7,418,503
Plainville	73,239,529	8,995,062
Plymouth	41,935,227	5,150,361
Pomfret	11,746,798	1,442,707
Portland	40,366,719	4,957,721
Preston	14,714,403	1,807,179
Putnam	36,389,446	4,469,244
Redding	41,914,530	5,147,819
RSD 1	27,442,066	3,370,353
RSD 4	29,781,184	3,657,637
RSD 5	81,596,716	10,021,467
RSD 6	33,060,442	4,060,386
RSD 7	33,100,552	4,065,312
RSD 8	48,313,482	5,933,719
Ridgefield	180,554,527	22,175,173
Rocky Hill	87,024,703	10,688,117
Salem	13,025,364	1,599,737
Salisbury	10,380,261	1,274,873
Scotland	4,503,884	553,154
Seymour	67,117,735	8,243,202
Sharon	7,054,214	866,378
Shelton	154,854,921	19,018,824
Sherman	14,011,982	1,720,910
Simsbury	143,961,121	17,680,879
Somers	47,163,558	5,792,489
Southington	183,875,769	22,583,078



Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
S. Windsor	\$ 142,062,712	\$ 17,447,722
Sprague	8,098,759	994,666
Stafford	47,525,347	5,836,923
Stamford	579,546,040	71,178,131
SDE	145,810,909	17,908,065
DCF Recq Home	6,437,486	790,633
Sterling	9,461,265	1,162,005
Stonington	68,011,051	8,352,916
Stratford	221,298,534	27,179,232
Suffield	75,245,493	9,241,429
Thomaston	27,547,926	3,383,355
Thompson	30,939,852	3,799,941
Tolland	68,093,479	8,363,040
Torrington	120,663,593	14,819,546
Trumbull	226,812,709	27,856,466
Union	2,522,794	309,842
Vernon	104,207,675	12,798,479
Voluntown	9,594,634	1,178,385
Wallingford	214,684,684	26,366,938
Waterbury	483,767,820	59,414,934
Waterford	97,008,042	11,914,241
Watertown	73,943,493	9,081,521
Westbrook	33,272,735	4,086,459
W.Hartford	316,104,035	38,822,963
West Haven	178,544,596	21,928,319
Weston	95,027,203	11,670,960
Westport	233,791,211	28,713,545
Wethersfield	112,192,091	13,779,101
Willington	15,559,240	1,910,940
Wilton	156,507,242	19,221,757
Winchester	20,943,408	2,572,207
Windham	103,292,937	12,686,133
Windsor	129,818,072	15,943,872
Windsor Locks	66,194,635	8,129,829
Winsted/Gilbert	16,719,445	2,053,433
Wolcott	67,804,494	8,327,547
Woodbridge	27,349,477	3,358,982
Woodstock	20,322,785	2,495,984
Woodstock Ad	32,366,266	3,975,129
UCONN	6,158,405	756,357
RSD 9	38,586,726	4,739,108
CCI Somers	-	-
RSD 10	73,911,482	9,077,590



Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
Supervision District	\$ 14,180,597	\$ 1,741,619
NWCTC	1,649,400	202,574
MCTC	4,424,594	543,416
Norwalk CTC	2,560,657	314,492
WCSU	5,064,023	621,948
CCSU	12,463,126	1,530,684
ESCU	3,609,988	443,368
SCSU	10,986,805	1,349,367
RSD 11	9,428,790	1,158,016
CCTC	493,969	60,668
Hou CTC	4,538,631	557,421
Naug CTC	5,244,295	644,089
MCTC	1,452,541	178,397
Ed Connection	10,533,621	1,293,708
RSD 12	34,556,644	4,244,145
Gateway CTC	7,092,662	871,100
RSD 13	64,080,249	7,870,147
RSD 14	61,076,960	7,501,292
CCI Cheshire	229,233	28,154
Shared Svcs	6,565,769	806,388
CREC	329,218,126	40,433,597
RSD 15	119,421,515	14,666,997
RSD 16	65,548,597	8,050,485
TRCC (Mohegan)	1,888,061	231,886
Tunxis CTC	2,127,407	261,282
QVCC	616,220	75,682
Odyssey	7,678,702	943,076
CES	48,628,454	5,972,403
ACES	90,861,496	11,159,340
Project Learn	64,981,920	7,980,887
RSD 17	66,501,471	8,167,514
Asnun CTC	669,344	82,207
Project O	-	-
RSD 18	51,629,190	6,340,945
DCF Mental Health	-	-
EASTCONN	29,389,564	3,609,539
BSBE	4,483,926	550,702
RSD 19	40,391,302	4,960,740
UConn Health	4,469,490	548,930
CCI Suffield	-	-
CCI Niantic	285,870	35,110
Children's CTR	4,505,154	553,310
Bridges Academy	6,106,319	749,960



Employers	State's Proportionate Share Of the Net Pension Liability Associated with the District	Pension Expense and Revenue For State Support
Common Ground	\$ 5,459,143	\$ 670,476
Explorations	3,983,344	489,223
Intergrated Day	7,286,834	894,947
Isaac	6,636,353	815,057
Jumoke Academy	12,775,817	1,569,088
Side by Side	4,711,514	578,654
Trailblazers Academy	3,973,997	488,075
New Beginnings	9,257,024	1,136,920
Elm City CP	6,585,714	808,838
Stamford Academy	2,538,454	311,765
Park City	6,732,002	826,805
AF Bridgeport Academy	6,258,363	768,634
SERC	429,126	52,704
AF Hartford Acad	14,149,296	1,737,775
Brass City	2,639,598	324,188
Path Academy	2,423,815	297,686
Great Oaks Charter	2,686,609	329,961
Booker T. Washington(BTW)	4,183,540	513,810
Capitol Prep Harbor	4,380,315	537,977
Stamford Charter Excellance	2,644,299	324,765
Total	\$ 17,072,720,000	\$ 2,096,821,000



SCHEDULE C

SUMMARY OF BENEFIT PROVISIONS EVALUATED

Covered Employees

Any teacher, principal, superintendent or supervisor engaged in service of public schools, plus professional employees at State schools of higher education if they choose to be covered.

Annual Salary

Annual Salary rate for service as a Connecticut teacher during a school year excluding amounts paid for extra duty assignments, coaching, unused sick time, unused vacation or terminal pay.

Average Annual Salary

Average of Annual Salary received during three years of highest salary.

Credited Service

One month for each month of service as a teacher in Connecticut public schools, maximum 10 months for each school year. Ten months of credited service constitutes one year of Credited Service. Certain other types of teaching service, State employment, or war-time military service may be purchased prior to retirement, if the Member pays one-half the cost.

Normal Retirement

Eligibility - Age 60 with 20 years of Credited Service in Connecticut, or 35 years of Credited Service including at least 25 years of service in Connecticut.

Benefit - 2% of Average Annual Salary times years of Credited Service (maximum benefit is 75% of Average Annual Salary)

In addition, amounts derived from the accumulation of mandatory contributions made prior to July 1, 1989 and voluntary contributions by the teacher are payable.

Minimum Benefit: Effective January 1, 1999, Public Act 98-251 provides a minimum monthly retirement benefit of \$1,200 to teachers who retire under the Normal Retirement provisions and who have completed at least 25 years of full time Connecticut service at retirement.

Early Retirement

Eligibility - 25 years of Credited Service including 20 years of Connecticut service, or age 55 with 20 years of Credited Service including 15 years of Connecticut service.

Benefit - Reduced normal retirement benefit. The early retirement factors currently in effect are 6% per year for the first five years by which early retirement precedes the minimum normal retirement age and 4% per year for the next five years by which early retirement precedes the minimum normal retirement age. Effective July 1, 1999, the reduction for individuals with 30 or more years of service is 3% for each year by which early retirement precedes the minimum retirement age.



Proratable Retirement

Eligibility - Age 60 with 10 years of Credited Service.

Benefit - 2% less 0.1% for each year less than 20 years of Average Annual Salary times years of Credited Service in Connecticut, plus 1% of Average Annual Salary times years of additional Credited Service time.

Disability Retirement

Eligibility - 5 years of Credited Service in Connecticut if not incurred in the performance of duty and no service requirement if incurred in the performance of duty.

Benefit - 2% of Average Annual Salary times Credited Service to date of disability, but not less than 15% of Average Annual Salary, nor more than 50% of Average Annual Salary. In addition, disability benefit under this plan (without regard to any cost-of-living adjustments) plus any initial award of Social Security benefits and workers' compensation cannot exceed Average Annual Salary.

Termination of Employment

Less than 5 years of Credited Service - Return mandatory contributions with interest.

5 or more years of Credited Service - Return employee mandatory contributions with interest and 1% contributions made prior to July 1, 1989 without interest.

10 or more years of Credited Service - Member is 100% vested in the accrued benefit based on Credited Service and Average Annual Salary as of the date of termination of covered employment. Benefits are payable at age 60 and early retirement reductions are based on the number of years of service the member would have had if they had continued to work until age 60.

Member may elect return of all contributions plus interest on employee mandatory contributions in lieu of vested benefit.

Pre-Retirement Death Benefits

A lump sum plus one of the following: survivor's benefit, return of all contributions with interest, or surviving spouse's benefit.

- Lump Sum: \$1,000 for the first 5 years of Connecticut service plus \$200 per year thereafter. Maximum benefit: \$2,000.
- Survivor's Benefit: For active teachers who die while in service, the family maximum benefit payable to survivors is \$1,500 per month. Each minor child is entitled to \$300 per month. The surviving spouse's benefit is \$300 per month if the member has 12 or less years of service. For each additional year of service, the surviving spouse's monthly benefit is increased \$25, up to a maximum of \$600.
- Accumulated contributions with interest plus dependent children's benefits as described in the "Survivor's Benefit" paragraph.
- Surviving Spouse's Benefit: An active member who is eligible for immediate retirement and who has named his or her spouse as primary beneficiary will be covered by a 100% Plan D co-participant option in the event of his or her death prior to retirement.



Benefit Options

Normal form: Partial Refund Option – For any member who retires prior to July 1, 2019, 75% of total benefit is paid as a life annuity. If 25% of the benefits paid prior to death do not exceed the Member's mandatory contributions plus interest frozen at the date of the benefit commencement, the difference is paid to the Member's beneficiary. For members retiring on or after July 1, 2019, 50% of total benefit is paid as a life annuity. If 50% of the benefits paid prior to death do not exceed the Member's mandatory contributions plus interest frozen at the date of the benefit commencement, the difference is paid to the Member's beneficiary.

Optional Forms: 5-, 10-, 20-, or 25-year certain and life and 33-1/3%, 50%, 66-2/3%, 75%, or 100% co-participant annuity (if co-participant dies first, benefit reverts to unreduced amount). Amounts payable under the optional forms are determined on an actuarially equivalent basis as set by the board.

Cost-of-Living Allowance

For teachers who retired prior to September 1, 1992, pension benefit adjustments are made in accordance with increases in the Consumer Price Index, with a minimum of 3% and a maximum of 5% per annum.

For teachers who were members of the Teachers' Retirement System before July 1, 2007, and retire on or after September 1, 1992, pension benefit adjustments are made that are consistent with those provided for Social Security benefits on January 1 of the year granted, with a maximum of 6% per annum. If the return on assets in the previous year was less than 8.5%, the maximum increase is 1.5%.

For teachers who were members of the Teachers' Retirement System after July 1, 2007, pension benefit adjustments are made that are consistent with those provided for Social Security benefits on January 1 of the year granted, with a maximum of 5% per annum. If the return on assets in the previous year was less than 11.5%, the maximum increase is 3%, and if the return on the assets in the previous year was less than 8.5%, the maximum increase is 1.0%.

Teachers' Mandatory Contribution

Effective July 1, 1992, each teacher is required to contribute 6% of annual salary for the pension benefit. Beginning January 1, 2018, each teacher is required to contribute 7% of annual salary. Beginning July 1, 2019, annual interest credited on mandatory contributions set at 4.0%.

State Contribution

The State's contribution requirement is determined in accordance with Section 10-183z (which reflects Public Act 79-436 as amended)

Early Retirement Incentive

A local or regional board of education may establish a retirement incentive plan. The plan shall provide for purchase of additional credited service by a board of education and a member of the system who chooses to participate in the plan, of additional credited service for such member and for payment by the board of education of not less than fifty per cent of the entire cost of such total cost. Any such plan shall specify a maximum number of years to be purchased, not to exceed five. Members must have attained age 50 and be eligible for retirement with the additional purchased service. The amount of service purchased cannot exceed the lesser of five years and one-fifth of the member's credited service.



SCHEDULE D

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

Investment Rate of Return

Assumed annual rate of 6.90% net of investment expenses.

Rates of Annual Salary Increase

Rates of Annual Salary Increase Assumption	
Years of Service	
0	6.50%
1	6.50
2	6.25
3	6.25
4	6.25
5	6.25
6	6.25
7	6.25
8	6.25
9	6.25
10	5.50
11	5.50
12	5.00
13	5.00
14	5.00
15	4.75
16	4.50
17	4.25
18	4.00
19	3.75
20	3.50
21+	3.25



Active Member Decrement Rates

a. Table below provides a summary of the assumed rates of service retirement.

Annual Rates of Retirement						
Age	Unreduced		Proratable		Reduced	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	27.5%	27.5%			1.00%	1.00%
55	38.5%	27.5%			4.00%	4.75%
60	22.0%	27.5%	6.0%	5.5%		
65	36.3%	32.5%	13.0%	12.5%		
70	100.0%	32.5%	30.0%	14.5%		
75	100.0%	32.5%	30.0%	18.0%		
80	100.0%	100.0%	100.0%	100.0%		

b. Table below provides a summary of the assumed rates of mortality while actively employed and disability.

Annual Rates of Death and Disability				
Age	Pre-Retirement Mortality		Disability	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	0.0377%	0.0147%	0.0341%	0.0500%
25	0.0412%	0.0162%	0.0341%	0.0500%
30	0.0404%	0.0205%	0.0341%	0.0410%
35	0.0448%	0.0272%	0.0341%	0.0410%
40	0.0539%	0.0375%	0.0536%	0.0720%
45	0.0818%	0.0622%	0.1219%	0.1200%
50	0.1476%	0.1116%	0.2438%	0.2630%
55	0.2800%	0.1927%	0.5363%	0.4380%
60	0.4557%	0.2914%	0.9604%	0.5000%
64	0.6572%	0.4272%		



- c. Table below provides a summary of the assumed rates of withdrawal for active members prior to eligibility for retirement.

Annual Rates of Withdrawal					
10 or more years of service					
Years of Service	Male	Female	Age	Male	Female
0	14.00%	12.00%	25	1.50%	4.00%
1	11.00	10.50	30	1.50	4.00
2	8.00	8.75	35	1.50	3.50
3	6.50	7.50	40	1.50	2.30
4	4.50	6.75	45	1.59	1.50
5	3.50	6.00	50	2.04	2.00
6	3.00	5.25	55	3.44	2.50
7	2.75	4.75	59	4.00	2.90
8	2.50	4.25			
9	2.50	4.00			

Post-Retirement Mortality

For healthy retirees and beneficiaries, the RPH-2014 White Collar table with employee and annuitant rates blended from ages 50 to 80 projected to the year 2020 using the BB improvement scale and further adjusted to grade in increases (5% for females and 8% for males) to rates over age 80. For disabled retirees, the RPH-2014 Disabled Mortality table projected to 2017 using the MP-2014 improvement scale. The following are sample rates for the retirees, beneficiaries, and disabled:

Annual Rates of Death				
Age	Healthy		Disabled	
	Male	Female	Male	Female
50	0.1476%	0.1116%	1.8406%	1.1487%
55	0.2800%	0.1927%	2.2661%	1.3727%
60	0.4557%	0.2914%	2.7070%	1.5886%
65	0.7214%	0.4747%	3.2573%	1.9356%
70	1.1906%	0.8584%	4.0909%	2.6165%
75	2.0499%	1.5897%	5.4230%	3.8159%
80	3.6764%	2.9756%	7.5768%	5.7047%
85	6.9254%	5.4419%	11.1066%	8.5219%

Marriage Assumption

85% of males and 75% of females assumed to be married, with female spouses 3 years younger than males.

Asset Valuation Method

Market value of assets is used for GASB 67 disclosure purposes.



Actuarial Cost Method

The Entry Age Normal actuarial cost method allocates the plan's actuarial present value of future benefits to various periods based upon service. The portion of the present value of future benefits allocated to years of service prior to the valuation date is the actuarial accrued liability, and the portion allocated to years following the valuation date is the present value of future normal costs. The normal cost is determined for each active member as the level percent of payroll necessary to fully fund the expected benefits to be earned over the career of each individual active member. The normal cost is partially funded with active member contributions with the remainder funded by employer contributions.

The unfunded accrued liability is determined by subtracting the actuarial value of assets from the actuarial accrued liability. The UAAL as of June 30, 2018 is amortized as a level percent of pay and will grade to a level dollar method beginning with the June 30, 2024 valuation. Future changes to the UAAL will be amortized utilizing layered 25-year closed amortization bases established at the end of each plan year.

Future Cost-of-living Increases

Members who retired prior to September 1, 1992 are assumed to receive an annual Cost-of-Living Adjustment (COLA) of 3.0%. Members who retired on or after September 1, 1992 and were hired prior to July 1, 2007 are assumed to receive an annual Cost-of-Living Adjustment (COLA) of 2.0%. Members who retired on or after September 1, 1992 and were hired on or after July 1, 2007 are assumed to receive an annual Cost-of-Living Adjustment (COLA) of 1.75%.

Expenses

The investment return assumption represents the expected return net of all investment expenses.

Payroll Growth Rate

This assumption only applies to the level percent of pay amortization method. The total annual payroll of active members is assumed to increase at an annual rate of 3.25%. This rate does not anticipate increases in the number of members. This rate will grade to 0% in the following steps: 2.60% for the FY 2022 payment, 1.95% for the FY 2023 payment, 1.30% for the FY 2024 payments, 0.65% for the FY 2025 payment and 0% for fiscal years thereafter.

Changes from Prior Valuation

Since the prior valuation, the Board adopted new assumptions in conjunction with HB 7424. The changes in assumptions are summarized below:

Economic Assumptions

- Reduce the inflation assumption from 2.75% to 2.50%.
- Reduce the real rate of return assumption from 5.25% to 4.40% which, when combined with the inflation assumption change results in a decrease in the investment rate of return assumption from 8.00% to 6.90%.
- Increase the annual rate of wage increase assumption from 0.50% to 0.75%.

Demographic Assumptions

None