Vermont State Employees' Retirement System

Governmental Accounting Standards Board (GASB) Statement No. 68 Accounting Valuation Report for the Fiscal Year Ending June 30, 2020

Segal

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May 26, 2020

Board of Trustees
Vermont State Employees' Retirement System
Montpelier, Vermont 05609

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statement No. 68 Accounting Valuation for the fiscal year ending June 30, 2020, for the Vermont State Employees' Retirement System, a single-employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 68.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the State in preparing its financial reports. The financial information on which our calculations were based was provided by the Office of the State Treasurer. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

The actuarial calculations were directed under the supervision of Kathleen Riley and Matthew Strom. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate.

This valuation was prepared based on the actuarial assumptions and methods used in the June 30, 2018, actuarial valuation of the System. In our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System and are appropriate for purposes of the valuation.

We look forward to reviewing this report with you and to answering any questions.

Sincerely,

Segal

By:

Kathleen A. Riley, FSA, MAAA, EA	*Matthew A. Strom, FSA, MAAA, EA*
Senior Vice President and Actuary	*Senior Vice President and Actuary*

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Important Information About Actuarial Valuations

In order to prepare a valuation, Segal relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by the System. The System uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Vermont State Employees' Retirement System. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Sections of this report may include actuarial results that are not rounded, but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

Purpose

This report has been prepared by Segal to present certain disclosure information required by Governmental Accounting Standards Board Statement No. 68 for the fiscal year ending June 30, 2020. This report, based on financial information as of June 30, 2019, provided by the Office of the State Treasurer and the Vermont State Employees' Retirement System Actuarial Valuation Report as of June 30, 2018, dated October 19, 2018, reflects:

- The benefit provisions of the Pension Plan, as administered by the Board; and
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of June 30, 2018, provided by the Office of the State Treasurer.

The assumptions are the same as shown in the Vermont State Employees' Retirement System Actuarial Valuation Report as of June 30, 2018.

Valuation Highlights

The following key findings were the result of this actuarial valuation:

- GASB 68 permits a measurement date as early as the end of the fiscal year prior to the reporting date. This report for the fiscal year ending June 30, 2020 uses a measurement date of June 30, 2019. The Net Pension Liability (NPL) measured as of June 30, 2019 and June 30, 2018, was determined based upon the results of the actuarial valuations as of June 30, 2018 and June 30, 2017, respectively, adjusted forward using standard actuarial techniques.
- The NPL is equal to the difference between the Total Pension Liability (TPL) and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis. The NPL increased from $767.1 million as of June 30, 2019, to $841.3 million as of June 30, 2020, and the Plan's Fiduciary Net Position as a percent of the TPL decreased from 70.59% to 69.41%.
- The discount rate used to determine the TPL and NPL as of June 30, 2019, and June 30, 2018, was 7.50%.
- The annual pension expense arises from certain changes in the collective net pension liability and changes in outstanding balances of deferred outflows and deferred inflows of resources related to pensions from the beginning of the year to the end of the year. The pension expense increased from $117.37 million for fiscal year ending June 30, 2019 to $161.44 million for fiscal year ending June 30, 2020.

EXHIBIT 1

Membership Data

	June 30, 2018	June 30, 2017
Retired members and beneficiaries	6,974	6,727
Deferred members as reported by the System	753	742
Inactive members as reported by the System	1,267	1,098
Active members:		
Vested	5,370	5,367
Non-vested	3,160	3,253
Total active members	8,530	8,620
Total membership	17,524	17,187

Note: The NPL amounts measured as of June 30, 2019 and June 30, 2018 were determined based on the membership data as of June 30, 2018 and June 30, 2017, respectively.

EXHIBIT 2

Net Pension Liability

The components of the net pension liability of the Vermont State Employees' Retirement System are as follows:

Reporting Date for Employer Under GASB 68	June 30, 2020	June 30, 2019
Measurement Date	**June 30, 2019**	**June 30, 2018**
Total pension liability	$2,750,811,083	$2,608,559,283
Plan fiduciary net position	1,909,469,823	1,841,500,283
System's net pension liability	841,341,260	767,059,000
Plan fiduciary net position as a percentage of the total pension liability*	69.41%	70.59%

* *These funded percentages are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.*

The net pension liability measured as of June 30, 2019 was determined based on the June 30, 2018 actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of June 30, 2018.

Actuarial assumptions. The total pension liability measured as of June 30, 2019, was determined by rolling forward the total pension liability as of June 30, 2018, to June 30, 2019, using the following actuarial assumptions:

Inflation	2.50%
Salary increases	Ranging from 3.50% to 7.04%
Investment rate of return	7.50%, net of pension plan investment expenses, including inflation
Cost of Living Adjustment	2.55% (2.60% for 2019 and 1.60% for 2020) for Group A, C and D and for Group F members who retired after July 1, 2008, and 1.40% (1.30% for 2019 and 1.00% for 2020) for all other Group F members

Mortality

Pre-retirement:	Groups A/F – 101% of RP-2006 blended 30% Blue Collar Employee Mortality Table, 70% Healthy Employee Mortality Table with generational projection using scale SSA-2017
	Group C – RP-2006 Blue Collar Employee Mortality Table with generational projection using scale SSA-2017
	Group D* – RP-2006 Healthy Employee Mortality Table with generational projection using scale SSA-2017
Healthy Retiree:	Groups A/F – 101% of RP-2006 blended 30% Blue Collar Annuitant Mortality Table, 70% Healthy Annuitant Mortality Table with generational projection using scale SSA-2017
	Group C – RP-2006 Blue Collar Annuitant Mortality Table with generational projection using scale SSA-2017
	Group D – RP-2006 Healthy Annuitant Mortality Table with generational projection using scale SSA-2017
Disabled Retiree:	RP-2006 Disabled Mortality Table with generational projection using scale SSA-2017

** 30% of deaths are assumed to be accidental*

The long-term expected rate of return on pension plan investments was determined using a building-block method 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. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2019, is summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equity	29.00%	6.90%
US Equity – Large Cap	4.00%	5.94%
US Equity – Small/Mid Cap	3.00%	6.72%
Non-US Equity – Large Cap	5.00%	6.81%
Non-US Equity – Small Cap	2.00%	7.31%
Emerging Markets Debt	4.00%	4.26%
Core Bond	14.00%	1.79%
Non-Core Bonds	6.00%	3.22%
Short Quality Credit	5.00%	1.81%
Private Credit	5.00%	6.00%
US TIPS	3.00%	1.45%
Core Real Estate	5.00%	4.26%
Non-Core Real Estate	3.00%	5.76%
Private Equity	10.00%	10.81%
Infrastructure/Farmland	2.00%	4.89%
	100.00%	

Discount rate: The discount rate used to measure the total pension liability was 7.50%. In accordance with paragraph 29 of GASB 68, professional judgement was applied to determine that the System's projected fiduciary net position exceeds projected benefit payments for current active and inactive members for all years. Our analysis was based on the expectation that the employer will continue to contribute at rates set by the Board, which exceed the actuarially determined contribution rate. The actuarially determined contribution rate is comprised of an employer normal cost payment and a payment to reduce the unfunded liability to zero by June 30, 2038, in accordance with Vermont statute. 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.

** Calculated as the Nominal Rates of Return minus the Rate of Inflation, as provided by the Vermont State Treasurer's Office*

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.50%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.50%) or 1-percentage-point higher (8.50%) than the current rate:

	1% Decrease (6.50%)	**Current Discount (7.50%)**	**1% Increase (8.50%)**
Net pension liability as of June 30, 2019	$1,176,831,960	$841,341,260	$563,638,166

EXHIBIT 3

Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End June 30,									
	2019	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**
Total pension liability										
Service cost	$51,945,814	$49,743,850	$42,703,770	$47,012,283	$41,786,352	$39,368,808				
Interest	194,126,755	180,860,845	178,958,654	171,562,804	164,404,550	156,634,668				
Differences between expected and actual experience	40,475,950	83,265,679	19,283,274	25,051,322	3,979,303	0				
Changes of assumptions	0	0	42,724,968	-21,853,404	62,246,999	0				
Changes of benefit terms	0	0	0	0	0	0				
Benefit payments, including refunds of employee contributions	-144,296,719	-134,090,344	-126,479,801	-120,093,586	-111,396,184	-104,492,554	(Historical information prior to implementation of GASB 67/68 is not required)			
Net change in total pension liability	$142,251,800	$179,780,030	$157,190,865	$101,679,419	$161,021,020	$91,510,922				
Total pension liability - beginning	2,608,559,283	2,428,779,253	2,271,588,388	2,169,908,969	2,008,887,949	1,917,377,027				
Total pension liability - ending (a)	$2,750,811,083	$2,608,559,283	$2,428,779,253	$2,271,588,388	$2,169,908,969	$2,008,887,949				
Plan fiduciary net position										
Contributions - employer	$66,617,894	$64,564,323	$60,280,480	$54,347,060	$55,881,364	$56,482,985				
Contributions - member	40,818,039	40,423,239	35,966,987	34,055,217	33,296,248	31,745,692				
Net investment income	106,777,462	123,632,169	170,358,016	17,962,424	-8,484,694	203,721,748				
Benefit payments, including refunds of employee contributions	-144,296,719	-134,090,344	-126,479,801	-120,093,586	-111,396,184	-104,492,554	(Historical information prior to implementation of GASB 67/68 is not required)			
Administrative expenses	-2,246,008	-1,720,253	-1,776,653	-1,468,605	-1,858,854	-1,158,183				
Other	298,872	248,855	443,113	-13,597	177,491	453,853				
Net change in fiduciary net position	$67,969,540	$93,057,989	$138,792,142	-$15,211,087	-$32,384,629	$186,753,541				
Plan fiduciary net position - beginning	1,841,500,283	1,748,442,294	1,609,650,152	1,624,861,239	1,657,245,868	1,470,492,327				
Plan fiduciary net position - ending (b)	$1,909,469,823	$1,841,500,283	$1,748,442,294	$1,609,650,152	$1,624,861,239	$1,657,245,868				
Net pension liability – ending: (a)-(b)	$841,341,260	$767,059,000	$680,336,959	$661,938,236	$545,047,730	$351,642,087				
Plan's fiduciary net position as a percentage of the total pension liability	69.41%	70.59%	71.99%	70.86%	74.88%	82.50%	(Historical information prior to implementation of GASB 67/68 is not required)			
Covered-employee payroll	$521,670,606	$504,553,289	$471,268,111	$462,057,022	$437,675,917	$416,766,302				
Net pension liability as a percentage of covered-employee payroll	161.28%	152.03%	144.36%	143.26%	124.53%	84.37%				

Note: Covered-employee payroll reflects actual compensation amounts from the prior Plan year.

Notes to Exhibit 3:

Changes in Assumptions and Methods:	There have been no changes in actuarial assumptions or methods since the last measurement date.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last measurement date.

EXHIBIT 4

Schedule of Contributions – Last Ten Years

	Year End June 30,									
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially determined contribution	$62,984,742	$52,065,397	$48,503,358	$46,237,853	$44,651,783	$40,217,666				
Contributions in relation to the actuarially determined contribution	-66,617,894	-64,564,323	-60,280,480	-54,347,060	-55,881,364	-56,482,985				
Contribution deficiency (excess)	-$3,633,152	-$12,498,926	-$11,777,122	-$8,109,207	-$11,229,581	-$16,265,319	(Historical information prior to implementation of GASB 67/68 is not required)			
Covered-employee payroll	$521,670,606	$504,553,289	$471,268,111	$462,057,022	$437,675,917	$416,766,302				
Contributions as a percentage of covered-employee payroll	12.77%	12.80%	12.79%	11.76%	12.77%	13.55%				

Note: Actuarially determined contributions for a given fiscal year are based on results from the June 30 actuarial valuation two years prior.

Notes to Exhibit 4:

Methods and assumptions used to establish the actuarially determined contribution for the year ending June 30, 2019:

Valuation date	Actuarially determined contribution for the year ending June 30, 2019 is based on results from the June 30, 2017 actuarial valuation, and was calculated as of June 30, with appropriate interest to the middle of the fiscal year.
Actuarial cost method	Entry Age Normal actuarial cost method
Amortization method	Amortization payments calculated to fully fund unfunded actuarial accrued liability with annual increases of 5% over a closed period.
Remaining amortization period	21 years as of July 1, 2017
	The amortization of unfunded actuarial accrued liability (UAAL) within the actuarially determined contribution rate calculation is based on the level percentage of pay required to amortize the UAAL over the 30-year closed period that began July 1, 2008.

Notes to Exhibit 4 (continued):

Asset valuation method	The amount of the assets for valuation purposes equals the preliminary asset value plus 20% of the difference between market and preliminary asset values. The preliminary asset value is equal to the previous year's asset value (for valuation purposes) adjusted for contributions less benefit payments and expenses plus expected investment income. If necessary, a further adjustment is made to ensure that the valuation assets are within 20% of the market value.
Actuarial assumptions:	
Investment rate of return	7.50%, net of pension plan investment expenses
Inflation rate	2.50%
Projected salary increases	3.50% to 7.04%
Mortality	Pre-retirement:
	Groups A/F – 101% of RP-2006 blended 30% Blue Collar Employee Mortality Table, 70% Healthy Employee Mortality Table with generational projection using Scale SSA-2017
	Group C – RP-2006 Blue Collar Employee Mortality Table with generational projection using Scale SSA-2017
	Group D* – RP-2006 Healthy Employee Mortality Table with generational projection using Scale SSA-2017
	** 30% of deaths are assumed to be accidental*
	Healthy Post-retirement:
	Groups A/F – 101% of RP-2006 blended 30% Blue Collar Employee Mortality Table, 70% Healthy Employee Mortality Table with generational projection using Scale SSA-2017
	Group C – RP-2006 Blue Collar Employee Mortality Table with generational projection using Scale SSA-2017
	Group D – RP-2006 Healthy Employee Mortality Table with generational projection using Scale SSA-2017
	Disabled Post-retirement:
	RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017
Other assumptions:	Same as those used in the June 30, 2017 actuarial funding valuation

Changes in the net pension liability from the prior measurement date to the current measurement date arise from the net difference between changes in the total pension liability and plan fiduciary net position that occurred during the year. Changes in net pension liability will be recognized immediately as pension expense, or reported as deferred outflows of resources related to pensions or deferred inflows of resources related to pensions, depending on the nature of the change.

Differences between actual and expected investment-related experience are recognized over a closed five-year period. Differences between actual and expected non-investment-related experience and changes of assumptions are recognized over the average of the expected remaining service lives of all members who are provided with pensions through the pension plan (active employees and inactive employees). The amounts below that are not included in pension expense for the current year are included in deferred outflows of resources or deferred inflows of resources related to pensions.

EXHIBIT A

Reconciliation of Net Pension Liability

	Increase/(Decrease) From June 30, 2018 to June 30, 2019		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) – (b)
Balances at beginning of year	$2,608,559,283	$1,841,500,283	$767,059,000
Changes for the year			
Service cost	51,945,814		51,945,814
Interest	194,126,755		194,126,755
Differences between expected and actual experience	40,475,950		40,475,950
Contributions – employer		66,617,894	-66,617,894
Contributions – member		40,818,039	-40,818,039
Net investment income		106,777,462	-106,777,462
Benefit payments, including refunds of employee contributions	-144,296,719	-144,296,719	0
Administrative expense		-2,246,008	2,246,008
Other		298,872	-298,872
Changes of assumptions	0		0
Change of benefit terms	0		0
Net changes	$142,251,800	$67,969,540	$74,282,260
Balances at end of year	$2,750,811,083	$1,909,469,823	$841,341,260

As shown in Exhibit A, the change in net pension liability due to differences between expected and actual demographic experience is an increase of $40,475,950. The average expected remaining service lives of all members is 6 years, determined as of July 1, 2018 (the beginning of the measurement period ending June 30, 2019). Therefore, of the $40,475,950 demographic loss, $6,745,990 is recognized in pension expense in the current year and $33,729,960 is reflected as a deferred outflow of resources related to pensions. There was no change in net pension liability due to assumption changes or changes in plan provisions.

Based on the assumed investment return of 7.50%, the expected net investment income for the year was $136,657,224. As shown in Exhibit A, the actual net investment income for the year was $106,777,462. The difference between actual and expected investment experience is an increase in net pension liability of $29,879,762, which is recognized over a 5-year period. Of this amount, $5,975,954 is reflected in the current year and $23,903,808 is reflected as a deferred outflow of resources related to pensions.

EXHIBIT B

Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

	Measurement Date Year Established	Original Balance	Original Amortization Period	Amortization Amount During 2019	Outstanding Balance at June 30, 2019
Outflows					
Demographics	2015	$3,979,303	6 years	$663,218	$663,213
Assumptions	2015	62,246,999	6 years	10,374,500	10,374,499
Investments	2015	139,303,693	5 years	27,860,737	0
Demographics	2016	25,051,322	6 years	4,175,220	8,350,442
Investments	2016	109,920,576	5 years	21,984,115	21,984,116
Demographics	2017	19,283,274	6 years	3,213,879	9,641,637
Assumptions	2017	42,724,968	6 years	7,120,828	21,362,484
Demographics	2018	83,265,679	6 years	13,877,613	55,510,453
Investments	2018	6,354,471	5 years	1,270,894	3,812,683
Demographics	2019	40,475,950	6 years	6,745,990	33,729,960
Investments	2019	29,879,762	5 years	5,975,954	23,903,808
Total outflows				**$103,262,948**	**$189,333,295**
Inflows					
Assumptions	2016	21,853,404	6 years	3,642,234	7,284,468
Investments	2017	43,645,572	5 years	8,729,114	17,458,230
Total inflows				**$12,371,348**	**$24,742,698**

EXHIBIT B (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

Reporting Date for Employer Under GASB 68	June 30, 2020	June 30, 2019
Measurement Date	June 30, 2019	June 30, 2018
Deferred Outflows of Resources		
Difference between expected and actual experience in the Total Pension Liability	$107,895,705	$96,095,675
Changes of assumptions	31,736,983	49,232,311
Net difference between projected and actual earnings on pension plan investments	32,242,377	50,725,201
Total Deferred Outflows of Resources	$171,875,065	$196,053,187
Deferred Inflows of Resources		
Difference between expected and actual experience in the Total Pension Liability	$0	$0
Changes of assumptions	7,284,468	10,926,702
Net difference between projected and actual earnings on pension plan investments	0	0
Total Deferred Inflows of Resources	$7,284,468	$10,926,702

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Year Ended June 30:		
2020	N/A	$78,169,656
2021	$63,030,858	50,308,914
2022	30,009,030	17,287,086
2023	38,205,159	25,483,215
2024	26,599,558	13,877,614
2025	6,745,992	0
Thereafter	0	0

Exhibit C below shows the individual components of pension expense, which totaled $161,436,042 for the fiscal year that ended June 30, 2020.

Annual pension expense for the year can also be viewed as the change in net pension liability, plus employer contributions for the year, less the change in outstanding balances of deferred outflows and deferred inflows of resources from the end of the prior fiscal year to end of the current fiscal year. From Exhibit A, the change in net pension liability during the year was $74,282,260 and employer contributions were $66,617,894. The net value of deferred outflows and deferred inflows of resources as of the end of the current fiscal year is $164,590,597 compared to the net value as of the end of the prior fiscal year of $185,126,485 for a change of $20,535,888. Therefore, the pension expense for the fiscal year that ended June 30, 2019, is $74,282,260 + $66,617,894 + $20,535,888, or $161,436,042.

EXHIBIT C

Pension Expense

Reporting Date for Employer Under GASB 68	June 30, 2020	June 30, 2019
Measurement Date	**June 30, 2019**	**June 30, 2018**
Components of pension expense		
Service cost	$51,945,814	$49,743,850
Interest on the total pension liability	194,126,755	180,860,845
Projected earnings on plan investments	-136,657,224	-129,986,640
Contributions – member	-40,818,039	-40,423,239
Administrative expense	2,246,008	1,720,253
Other	-298,872	-248,855
Current year recognition of:		
Changes of assumptions	0	0
Difference between expected and actual experience	6,745,990	13,877,613
Difference between projected and actual earnings on pension plan investments	5,975,954	1,270,894
Change of benefit terms	0	0
Recognition of prior year's deferred outflows of resources	90,541,004	75,392,499
Recognition of prior year's deferred inflows of resources	-12,371,348	-34,838,896
Total pension expense	$161,436,042	$117,368,324

EXHIBIT I

Actuarial Assumptions and Actuarial Cost Method*

Rationale for Assumptions:	The information and analysis used in selecting each assumption (except for economic assumptions and mortality tables) that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated October 29, 2015 (as prepared by Buck Consultants). Economic assumptions, including inflation, investment return, and assumed cost-of-living adjustment increases were studied and adopted by the Board on July 13, 2017. Mortality table assumptions were studied and adopted by the Board on September 25, 2017. The next Actuarial Experience study will be performed in 2020 for the June 30, 2020 valuation.
Roll-forward Techniques:	The results as of June 30, 2019, are based on the results of the Vermont State Employees' Retirement System Actuarial Valuation Report as of June 30, 2018 adjusted forward, using standard actuarial techniques.
Inflation:	2.50%.
Investment Return:	7.50%. The investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.

* *Same assumptions used in the June 30, 2019, Actuarial Valuation and Review.*

Salary Increases:

Age	Annual Rate of Salary Increase %
20	7.04%
25	6.21%
30	5.66%
35	5.26%
40	4.92%
45	4.36%
50	3.70%
55	3.50%
60	3.50%

Cost-of-Living Adjustments: Assumed to occur at the rate of 2.55% per annum for Groups A, C and D members and 1.40% per annum for Group F members (beginning at age 62 for deferred retirements). For Group F members retiring after July 1, 2008, cost-of-living adjustments are assumed to occur at the rate of 2.55% per annum effective January 1, 2014. The January 1, 2019 COLA and January 1, 2020 COLAs are 2.60% and 1.60% respectively, for Groups A, C, and D members and for Group F members who retired after July 1, 2008, and 1.30% and 1.00%, respectively, for all other Group F members.

Mortality Rates:

Death in Active Service:

Groups A/F: 101% of RP-2006 blended 30% Blue Collar Employee Mortality Table, 70% Healthy Employee Mortality Table with generational projection using Scale SSA-2017.

Group C: RP-2006 Blue Collar Employee Mortality Table with generational projection using Scale SSA-2017.

Group D*: RP-2006 Healthy Employee Mortality Table with generational projection using Scale SSA-2017.

**30% of deaths are assumed to be accidental*

Healthy Post-retirement:	Groups A/F:	101% of RP-2006 blended 30% Blue Collar Annuitant Mortality Table, 70% Healthy Annuitant Mortality Table with generational projection using Scale SSA-2017.
	Group C:	RP-2006 Blue Collar Annuitant Mortality Table with generational projection using Scale SSA-2017.
	Group D:	RP-2006 Healthy Annuitant Mortality Table with generational projection using Scale SSA-2017.

Disabled Post-retirement: All Groups – RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017.

The tables with the generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date. The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the various industries and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual amount of deaths by benefit amount and the projected amount based on the prior assumption over the five-year period ending June 30, 2016. The mortality tables were then adjusted to future years using a generational projection with Scale SSA-2017 to reflect future mortality improvement.

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Separation from Service before Retirement (Due to Withdrawal and Disability):

Representative values of the assumed annual rates of withdrawal and disability are as follows:

	Rate (%)				
	Withdrawal[1]			Disability	
	Groups A/D/F	Group C			
Age	Male/Female	Male	Female	Groups A/D/F	Group C
25	4.91%	4.32%	8.64%	0.02%	0.08%
30	3.93	4.32	8.64	0.02	0.10
35	3.28	4.32	8.64	0.03	0.13
40	3.04	4.32	8.64	0.04	0.20
45	2.69	4.32	8.64	0.06	0.32
50	2.25	4.32	8.64	0.10	0.55
55	1.83	4.32	8.64	0.18	0.91
60	3.90	4.32	8.64	0.28	1.46

[1] Withdrawal rates are increased during the first 10 years of service for Groups C and F. For Group C, no withdrawal is assumed after a member has attained 20 years of service, For Group D, no withdrawal is assumed after a member has reached age 55.

Retirement Rates:

Retirement Group F[2]

Age	Male	Female	Age	Male	Female
50	16.0%	6.0%	60	5.6%	5.6%
51	16.0	8.0	61	11.2	11.2
52	8.0	9.0	62	22.4	22.4
53	8.0	9.0	63	17.5	14.0
54	8.0	10.0	64	17.5	14.0
55	4.0	5.0	65	25.0	20.0
56	3.4	4.2	66	15.0	15.0
57	4.5	5.6	67	17.5	17.5
58	5.0	6.3	68	17.5	17.5
59	5.6	5.6	69	20.0	20.0
			70	100.0	100.0

[2] *All Group A, C, and D members are assumed to retire when first eligible.*

The retirement rates were based on historical and current demographic data, adjusted to reflect conditions of the various industries, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior assumption over the four-year period ending June 30, 2014.

Inactive Members as Reported by the System: Valuation liability equals 250% of accumulated contributions.

Deferred Members as Reported by the System: Assumed to retire at their Normal Retirement Age with deferred vested benefit.

Future Administrative Expenses: No provisions made; expenses of the System are paid by the State.

Unknown Data for Participants: Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

Percent Married:	Groups A/D:	75.4% of male members and 64.0% of female members are assumed to be married.
	Group C:	73.3% of male members and 61.0% of female members are assumed to be married.
	Group F:	71.4% of male members and 63.1% of female members are assumed to be married.
Age of Spouse:	Females three years younger than males.	
Benefit Elections:	Non-Group C:	All members are assumed to elect the single life annuity option
	Group C:	Single members are assumed to elect single life annuity. Married members are assumed to elect 70% joint & survivor option
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each member.	
Changes Actuarial Assumptions:	There have been no changes in actuarial assumptions since the last valuation.	

EXHIBIT II
Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Effective Date:	July 1, 1972 (for consolidated system).	
Creditable Service:	Service as a member plus purchased service.	
Average Final Compensation (AFC):	Groups A/F:	Average annual compensation during highest 3 consecutive years.
	Group C:	Average annual compensation during highest 2 consecutive years.
	Group D:	Annual compensation at retirement.
Normal Retirement – Eligibility:	Group A:	Earlier of age 65 with 5 years of service for members hired after July 1, 2004, and age 62 with 20 years of service.
	Group C:	Age 55.
	Group D:	Age 62 with 5 years of service.
	Group F:	Age 62 or 30 years of service. For members hired after June 30, 2008, age 65 or a sum of age plus service greater than or equal to 87.
Normal Retirement – Amount:	Group A:	1.67% of AFC times service.
	Group C:	2.50% of AFC times service up to 20 years.
	Group D:	3.33% of AFC times service up to 30 years.
	Group F:	1.25% of AFC times service prior to January 1, 1991, plus 1.67% of AFC times service after 1990, up to a maximum benefit of 50% of AFC. For members hired on or after July 1, 2008, the maximum benefit is 60% of AFC.

Early Retirement – Eligibility:

Groups A/D: Age 55 with 5 years of service or 30 years of service.

Group C: Age 50 with 20 years of service.

Group F: Age 55 with 5 years of service.

Early Retirement – Amount:

Group A: Actuarial equivalent of normal retirement allowance. For members with 30 years of service, there is no reduction.

Group C: Same as normal retirement allowance.

Group D: Normal allowance reduced by 3% for each year commencement precedes age 62.

Group F: For members hired prior to July 1, 2008, no reduction if 30 years of service; otherwise normal allowance reduced by 6% for each year commencement precedes age 62. For members hired on or after July 1, 2008, no reduction if combination of years and service equal 87; other reduced from age 65 based on the following table:

Years of Service	Reduction in Benefit
35	One-eighth of 1% per year
30	One-fourth of 1% per year
25	One-third of 1% per year
20	Five-twelfths of 1% per year
Less than 20	Five-ninths of 1% per year

Vesting: All groups – 5 years of creditable service. Allowance beginning at normal retirement age based on AFC and service at termination.

Ordinary Disability – Eligibility: All groups – 5 years of service and incapacitated, not work related, for performance of duty.

Ordinary Disability – Amount: All groups – Immediate allowance based on service to date of disability. Benefit is the greatest of 25% of AFC and unreduced accrued benefit as of date of disability.

Accidental Disability – Eligibility:	All groups – Incapacitated because of work related accident.	
Accidental Disability – Amount:	Groups A/D/F:	Immediate allowance based on service projected to normal retirement. Benefit is the greater of 25% of AFC and unreduced accrued benefit as of date of disability.
	Group C:	Immediate allowance equal to 50% of AFC with additional 10% of AFC for each dependent child (up to 30%).
Ordinary Death – Eligibility:	Groups A/F:	Death after eligibility for early retirement or 10 years of service.
	Groups C/D:	Death after normal retirement age or 10 years of service.
Ordinary Death – Amount:	Groups A/D/F:	Maximum of reduced allowance under 100% survivor option and disability allowance under 100% disability survivor option, commencing immediately.
	Group C:	70% of the allowance that would have been payable to the member plus additional allowance equal to 10% of AFC for each dependent child (up to 30%).
Accidental Death – Eligibility:	All groups – Death because of work related accident.	
Accidental Death – Amount:	Groups A/D/F:	Allowance equal to 25% of AFC payable to spouse.
	Group C:	Allowance equal to 35% of AFC payable to spouse plus 10% for each dependent child (up to 30%).
Post-Retirement Adjustments:	Groups A/C/D:	Allowances in payment for at least one year increased on each January 1 by the percentage increase in Consumer Price Index, but not more than 5%.
	Group F:	Same, but increase is based on half of the Consumer Price Index increase. Increase is based on the full Consumer Price Index increase starting in 2014 for employees retiring after July 1, 2008.
Optional Benefit and Death after Retirement:	Lifetime allowance or actuarially equivalent allowance with survivor benefit as elected by member upon retirement. Upon death of a Group C member, an allowance equal to 70% of the member's allowance is continue to the surviving spouse.	
Refund of Contributions:	Upon termination, if the member so elects, or if no other benefit is payable, the member's accumulated contributions with interest are refunded.	

Member Contribution Rates:	Groups A/D/F: 6.65%. Group C: 8.53%.
Changes in Plan Provisions	There have been no changes in plan provisions since the last valuation.

Appendix A
Glossary

Definitions of certain terms *as they are used in Statement 68;* the terms may have different meanings in other contexts.

Active employees:	Individuals employed at the end of the reporting or measurement period, as applicable.
Actual contributions:	Cash contributions recognized as additions to a pension plan's fiduciary net position.
Actuarial present value of projected benefit payments:	Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial valuation:	The determination, as of a point in time (the actuarial valuation date), of the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial valuation date:	The date as of which an actuarial valuation is performed.
Actuarially determined contribution:	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
Ad hoc cost-of-living adjustments (ad hoc COLAs):	Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.
Ad hoc postemployment benefit changes:	Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions.
Agent employer:	An employer whose employees are provided with pensions through an agent multiple-employer defined benefit pension plan.

Agent multiple-employer defined benefit pension plan (agent pension plan): A multiple-employer defined benefit pension plan in which pension plan assets are pooled for investment purposes but separate accounts are maintained for each individual employer so that each employer's share of the pooled assets is legally available to pay the benefits of only its employees.

Allocated insurance contract: A contract with an insurance company under which related payments to the insurance company are currently used to purchase immediate or deferred annuities for individual employees. Also may be referred to as an annuity contract.

Automatic cost-of-living adjustments (automatic COLAs): Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Automatic postemployment benefit changes: Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Closed period: A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.

Collective deferred outflows of resources and deferred inflows of resources related to pensions: Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective net pension liability.

Collective net pension liability: The net pension liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.

Collective pension expense:	Pension expense arising from certain changes in the collective net pension liability.
Contributions:	Additions to a pension plan's fiduciary net position for amounts from employers, nonemployer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.
Cost-of-living adjustments:	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-sharing employer:	An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.
Cost-sharing multiple-employer defined benefit pension plan (cost-sharing pension plan):	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-employee payroll:	The payroll of employees that are provided with pensions through the pension plan.
Deferred retirement option program (DROP):	A program that permits an employee to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The employee continues to provide service to the employer and is paid for that service by the employer after the DROP entry date; however, the pensions that would have been paid to the employee (if the employee had retired and not entered the DROP) are credited to an individual employee account within the defined benefit pension plan until the end of the DROP period.
Defined benefit pension plans:	Pension plans that are used to provide defined benefit pensions.

Defined benefit pensions: Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statements 67/68.)

Defined contribution pension plans: Pension plans that are used to provide defined contribution pensions.

Defined contribution pensions: Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.

Discount rate: The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of Statements 67/68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.
2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

Entry age actuarial cost method:	A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the *normal cost*. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the *actuarial accrued liability*.
Inactive employees:	Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
Measurement period:	The period between the prior and the current measurement dates.
Multiple-employer defined benefit pension plan:	A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Net pension liability:	The liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan.
Nonemployer contributing entities:	Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 68, employees are not considered nonemployer contributing entities.
Other postemployment benefits:	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits, regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
Pension plans:	Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed, and benefits are paid as they come due.
Pensions:	Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.

Plan members:	Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).
Postemployment:	The period after employment.
Postemployment benefit changes:	Adjustments to the pension of an inactive employee.
Postemployment healthcare benefits:	Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment.
Projected benefit payments:	All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.
Public employee retirement system:	A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.
Real rate of return:	The rate of return on an investment after adjustment to eliminate inflation.
Service costs:	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
Single employer:	An employer whose employees are provided with pensions through a single-employer defined benefit pension plan.
Single-employer defined benefit pension plan (single-employer pension plan):	A defined benefit pension plan that is used to provide pensions to employees of only one employer.
Special funding situations:	Circumstances in which a nonemployer entity is legally responsible for making contributions directly to a pension plan that is used to provide pensions to the employees of another entity or entities and either of the following conditions exists: The amount of contributions for which the nonemployer entity legally is responsible is *not* dependent upon one or more events or circumstances unrelated to the pensions.

	The nonemployer entity is the only entity with a legal obligation to make contributions directly to a pension plan.
Termination benefits:	Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.
Total pension liability:	The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement.

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