Vermont Municipal Employees' Retirement System

Governmental Accounting Standards Board Statement 67 Actuarial Valuation Report as of June 30, 2021





November 10, 2021

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

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statement No. 67 Accounting Valuation as of June 30, 2021, for the Vermont Municipal Employees' Retirement System, a cost-sharing multiple-employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 67.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the Board and the member units in preparing their 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 Matthew A. Strom, FSA, MAAA, EA. 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, 2020, actuarial valuation of the System, except as noted herein. 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

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

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

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Section 1: Actuarial Valuation Summary

Important information about actuarial valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – 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.

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.



Section 1: Valuation Summary

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 Municipal 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.



Section 1: Valuation Summary

Purpose and basis

This report has been prepared by Segal to present certain disclosure information required by Governmental Accounting Standards Board Statement No. 67 as of June 30, 2021. This report, based on unaudited financial information as of June 30, 2021, provided by the Office of the State Treasurer and the Vermont Municipal Employees' Retirement System Actuarial Report as of June 30, 2020, dated October 28, 2020, 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, 2020, provided by the Office of the State Treasurer.

The assumptions are the same as shown in the Vermont Municipal Employees' Retirement System Actuarial Valuation Report as of June 30, 2020.

Highlights of the valuation

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

- The Net Pension Liability (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 decreased from \$253.0 million as of June 30, 2020, to \$147.2 million as of June 30, 2021, and the Plan's Fiduciary Net Position as a percent of the TPL increased from 74.52% to 86.29%.
- The NPL, measured as of June 30, 2021, and June 30, 2020, was determined based upon the results of the actuarial valuations as of June 30, 2020, and June 30, 2019, respectively, adjusted forward using standard actuarial techniques.
- The discount rate used to determine the TPL and NPL as of June 30, 2021, and June 30, 2020, was 7.00%.



Exhibit 1 – Net Pension Liability

The components of the Net Pension Liability of the Vermont Municipal Employees' Retirement System are as follows:

	June 30, 2021	June 30, 2020
Total Pension Liability	\$1,073,218,528	\$993,026,959
Plan Fiduciary Net Position	926,034,330	740,052,895
System's Net Pension Liability	147,184,198	252,974,064
Plan Fiduciary Net Position as a percentage of the Total Pension Liability *	86.29%	74.52%

* 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.

Actuarial assumptions. The Total Pension Liability as of June 30, 2021, was determined by rolling forward the Total Pension Liability as of June 30, 2020, to June 30, 2021, using the following actuarial assumptions:

Investment rate of return	7.00%, net of pension plan investment expenses, including inflation
Inflation	2.30%
Salary increases	Varying service-based rates from 0-10 years of service, then a single rate of 4.50% (includes assumed inflation rate of 2.30%) for all subsequent years.
Cost of Living Adjustment	1.10% for Group A members and 1.20% for Groups B, C and D members. The January 1, 2021 COLA is 0.40% for all groups. The January 1, 2022 COLA is 2.00% for Group A members and 2.30% for Groups B, C, and D members.
Mortality	 Pre-Retirement: Groups A/B/C – 40% PubG-2010 General Employee Amount-Weighted below-median and 60% of PubG-2010 General Employee Amount-Weighted, with generational projection using Scale MP-2019. Group D – PubG-2010 General Employee Amount-Weighted above-median, with generational projection using scale MP-2019.



Mortality (continued)	Healthy Post-Retirement - Retirees:
	 Groups A/B/C – 104% of 40% PubG-2010 General Healthy Retiree Amount- Weighted below-median and 60% of PubG-2010 General Healthy Retiree Amount-Weighted, with generational projection using scale MP-2019.
	 Group D – PubG-2010 General Healthy Retiree Amount-Weighted, with generational projection using scale MP-2019.
	Healthy Post-Retirement - Beneficiaries:
	 Groups A/B/C – 70% Pub-2010 Contingent Survivor Amount-Weighted below-median and 30% of Pub-2010 Contingent Survivor Amount-Weighted, with generational projection using scale MP-2019.
	 Group D – Pub-2010 Contingent Survivor Amount-Weighted, with generational projection using scale MP-2019.
	Disabled Post-Retirement.
	 All Groups – PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with generational projection using Scale MP-2019.
	The tables with the generational projection to the ages of members as of the measurement date reasonably reflect the mortality experience of the System as of the measurement date.
	The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the underlying groups and estimated future experience and professional judgment. The mortality tables were then adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.



Determination of discount rate and investment rates of return

The long-term expected rate of return on pension plan investments was determined using a building-block method in which bestestimate 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, 2021, are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return [*]
Passive Global Equities	24.00%	5.05%
Active Global Equities	5.00%	5.05%
Large Cap US Equities	4.00%	4.00%
Small/Mid Cap US Equities	3.00%	4.50%
Non-US Developed Market Equities	7.00%	5.50%
Private Equity	10.00%	6.75%
Emerging Market Debt	4.00%	3.00%
Private and alternative Credit	10.00%	4.75%
Non-Core Real Estate	4.00%	5.75%
Core Fixed Income	19.00%	0.00%
Core Real Estate	4.00%	3.75%
US TIPS	3.00%	-0.50%
Infrastructure/Farmland	<u>3.00%</u>	4.25%
	100.00%	

* Calculated as the Arithmetic Rates of Return minus the Rate of Inflation, as provided by the Vermont State Treasurers' Office



Discount rate: The long-term expected rate of return on pension plan investments is 7.00%. The high quality tax-exempt general obligation municipal bond rate (20-Bond GO Index) as of the closest date prior to the valuation date of June 30, 2021, is 2.16%, as published by The Bond Buyer.

The discount rate used to measure the Total Pension Liability was 7.00% as of June 30, 2021. The projection of cash flows used to determine the discount rate assumed plan member and employer contributions will be made at rates set by the Board (employers) and statute (members). The Board voted to authorize employer contribution rate increases of 0.50% each year for a period of four years beginning July 1, 2022, to be offset by any increases in the employee contribution rates as negotiated with employee groups and approved by Legislature¹. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the pension plans' Fiduciary Net Position was projected to be available to make all projected future benefit payments of current plan members as of June 30, 2021. 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.

Discount rate sensitivity

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 7.00%, as well as what the Net Pension Liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.00%) or 1-percentage-point higher (8.00%) than the current rate:

	1% Decrease	Current Discount	1% Increase
	(6.00%)	Rate (7.00%)	(8.00%)
Net Pension Liability as of June 30, 2021	\$290,917,972	\$147,184,198	\$28,992,979

¹ For purposes of this projection, the entire contribution increase is assumed to be an increase in employer contribution rates.



Exhibit 2 – Schedule of changes in Net Pension Liability – last ten fiscal years

	Year End June 30,				
	2021	2020	2019	2018	2017
Total Pension Liability					
Service cost	\$37,158,549	\$34,726,405	\$30,744,435	\$28,434,045	\$27,245,986
Interest	70,595,483	67,360,649	61,617,803	56,503,328	54,779,918
Differences between expected and actual experience	15,794,755	8,291,943	17,467,646	14,172,418	-3,749,037
Changes of assumptions	0	38,774,448	0	0	14,481,136
Changes of benefit terms	0	0	0	193,575	0
Benefit payments, including refunds of employee contributions	<u>-43,357,218</u>	-39,084,124	<u>-35,397,043</u>	<u>-31,444,463</u>	-27,803,390
Net change in Total Pension Liability	\$80,191,569	\$110,069,321	\$74,432,841	\$67,858,903	\$64,954,613
Total Pension Liability – beginning	<u>993,026,959</u>	<u>882,957,638</u>	<u>808,524,797</u>	<u>740,665,894</u>	<u>675,711,281</u>
Total Pension Liability – ending (a)	\$1,073,218,528	\$993,026,959	\$882,957,638	\$808,524,797	\$740,665,894
Plan Fiduciary Net Position					
Contributions – employer	\$22,297,570	\$20,680,856	\$19,202,981	\$17,519,690	\$16,481,881
Contributions – employee	23,074,402	20,771,304	19,777,956	19,166,537	25,210,413
Net investment income	184,850,095	29,113,786	38,740,356	43,889,050	59,486,928
Benefit payments, including refunds of employee contributions	-43,357,218	-39,084,124	-35,397,043	-31,444,463	-27,803,390
Administrative expenses	-1,248,639	-1,354,418	-1,158,070	-928,741	-874,707
Other	<u>365,225</u>	<u>459,660</u>	<u>450,746</u>	<u>136,490</u>	<u>-5,897</u>
Net change in Fiduciary Net Position	\$185,981,435	\$30,587,064	\$41,616,926	\$48,338,563	\$72,495,228
Plan Fiduciary Net Position – beginning	<u>740,052,895</u>	<u>709,465,831</u>	<u>667,848,905</u>	<u>619,510,342</u>	<u>547,015,114</u>
Plan Fiduciary Net Position – ending (b)	\$926,034,330	\$740,052,895	\$709,465,831	\$667,848,905	\$619,510,342
Net Pension Liability – ending: (a)-(b)	\$147,184,198	\$252,974,064	\$173,491,807	\$140,675,892	\$121,155,552
Plan's Fiduciary Net Position as a percentage of the Total Pension Liability	86.29%	74.52%	80.35%	82.60%	83.64%
Covered-employee payroll	\$327,491,743	\$306,103,224	\$289,838,838	\$274,813,707	\$256,730,055
Net Pension Liability as a percentage of covered-employee payroll	44.94%	82.64%	59.86%	51.19%	47.19%

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



Exhibit 2 – Schedule of changes in Net Pension Liability – last ten fiscal years *(continued)*

	Year End June 30,				
	2016	2015	2014	2013*	2012*
Total Pension Liability					
Service cost	\$25,264,340	\$24,366,167	\$22,519,428		
Interest	49,744,271	46,058,159	42,139,031		
Differences between expected and actual experience	1,088,020	3,046,272	0		
Changes of assumptions	12,203,982	19,192,039	0		
Changes of benefit terms	0	0	0		
Benefit payments, including refunds of employee contributions	<u>-25,588,884</u>	<u>-23,315,175</u>	<u>-20,601,380</u>		
Net change in Total Pension Liability	\$62,711,729	\$69,347,462	\$44,057,079		
Total Pension Liability – beginning	<u>612,999,552</u>	<u>543,652,090</u>	<u>499,595,011</u>		
Total Pension Liability – ending (a)	\$675,711,281	\$612,999,552	\$543,652,090		
Plan Fiduciary Net Position					
Contributions – employer	\$15,235,742	\$14,136,067	\$12,805,737		
Contributions – employee	15,226,948	13,587,975	13,233,728		
Net investment income	6,776,933	-2,358,518	64,346,116		
Benefit payments, including refunds of employee contributions	-25,588,884	-23,315,175	-20,601,380		
Administrative expenses	-755,013	-950,625	-588,022		
Other	<u>215,646</u>	<u>278,541</u>	<u>2,142,868</u>		
Net change in Fiduciary Net Position	\$11,111,372	\$1,378,265	\$71,339,047		
Plan Fiduciary Net Position – beginning	<u>535,903,742</u>	<u>534,525,477</u>	<u>463,186,430</u>		
Plan Fiduciary Net Position – ending (b)	\$547,015,114	\$535,903,742	\$534,525,477		
Net Pension Liability – ending: (a)-(b)	\$128,696,167	\$77,095,810	\$9,126,613		
Plan's Fiduciary Net Position as a percentage of the Total Pension Liability	80.95%	87.42%	98.32%		
Covered-employee payroll	\$249,810,907	\$230,969,202	\$220,371,643		
Net Pension Liability as a percentage of covered-employee payroll	51.52%	33.38%	4.14%		

Historical information prior to implementation of GASB 67/68 is not required.

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



Notes to Exhibit 2:

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



Exhibit 3 – Schedule of contributions – last ten fiscal years

	Year End June 30				
	2021	2020	2019	2018	2017
Actuarially determined contribution	\$36,722,301	\$22,618,468	\$17,263,214	\$15,066,601	\$12,895,672
Contributions in relation to the actuarially determined contribution*	<u>22,297,570</u>	<u>20,680,856</u>	<u>19,202,981</u>	<u>17,519,690</u>	<u>16,481,881</u>
Contribution deficiency (excess)	\$14,424,731	\$1,937,612	-\$1,939,767	-\$2,453,089	-\$3,586,209
Covered-employee payroll	\$327,491,743	\$306,103,224	\$289,838,838	\$274,813,707	\$256,730,055
Contributions as a percentage of covered-employee payroll	6.81%	6.76%	6.63%	6.38%	6.42%
	2016	2015	2014	2012**	2012**
	2010	2013	2014	2013	2012
Actuarially determined contribution	\$15,235,742	\$11,956,121	\$11,638,928		
Contributions in relation to the actuarially determined contribution*	<u>15,235,742</u>	<u>14,136,067</u>	<u>12,805,737</u>		
Contribution deficiency (excess)	\$0	-\$2,179,946	-\$1,166,809		
Covered-employee payroll	\$249,810,907	\$230,969,202	\$220,371,643		
Contributions as a percentage of covered-employee payroll	6.10%	6.12%	5.81%		

* Includes a portion of the contribution amount denoted as "other" in Exhibit 2.

** Historical information prior to implementation of GASB 67/68 is not required.

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 3:

Valuation date	Actuarially determined contribution for the year ending June 30, 2021, is based on results from the June 30, 2020, 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 cost method
Amortization method	Amortization payments calculated to fully fund unfunded actuarial accrued liability with annual increases of 3% over a closed period.
Remaining amortization period	18 years as of July 1, 2020
	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.
Asset valuation method	A smoothing method is used, under which the value of assets for actuarial purposes equals market value less a five-year phase-in of the differences between actual and assumed investment return. The value of assets for actuarial purposes may not differ from market value of assets by more than 20%.
Actuarial assumptions:	
Investment rate of return	7.00%, net of pension plan investment expenses, including inflation
Inflation rate	2.30% per year
Projected salary increases	Varying service-based rates from 0-10 years of service, then a single rate of 4.50% (includes assumed inflation rate of 2.30%) for all subsequent years.
Mortality	Pre-Retirement:
	 Groups A/B/C – 40% PubG-2010 General Employee Amount-Weighted below- median and 60% of PubG-2010 General Employee Amount-Weighted, with generational projection using Scale MP-2019.
	 Group D – PubG-2010 General Employee Amount-Weighted above-median, with generational projection using scale MP-2019.
	Healthy Post-Retirement - Retirees:
	 Groups A/B/C – 104% of 40% PubG-2010 General Healthy Retiree Amount- Weighted below-median and 60% of PubG-2010 General Healthy Retiree Amount-Weighted, with generational projection using scale MP-2019.
	 Group D – PubG-2010 General Healthy Retiree Amount-Weighted, with generational projection using scale MP-2019.



Mortality (continued)	 Healthy Post-Retirement - Beneficiaries: Groups A/B/C – 70% Pub-2010 Contingent Survivor Amount-Weighted belowmedian and 30% of Pub-2010 Contingent Survivor Amount-Weighted, with generational projection using scale MP-2019. Group D – Pub-2010 Contingent Survivor Amount-Weighted, with generational projection using scale MP-2019. Disabled Post-Retirement: All Groups – PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with generational projection using Scale MP-2019.
	The tables with the generational projection to the ages of members as of the measurement date reasonably reflect the mortality experience of the System as of the measurement date. The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the underlying groups and estimated
Other assumptions	future experience and professional judgment. The mortality tables were then adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years. Same as those used in the June 30, 2020, funding actuarial valuation.
Other assumptions	Same as those used in the June 30, 2020, funding actuarial valuation.



Exhibit 4 – Development of Blended Discount Rate

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Farnings	Projected Ending Fiduciary Net Position
2020*	\$740.052.895	\$45 371 972	\$43,357,218	\$1 248 638	\$185 215 317	\$926 034 330
2020	926 034 330	41 748 963	49 260 984	1 176 105	64 518 319	981 864 523
2022	981 864 523	41 256 022	53 391 449	1 133 870	68 266 091	1 036 861 317
2022	1 036 861 317	41,200,022	57 343 541	1 106 428	71 976 437	1 091 584 754
2020	1 091 584 754	41,130,305	61 648 071	1,100,420	75 666 966	1 145 995 513
2024	1 145 995 513	41,402,010	66 304 405	1,030,432	79 329 604	1 199 894 205
2026	1 199 894 205	40 517 309	71 225 711	1,001,407	82 880 089	1 250 988 415
2020	1 250 988 415	39 288 073	75 825 675	1,078,550	86 252 624	1 299 624 887
2028	1 299 624 887	38 249 986	80 433 364	1 083 859	89 459 389	1 345 817 039
2020	1 345 817 039	37 293 652	85 039 210	1,000,000	92 497 891	1 389 477 736
2020	1 389 477 736	36,394,608	89 631 443	1 100 682	95,361,628	1 430 501 847
2031	1 430 501 847	35 577 542	93 843 835	1 111 350	98 056 912	1 469 181 116
2032	1 469 181 116	34 832 788	98 031 347	1 123 857	100 591 394	1 505 450 094
2033	1,505,450,094	34,120,816	102.038.124	1,137,440	102,964,590	1,539,359,936
2034	1 539 359 936	33 461 552	105 765 563	1 151 070	105 184 268	1 571 089 123
2035	1.571.089.123	32,880,506	109,274,522	1,165,706	107,261,648	1,600,791,049
2036	1,600,791,049	32,401,498	112.461.837	1,181,237	109,211,918	1,628,761,391
2037	1,628,761,391	31,986,759	115.328.061	1,196,852	111.054.462	1,655,277,699
2038	1,655,277,699	31,645,859	118.041.292	1,212,995	112,803,144	1.680.472.415
2039	1,680,472,415	31,350,261	120,752,758	1,229,632	114,460,945	1.704.301.231
2040	1,704,301,231	31,107,317	123.040.354	1.246.418	116,039,805	1,727,161,581
2041	1,727,161,581	30,909,757	125,126,307	1.262.511	117,559,544	1.749.242.064
2042	1.749.242.064	30.762.478	127.028.831	1.278.335	119.032.880	1.770.730.256
2043	1,770,730,256	30,638,669	128,570,066	1,293,614	120,478,243	1,791,983,488
2044	1.791.983.488	30.591.562	129,901,647	1.308.378	121,917,198	1.813.282.223
2045	1.813.282.223	30.564.117	130.873.581	1.321.784	123.372.662	1.835.023.637
2046	1.835.023.637	30.595.591	131.316.523	1.333.321	124,879,756	1.857.849.140
2047	1.857.849.140	30.671.635	131,662,102	1.344.246	126,467,725	1.881.982.152
2048	1.881.982.152	30,795,758	131.643.412	1.353.331	128,161,716	1.907.942.883
2049	1,907,942,883	30,974,554	131,473,202	1,361,063	129,990,912	1,936,074,084
2050	1,936,074,084	31,194,336	131,030,435	1,367,319	131,983,066	1,966,853,732
2051	1,966,853,732	31,475,074	130,230,123	1,371,573	134,175,329	2,000,902,439
2052	2,000,902,439	31,806,595	129,233,149	1,374,061	136,605,149	2,038,706,973
2053	2,038,706,973	32,183,575	127,772,781	1,373,538	139,315,792	2,081,060,021
2054	2,081,060,021	32,641,653	126,042,214	1,371,378	142,357,184	2,128,645,266
2055	2,128,645,266	33,154,819	124,015,784	1,366,971	145,777,191	2,182,194,521
2056	2,182,194,521	33,720,417	121,690,546	1,359,957	149,627,063	2,242,491,498
2057	2,242,491,498	34,352,374	119,183,985	1,350,575	153,958,028	2,310,267,340
2058	2,310,267,340	35,052,671	116,401,671	1,338,784	158,824,641	2,386,404,197

* First year values in this projection reflect actual experience; first year investment earnings include "other" income.



Exhibit 4 – Development of Blended Discount Rate continued

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative	Projected Investment Farnings	Projected Ending Fiduciary Net Position
2059	\$2 386 404 197	\$35 824 748	\$113 362 620	\$1 324 535	\$164 288 100	\$2 471 820 800
2009	2 471 820 800	26 652 242	110 242 670	1 207 820	170 /06 622	2 567 337 356
2000	2,471,029,090	37 538 467	106 730 002	1 288 223	177,246,505	2,507,557,550
2001	2,507,557,550	38 505 270	103,739,092	1,200,223	18/ 877 866	2 703 007 501
2002	2,074,093,013	30,505,270	00 /68 620	1 242 378	103 360 233	2,795,007,591
2003	2,795,007,591	40 621 300	95,400,025	1 215 997	202 702 010	3 071 679 459
2004	3 071 679 459	40,021,390	93,713,711	1 187 315	202,792,919	3 233 683 677
2005	3 233 683 677	41,707,002	87 838 263	1 156 516	213,224,040	3 412 403 400
2000	3 412 403 400	42,307,032	83 878 766	1 123 699	224,740,909	3 609 066 052
2007	3 600 066 052	44,224,019	70 834 653	1,123,033	251,440,999	3 825 067 042
2000	3 825 067 042	45,520,730	75,804,000	1,000,092	266 705 601	4 061 798 601
2009	4 061 798 601	40,002,712	71 801 373	1,032,200	283 /67 2/0	4,001,730,001
2070	4,001,732,636	40,202,047	67 851 572	073 880	203,407,240	4,020,732,030
2071	4,520,752,050	51 218 308	63 957 578	973,000	321 760 753	4,003,417,933
2072	4 911 507 178	52 754 950	60 111 702	801 / 135	3/3 516 816	5 246 775 807
2073	5 2/6 775 807	5/ 337 598	56 327 607	851,435	367 174 863	5 611 109 425
2075	5 611 109 425	55 967 726	52 612 110	811 870	302 866 601	6 006 519 853
2075	6 006 519 853	57 6/6 759	/8 967 803	773 //1	/20 733 083	6 435 158 451
2070	6 /35 158 /51	59 376 161	45,307,003	736.035	450 924 337	6 899 318 360
2078	6 899 318 360	61 157 446	/1 928 377	699 723	430,924,337	7 401 448 518
2070	7 401 448 518	62 992 170	38 552 660	664 565	518 033 510	7,401,440,510
2019	7,401,440,510	6/ 881 03/	35,332,009	630,603	557 104 737	8 530 225 962
2000	8 530 225 962	66 828 302	32 144 164	507 869	508 308 840	0,162,621,161
2001	0,000,220,902	68 833 244	20 130 075	566 385	6/2 753 260	9,102,021,101
2002	9,102,021,101	70 808 241	29,130,075	536 160	600 650 458	10 570 275 625
2003	10 570 275 625	70,090,241	20,207,120	507 107	742 262 659	11 270 521 125
2004	11 270 521 125	75,025,169	23,330,130	470.497	742,203,030	12 222 008 018
2000	12 222 009 019	75,215,944	18 570 570	479,407	857 502 255	12,222,090,010
2080	12,222,090,010	70,706,505	16,379,379	403,010	021 974 452	14 122 014 452
2007	14 123 014 452	82 100 403	14 304 974	427,771	921,074,400	15 181 /60 126
2000	15 181 /60 126	84 656 208	12 /33 /53	380 837	1 065 217 306	16 318 528 350
2009	16 318 528 350	87 105 805	10 736 803	359,089	1 1// 960 /85	17 530 588 838
2090	17 530 588 838	80 811 771	0,730,005	338 443	1,144,900,403	18 850 431 623
2091	18 850 431 623	03,011,771	7 844 848	318 861	1 322 /82 108	20 257 256 236
2032	20 257 256 236	92,000,124	6 645 532	300 306	1 /21 000 679	20,207,200,200
2095	20,207,200,200	08 120 7/8	5 500 057	282 727	1 526 807 425	21,700,031,304
2094	23 385 8/6 763	101 083 040	4 695 074	202,131	1,520,037,420	25,505,040,705
2095	25,305,040,705	101,003,940	3 026 477	200,114	1 762 061 001	26,122,343,000
2090	20,122,040,000	104,110,400	2 277 002	200,099	1 902 524 547	20,904,044,000
2097	20,904,344,300	107,239,951	3,211,902	∠30,001	1,092,004,047	20,900,000,013



Exhibit 4 – Development of Blended Discount Rate continued

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2098	\$28,980,605,613	\$110,457,151	\$2,737,837	\$221,530	\$2,032,404,815	\$31,120,508,212
2099	31,120,508,212	113,770,864	2,296,039	208,298	2,182,329,903	33,414,104,642
2100	33,414,104,642	117,183,991	1,944,584	195,817	2,343,013,851	35,872,162,083
2101	35,872,162,083	120,699,510	1,662,689	184,049	2,515,211,193	38,506,226,048
2102	38,506,226,048	124,320,495	1,441,817	172,958	2,699,730,524	41,328,662,292
2103	41,328,662,292	128,050,110	1,255,181	162,510	2,897,438,495	44,352,733,206
2104	44,352,733,206	131,891,614	1,137,675	152,671	3,109,262,369	47,592,596,843
2105	47,592,596,843	135,848,362	1,028,598	143,409	3,336,195,451	51,063,468,649
2106	51,063,468,649	139,923,813	953,715	134,691	3,579,302,045	54,781,606,101
2107	54,781,606,101	144,121,527	892,314	126,490	3,839,721,022	58,764,429,846
2108	58,764,429,846	148,445,174	809,490	118,775	4,118,673,181	63,030,619,936
2109	63,030,619,936	152,898,529	746,224	111,520	4,417,464,823	67,600,125,544
2110	67,600,125,544	157,485,484	671,510	104,699	4,737,493,613	72,494,328,432
2111	72,494,328,432	162,210,049	623,254	98,287	5,080,255,088	77,736,072,028
2112	77,736,072,028	167,076,350	553,680	92,262	5,447,350,106	83,349,852,542
2113	83,349,852,542	172,088,640	504,489	86,599	5,840,492,092	89,361,842,186
2114	89,361,842,186	177,251,301	415,409	81,279	6,261,515,364	95,800,112,163
2115	95,800,112,163	182,568,839	304,623	76,282	6,712,384,429	102,694,684,526
2116	102,694,684,526	188,045,904	204,061	71,588	7,195,199,876	110,077,654,657
2117	110,077,654,657	193,687,281	93,315	67,179	7,712,209,264	117,983,390,708
2118	117,983,390,708	199,497,900	54,174	63,040	8,265,815,674	126,448,587,068
2119	126,448,587,068	205,482,837	18,250	59,153	8,858,590,285	135,512,582,787
2120	135,512,582,787	211,647,322	6,342	55,503	9,493,286,287	145,217,454,551
2121	145,217,454,551	217,996,742	89	52,077	10,172,849,879	155,608,249,006
2122	155,608,249,006	224,536,644	59	48,861	10,900,434,501	166,733,171,231
2123	166,733,171,231	231,272,743	38	45,842	11,679,414,926	178,643,813,020
2124	178,643,813,020	238,210,926	24	43,009	12,513,402,788	191,395,383,701
2125	191,395,383,701	245,357,253	14	40,349	13,406,262,950	205,046,963,541
2126	205,046,963,541	252,717,971	8	37,854	14,362,131,252	219,661,774,902
2127	219,661,774,902	260,299,510	5	35,511	15,385,433,483	235,307,472,379
2128	235,307,472,379	268,108,495	3	33,314	16,480,905,698	252,056,453,255
2129	252,056,453,255	276,151,750	1	31,251	17,653,615,945	269,986,189,698
2130	269,986,189,698	284,436,302	1	29,316	18,908,987,523	289,179,584,206
2131	289,179,584,206	292,969,392	0	0	20,252,824,823	309,725,378,421



Exhibit 4 – Development of Blended Discount Rate continued

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.16%*	Present Value of Benefit Payments at 7.00%
2020	\$740,052,895	\$43,357,218	\$43,357,218	\$0	\$41,915,005	\$0	\$41,915,005
2021	926,034,330	49,260,984	49,260,984	0	44,506,907	0	44,506,907
2022	981,864,523	53,391,449	53,391,449	0	45,082,943	0	45,082,943
2023	1,036,861,317	57,343,541	57,343,541	0	45,252,365	0	45,252,365
2024	1,091,584,754	61,648,071	61,648,071	0	45,466,601	0	45,466,601
2025	1,145,995,513	66,304,405	66,304,405	0	45,701,621	0	45,701,621
2026	1,199,894,205	71,225,711	71,225,711	0	45,881,989	0	45,881,989
2027	1,250,988,415	75,825,675	75,825,675	0	45,649,703	0	45,649,703
2028	1,299,624,887	80,433,364	80,433,364	0	45,255,787	0	45,255,787
2029	1,345,817,039	85,039,210	85,039,210	0	44,717,069	0	44,717,069
2030	1,389,477,736	89,631,443	89,631,443	0	44,048,459	0	44,048,459
2031	1,430,501,847	93,843,835	93,843,835	0	43,101,492	0	43,101,492
2032	1,469,181,116	98,031,347	98,031,347	0	42,079,227	0	42,079,227
2033	1,505,450,094	102,038,124	102,038,124	0	40,933,744	0	40,933,744
2034	1,539,359,936	105,765,563	105,765,563	0	39,653,316	0	39,653,316
2035	1,571,089,123	109,274,522	109,274,522	0	38,288,677	0	38,288,677
2036	1,600,791,049	112,461,837	112,461,837	0	36,827,551	0	36,827,551
2037	1,628,761,391	115,328,061	115,328,061	0	35,295,463	0	35,295,463
2038	1,655,277,699	118,041,292	118,041,292	0	33,762,459	0	33,762,459
2039	1,680,472,415	120,752,758	120,752,758	0	32,278,504	0	32,278,504
2040	1,704,301,231	123,040,354	123,040,354	0	30,738,320	0	30,738,320
2041	1,727,161,581	125,126,307	125,126,307	0	29,214,429	0	29,214,429
2042	1,749,242,064	127,028,831	127,028,831	0	27,718,345	0	27,718,345
2043	1,770,730,256	128,570,066	128,570,066	0	26,219,300	0	26,219,300
2044	1,791,983,488	129,901,647	129,901,647	0	24,757,803	0	24,757,803
2045	1,813,282,223	130,873,581	130,873,581	0	23,311,255	0	23,311,255
2046	1,835,023,637	131,316,523	131,316,523	0	21,859,955	0	21,859,955
2047	1,857,849,140	131,662,102	131,662,102	0	20,483,629	0	20,483,629
2048	1,881,982,152	131,643,412	131,643,412	0	19,140,861	0	19,140,861
2049	1,907,942,883	131,473,202	131,473,202	0	17,865,526	0	17,865,526
2050	1,936,074,084	131,030,435	131,030,435	0	16,640,523	0	16,640,523
2051	1,966,853,732	130,230,123	130,230,123	0	15,456,902	0	15,456,902
2052	2,000,902,439	129,233,149	129,233,149	0	14,335,114	0	14,335,114
2053	2,038,706,973	127,772,781	127,772,781	0	13,245,910	0	13,245,910
2054	2,081,060,021	126,042,214	126,042,214	0	12,211,688	0	12,211,688
2055	2,128,645,266	124,015,784	124,015,784	0	11,229,304	0	11,229,304
2056	2,182,194,521	121,690,546	121,690,546	0	10,297,907	0	10,297,907
2057	2,242,491,498	119,183,985	119,183,985	0	9,425,974	0	9,425,974
2058	2,310,267,340	116,401,671	116,401,671	0	8,603,671	0	8,603,671

* Bond Buyer's 20-Bond GO index

Vermont Municipal Employees' Retirement System Governmental Accounting Standards Board Statement 67 Actuarial Valuation Report as of June 30, 2021



Exhibit 4 – Development of Blended Discount Rate continued

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.16%*	Present Value of Benefit Payments at 7.00%
2059	\$2,386,404,197	\$113,362,629	\$113,362,629	\$0	\$7,830,882	\$0	\$7,830,882
2060	2,471,829,890	110,243,679	110,243,679	0	7,117,225	0	7,117,225
2061	2,567,337,356	106,739,092	106,739,092	0	6,440,161	0	6,440,161
2062	2,674,095,013	103,203,994	103,203,994	0	5,819,504	0	5,819,504
2063	2,793,007,591	99,468,629	99,468,629	0	5,241,937	0	5,241,937
2064	2,925,196,858	95,715,711	95,715,711	0	4,714,169	0	4,714,169
2065	3,071,679,459	91,800,309	91,800,309	0	4,225,540	0	4,225,540
2066	3,233,683,677	87,838,263	87,838,263	0	3,778,662	0	3,778,662
2067	3,412,403,499	83,878,766	83,878,766	0	3,372,272	0	3,372,272
2068	3,609,066,052	79,834,653	79,834,653	0	2,999,703	0	2,999,703
2069	3,825,067,042	75,804,466	75,804,466	0	2,661,937	0	2,661,937
2070	4,061,798,601	71,801,373	71,801,373	0	2,356,416	0	2,356,416
2071	4,320,732,636	67,851,572	67,851,572	0	2,081,112	0	2,081,112
2072	4,603,417,955	63,957,578	63,957,578	0	1,833,343	0	1,833,343
2073	4,911,507,178	60,111,702	60,111,702	0	1,610,375	0	1,610,375
2074	5,246,775,807	56,327,607	56,327,607	0	1,410,280	0	1,410,280
2075	5,611,109,425	52,612,119	52,612,119	0	1,231,080	0	1,231,080
2076	6,006,519,853	48,967,803	48,967,803	0	1,070,846	0	1,070,846
2077	6,435,158,451	45,404,554	45,404,554	0	927,966	0	927,966
2078	6,899,318,360	41,928,377	41,928,377	0	800,861	0	800,861
2079	7,401,448,518	38,552,669	38,552,669	0	688,208	0	688,208
2080	7,944,156,973	35,287,079	35,287,079	0	588,704	0	588,704
2081	8,530,225,962	32,144,164	32,144,164	0	501,187	0	501,187
2082	9,162,621,161	29,130,075	29,130,075	0	424,478	0	424,478
2083	9,844,511,214	26,257,128	26,257,128	0	357,583	0	357,583
2084	10,579,275,625	23,536,150	23,536,150	0	299,559	0	299,559
2085	11,370,521,125	20,977,603	20,977,603	0	249,528	0	249,528
2086	12,222,098,018	18,579,579	18,579,579	0	206,545	0	206,545
2087	13,138,130,099	16,358,924	16,358,924	0	169,961	0	169,961
2088	14,123,014,452	14,304,974	14,304,974	0	138,899	0	138,899
2089	15,181,469,126	12,433,453	12,433,453	0	112,829	0	112,829
2090	16,318,528,350	10,736,803	10,736,803	0	91,058	0	91,058
2091	17,539,588,838	9,210,945	9,210,945	0	73,007	0	73,007
2092	18,850,431,623	7,844,848	7,844,848	0	58,111	0	58,111
2093	20,257,256,236	6,645,532	6,645,532	0	46,007	0	46,007
2094	21,766,691,384	5,599,057	5,599,057	0	36,226	0	36,226
2095	23,385,846,763	4,695,074	4,695,074	0	28,390	0	28,390
2096	25,122,343,085	3,926,477	3,926,477	0	22,189	0	22,189
2097	26,984,344,568	3,277,902	3,277,902	0	17,312	0	17,312

* Bond Buyer's 20-Bond GO index

Vermont Municipal Employees' Retirement System Governmental Accounting Standards Board Statement 67 Actuarial Valuation Report as of June 30, 2021



Exhibit 4 – Development of Blended Discount Rate continued

Fiscal Year Beginning	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.16%*	Present Value of Benefit Payments at 7.00%
2098	\$28,980,605,613	\$2,737,837	\$2,737,837	\$0	\$13,514	\$0	\$13,514
2099	31,120,508,212	2,296,039	2,296,039	0	10,592	0	10,592
2100	33,414,104,642	1,944,584	1,944,584	0	8,384	0	8,384
2101	35,872,162,083	1,662,689	1,662,689	0	6,699	0	6,699
2102	38,506,226,048	1,441,817	1,441,817	0	5,429	0	5,429
2103	41,328,662,292	1,255,181	1,255,181	0	4,417	0	4,417
2104	44,352,733,206	1,137,675	1,137,675	0	3,742	0	3,742
2105	47,592,596,843	1,028,598	1,028,598	0	3,162	0	3,162
2106	51,063,468,649	953,715	953,715	0	2,740	0	2,740
2107	54,781,606,101	892,314	892,314	0	2,396	0	2,396
2108	58,764,429,846	809,490	809,490	0	2,031	0	2,031
2109	63,030,619,936	746,224	746,224	0	1,750	0	1,750
2110	67,600,125,544	671,510	671,510	0	1,472	0	1,472
2111	72,494,328,432	623,254	623,254	0	1,277	0	1,277
2112	77,736,072,028	553,680	553,680	0	1,060	0	1,060
2113	83,349,852,542	504,489	504,489	0	903	0	903
2114	89,361,842,186	415,409	415,409	0	695	0	695
2115	95,800,112,163	304,623	304,623	0	476	0	476
2116	102,694,684,526	204,061	204,061	0	298	0	298
2117	110,077,654,657	93,315	93,315	0	127	0	127
2118	117,983,390,708	54,174	54,174	0	69	0	69
2119	126,448,587,068	18,250	18,250	0	22	0	22
2120	135,512,582,787	6,342	6,342	0	7	0	7
2121	145,217,454,551	89	89	0	0	0	0
2122	155,608,249,006	59	59	0	0	0	0
2123	166,733,171,231	38	38	0	0	0	0
2124	178,643,813,020	24	24	0	0	0	0
2125	191,395,383,701	14	14	0	0	0	0
2126	205,046,963,541	8	8	0	0	0	0
2127	219,661,774,902	5	5	0	0	0	0
2128	235,307,472,379	3	3	0	0	0	0
2129	252,056,453,255	1	1	0	0	0	0
2130	269,986,189,698	1	1	0	0	0	0
2131	289,179,584,206	0	0	0	0	0	0
Total					\$1,260,160,610	\$0	\$1,260,160,610

* Bond Buyer's 20-Bond GO index



Exhibit I: Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions:	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated September 24, 2020 (as prepared by Segal).						
Roll-forward Techniques:	The results as of Jur Actuarial Valuation F	ne 30, 2021, are based on t Report as of June 30, 2020,	he results of the Vermont Municipal Employees' Retirement System adjusted forward, using standard actuarial techniques.				
Inflation:	2.30%.						
Investment Return:	7.00%. 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.						
Salary Increases:	Varying service base	ed rates from 0-10 years of	service, then a single rate of 4.50% for all subsequent years.				
	Service	Annual Rate of Salary Increase** (%)					
	0	7.00%					
	1	6.50%					
	2	5.75%					
	3	5.25%					
	4	5.00%					
	5	4.75%					
	6	4.75%					
	7	4.75%					
	8	4.75%					
	9	4.75%					
	10+	4.50%					

Includes assumed inflation rate of 2.30%.

*



Cost-of-Living Adjustments:	Assumed to occu members and 1.2 members who ele retirement benefi 1, 2022, COLA is COLAs were 0.4	ar on January 1 following one year of retirement at the rate of 1.10% per annum for Group A 20% per annum for Groups B, C and D members (beginning at Normal Retirement eligibility age for ect reduced early retirement, at age 62 for members of Groups A, B, and D who receive a disability t, and at age 55 for members of Group C who receive a disability retirement benefit). The January assumed to be 2.00% for Group A and 2.30% for Groups B, C, and D. The January 1, 2021, 0% for all groups.			
Mortality Rates:	Pre-Retirement:				
	Groups A/B/C	40% PubG-2010 General Employee amount-weighted below-median and 60% of PubG-2010 General Employee amount-weighted, with generational projection using Scale MP-2019.			
	Group D	PubG-2010 General Employee amount-weighted above-median, with generational projection using scale MP-2019.			
	Healthy Post-reti	rement - Retirees:			
	Groups A/B/C	104% of 40% PubG-2010 General Healthy Retiree amount-weighted below-median and 60% of PubG-2010 General Healthy Retiree amount-weighted, with generational projection using scale MP-2019.			
	Group D	PubG-2010 General Healthy Retiree amount-weighted, with generational projection using scale MP-2019.			
	Healthy Post-reti	rement - Beneficiaries:			
	Groups A/B/C	70% Pub-2010 Contingent Survivor amount-weighted below-median and 30% of Pub-2010 Contingent Survivor amount-weighted, with generational projection using scale MP-2019.			
	Group D	Pub-2010 Contingent Survivor amount-weighted, with generational projection using scale MP-2019.			
	Disabled Post-retirement.				
	All Groups	PubNS-2010 Non-Safety Disabled Retiree amount-weighted with generational projection using Scale MP-2019.			
	The tables with t the mortality expe	he generational projection to the ages of members as of the measurement date reasonably reflect erience of the System as of the measurement date.			
	The mortality rate of the underlying adjusted to futur measurement da	es were based on historical and current demographic data, adjusted to reflect health characteristics groups and estimated future experience and professional judgment. The mortality tables were then re years using the generational projection to reflect future mortality improvement between the te and those years.			



Withdrawal from Service before Retirement

Assumed annual rates of withdrawal are as follows:

		Rate (%)	
	Service	Male	Female
	0	22.50%	25.00%
	1	16.20	22.00
	2	13.50	17.50
	3	12.15	15.50
	4	10.80	12.00
	5	9.00	11.00
	6	8.10	10.50
	7	7.20	10.00
	8	7.20	7.50
	9	6.30	7.00
	10	3.60	6.00



Disability Incidence:

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

	Rate (%) ¹	
Service	Male	Female
25	0.0100%	0.0050%
30	0.0130	0.0065
35	0.0170	0.0085
40	0.0300	0.0150
45	0.0500	0.0250
50	0.0900	0.0450
55	0.1800	0.0900
60	0.3150	0.1575
65	0.3150	0.1575

¹ Disability rates stop after age 55 with 5 or more years of service for Group B, C and D members and after age 55 with 35 or more years of service for Group A members.



Retirement Rates:

		F	Retirement Group	o A	
Age	Male	Female	Age	Male	Female
55	3.00%	4.00%	63	15.00%	15.00%
56	6.00	6.00	64	15.00	20.00
57	4.00	6.00	65	45.00	20.00
58	4.00	4.00	66	15.00	20.00
59	5.75	7.50	67	15.00	20.00
60	7.50	4.00	68	15.00	25.00
61	10.00	7.50	69	15.00	25.00
62	22.50	7.50	70	100.00	100.00

		F	Retirement Group	рВ	
Age	Male	Female	Age	Male	Female
55	4.00%	4.00%	63	20.00%	12.50%
56	4.00	4.00	64	20.00	17.50
57	4.00	4.00	65	40.00	27.50
58	4.00	5.00	66	35.00	22.50
59	4.00	5.00	67	30.00	17.50
60	4.00	5.00	68	30.00	17.50
61	14.00	12.50	69	30.00	17.50
62	28.00	17.50	70	100.00	100.00

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Retirement Rates: (continued)

	Retirement Group C			
Age	Unisex	Age	Unisex	
55	20.00%	63	10.00%	
56	10.00	64	22.50	
57	10.00	65	35.00	
58	15.00	66	35.00	
59	17.50	67	35.00	
60	15.00	68	35.00	
61	10.00	69	35.00	
62	20.00	70	100.00	

Retirement	Group	D
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Age	<20 Years of Service	20+ Years of Service	Age	<20 Years of Service	20+ Years of Service
50	0.00%	40.0%	58	15.0%	10.0%
51	0.00	35.0	59	15.0	10.0
52	0.00	30.0	60	15.0	15.0
53	0.00	25.0	61	10.0	10.0
54	0.00	20.0	62	25.0	25.0
55	20.00	15.0	63	25.0	25.0
56	20.00	10.0	64	25.0	25.0
57	20.00	10.0	65	100.0	100.0

Rates shown are for participants with 5 or more years of service (unless otherwise indicated). For participants with less than 5 years of service, 0% is assumed.



Inactive Members as Reported by the System:	Not Vested: Valuation liability equals 100% of accumulated contributions. Vested: Valuation liability based on accrued benefit and members are assumed to retire 10% of the time each year from their Early Retirement Age until their Normal Retirement Age, than 100% of the time at their Normal Retirement age, with deferred vested benefit.	
Deferred Members as Reported by the System:	Assumed to retire 10% of the time each year from their Early Retirement Age until their Normal Retirement Age, than 100% of the time at their Normal Retirement age, with deferred vested benefit.	
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.	
Percent Married:	85% of male members and 50% of female members are assumed to be married.	
Age of Spouse:	Females three years younger than males.	
Benefit Elections:	Non-Group D:All members are assumed to elect the single life annuity.Group D:Single members are assumed to elect the single life annuity. Married members are assumed to elect the 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 participant.	
Modeling	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Deterministic cost projections are based on a proprietary forecasting model. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the direction of the supervising actuary.	
Changes in Actuarial Assumptions:	There were 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, 1975.		
Credible Service:	Service as a member plus purchased service.		
Membership:	Full time employees of participating municipalities. Municipality elects coverage under Groups A, B, C, or D provisions.		
Average Final Compensation (AFC):	 Group A: Average annual compensation during highest 5 consecutive years. Group B/C: Average annual compensation during highest 3 consecutive years. Group D: Average annual compensation during highest 2 consecutive years. 		
Normal Retirement – Eligibility:	 Group A: Earlier of age 65 with 5 years of service or age 55 with 35 years of service. Group B: Earlier of age 62 with 5 years of service or age 55 with 30 years of service. Groups C/D: Age 55 with 5 years of service. 		
Normal Retirement – Amount:	 Group A: 1.4% of AFC times service. Group B: 1.7% of AFC times service as a Group B member plus percentage earned as a Group A member times AFC. 		
	• Group C: 2.5% of AFC times service as a Group C member plus percentage earned as a Group A or B member times AFC.		
	• Group D: 2.5% of AFC times service as a Group D member plus percentage earned as a Group A, B or C member times AFC.		
	Maximum benefit is 60% of AFC for Groups A and B and 50% of AFC for Groups C and D. The above amounts include the portion of the allowance provided by member contributions.		
Early Retirement – Eligibility:	Groups A/B: Age 55 with 5 years of service.		
	Group C: None.		
	Group D: Age 50 with 20 years of service.		
Early Retirement – Amount:	Normal retirement allowance based on service and AFC at early retirement, reduced by 6% for each year commencement precedes Normal Retirement Age for Group A and B members; payable without reduction to Group D members.		



Vesting:	All groups – 5 years of service. Allowance beginning at normal retirement age based on AFC and service at termination. The AFC is to be adjusted annually by one-half of the percentage change in the Consumer Price Index, subject to the limits on "Post-Retirement Adjustments" described below.		
Disability Retirement – Eligibility:	All groups – 5 yea	rs of service and disability as determined by Retirement Board.	
Disability Retirement – Amount:	All groups – Immediate allowance based on AFC and service to date of disability. Children's benefit of 10% of AFC payable to up to three minor children (or children up to age 23 if enrolled in full-time studies) of a disabled Group D member.		
Death Benefit – Eligibility:	All groups – Death	after 5 years of service.	
Death Benefit – Amount:	Groups A/B/C:	Reduced early retirement allowance under 100% survivor option commencing immediately or, if greater, survivor's benefit under disability allowance computed as of date of death.	
	Group D:	70% of the unreduced accrued benefit, plus children's benefit.	
Post-Retirement Adjustments:	• Group A:	Allowances in pay status for at least one year increased on each January 1 by one-half of the percentage increase in Consumer Price Index, but not more than 2%. If receiving an Early Retirement benefit, no increases until after reaching attaining Normal Retirement eligibility. If receiving a Disability Retirement benefit, no increases until after attaining age 62.	
	Groups B/C/D:	Allowances in payment for at least one year increased on each January 1 by one-half of the percentage increase in Consumer Price Index, but not more than 3%. If receiving an Early Retirement benefit, no increases until after reaching attaining Normal Retirement eligibility. If receiving a Disability Retirement benefit, no increases until after attaining age 62 (age 55 for Group C).	
Retirement Stipend:	\$25 per month payable at the option of the Retirement Board.		
Optional Benefit and Death after Retirement:	• Group A/B/C:	A lifetime allowance or actuarially equivalent 50% or 100% joint and survivor allowance with refund of contribution guarantee.	
	Group D:	A lifetime allowance or 70% contingent annuitant option with no reduction.	
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:	Group AGroup BGroup CGroup D	3.250% effective July 1, 2021 5.625% effective July 1, 2021 10.750% effective July 1, 2021 12.100% effective July 1, 2021
Employer Contribution Rates:	 Group A Group B Group C Group D At the Novemb 	 4.750% effective July 1, 2021 6.250% effective July 1, 2021 8.000% effective July 1, 2021 10.600% effective July 1, 2021 er 17, 2020 Board meeting, the Board voted unanimously to authorize
	employer contr July 1, 2022, to with employee	ibution rate increases of 0.50% each year for a period of four years, beginning be offset by any increases in the employee contribution rates as negotiated groups and approved by the Legislature.
Changes in Plan Provisions:	Aside from the future contribution rate increases shown above, there were no other changes in plan provisions since the prior valuation.	



Definitions of certain terms as they are used in Statements 67/68. 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 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: 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.



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 <i>normal cost</i> . 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 <i>actuarial accrued liability</i> .
Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
The period between the prior and the current measurement dates.
A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
The liability of employers and non-employer contributing entities to employees for benefits provided through a defined benefit pension plan.
Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statements 67/68, employees are not considered non-employer contributing entities.
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.
Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed and benefits are paid as they come due.
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.
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).
The period after employment.
Adjustments to the pension of an inactive employee.
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 (TPL):	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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