PLYMOUTH CONTRIBUTORY RETIREMENT SYSTEM

ACTUARIAL VALUATION
as of
January 1, 2024

KMS Actuaries, LLC
52 Hunt Road
Kingston, NH 03848

June, 2024

ACTUARIES

LLC

KMS

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LLC

June 27, 2024

Plymouth Contributory Retirement Board
212 South Meadow Road
Unit #3
Plymouth, MA 02360

Dear Board Members:

We are pleased to present the enclosed report providing the results of our actuarial valuation of the Plymouth Contributory Retirement System as of January 1, 2024. Our valuation was performed in accordance with the provisions contained in Chapter 32 of the Massachusetts General Laws, "M.G.L.", as of January 1, 2024. Disclosures under GASB Statement No. 67, Financial Reporting for Pension Plans (GASB 67) and GASB Statement No. 68, Accounting and Financial Reporting for Pensions (GASB 68) are provided in a separate report.

The principal results of our valuation are summarized in Section 2. The Summary of Plan Provisions and Actuarial Assumptions and Methods are shown in Sections 5 and 6, respectively. Section 7 summarizes the demographic profile of active members, retired plan members and beneficiaries and disabled plan members. Asset information and actuarial liabilities are presented in Section 2. The development of the required appropriations pursuant to Chapter 32 of the M.G.L. is shown in Section 3, including a 30-year forecast of the required appropriations and projected cash flows. Section 4 includes a summary of valuation information for PERAC as well as information relating to the primary risks to the System and an assessment of those risks.

This valuation is based upon member data provided by the Plymouth Contributory Retirement Board and asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Retirement Board. Although we did not audit the data used in the valuation, we believe that the information is complete and reliable.

Liabilities presented in this report are based on a long-term investment return rate assumption of 7%, net of investment expense, compounded annually.

This report was completed in accordance with generally accepted actuarial standards and procedures, and conforms to the Code of Professional Conduct of the American Academy of Actuaries. The actuarial assumptions used in the determination of costs are reasonably related to the experience of the System and to reasonable expectations, and represent our best estimate of anticipated long-term experience under the System.

Future actuarial valuation results may differ significantly from the current results presented in this report. Examples of potential sources of volatility include plan experience differing from that anticipated by the economic or demographic assumptions, the effect of new entrants, changes in economic or demographic assumptions, the effect of law changes and the delayed effect of smoothing techniques. The potential range of future measurements was not assessed as it was outside the scope of the project.

Our valuation follows generally accepted actuarial methods and we perform such tests as we consider necessary to assure the accuracy of the results. The amounts presented in this report have been appropriately determined according to the actuarial assumptions and methods stated herein.

This report is intended for the sole use of the Plymouth Contributory Retirement Board and may only be provided to other parties in its entirety, unless expressly authorized by KMS Actuaries. Further, it is intended to provide information to comply with the stated purpose of the report. It may not be appropriate for other purposes.

KMS Actuaries is completely independent of the Plymouth Contributory Retirement System and any of its officers or key personnel. None of the actuaries signing this report or anyone closely associated with them has a relationship with the Plymouth Contributory Retirement System, other than as consulting actuary for this assignment, that would impair our independence.

The undersigned credentialed actuaries agree that the analysis, assumptions and results are overall reasonable. They are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinion contained herein. They are available to answer any questions with regard to this report.

Respectfully submitted,

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SECTION 1 - EXECUTIVE SUMMARY

Background

We have completed the Actuarial Valuation of the Plymouth Contributory Retirement System as of January 1, 2024. This valuation is based upon census data provided by the Retirement Board and asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Plymouth Contributory Retirement Board. Information for the prior valuation completed as of January 1, 2022 was obtained from the valuation report prepared by KMS Actuaries.

Primary Purpose

This report was prepared for the Retirement Board for the purposes described below:

- Measure and disclose the financial condition of the System as of the valuation date,
- Indicate trends, both historical and prospective, in the financial progress of the System,
- Identify, assess and disclose material risks of the System and
- Develop System appropriations.

Massachusetts General Laws

The valuation was prepared in accordance with Chapter 32 of the Massachusetts General Laws ("M.G.L."). The results are based on the active, inactive and retired members and beneficiaries as of December 31, 2023, the assets as of December 31, 2023 and assumptions regarding investment returns, salary increases, mortality, turnover, disability and retirement.

The valuation does not take into consideration:

- Changes in the law after the valuation date,
- Reimbursements between retirement systems pursuant to Section 3(8)(c) of Chapter 32,
- State-mandated benefits and
- Cost-of-living increases granted to members in pay status between 1982 and 1997.

GASB Statement Numbers 67 and 68

In June 2012, the GASB approved two related Statements that significantly changed the way pension plans and governments account and report pension liabilities. Effective for plans with fiscal years beginning after June 15, 2013, GASB Statement No. 67, Financial Reporting for Pension Plans, replaced the requirements of Statement No. 25 and effective for employers with fiscal years beginning after June 15, 2014, GASB Statement No. 68, Accounting and Financial Reporting for Pensions, replaced the requirements of Statement No. 27.

The pension standards reflect changes from those previously in place regarding how governments calculate total pension liability and pension expense. Further, the standards contain requirements for disclosing information in the notes to financial statements and presenting required supplementary information following the notes.

The required disclosures and notes under GASB Statement Number 67 and 68 for the fiscal year ending December 31, 2023 are provided in a separate report.

Assets

This valuation is based upon asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Plymouth Contributory Retirement Board. The market value of assets decreased from $257,554,724 as of December 31, 2021 to $254,156,760 as of December 31, 2023. During the plan years ended 2022 and 2023, the market value rates of return were -10.55% and 12.13%, respectively.

The actuarial value of assets increased from $231,799,252 as of January 1, 2022 to $261,548,307 as of January 1, 2024. During the plan years ended 2022 and 2023, the rates of return on the actuarial value of assets were 7.27% and 6.27%, respectively.

The corridor for the actuarial value of assets was modified to be within 20% of the market value of assets. In prior valuations, the corridor was 10%.

Changes Since the Last Valuation

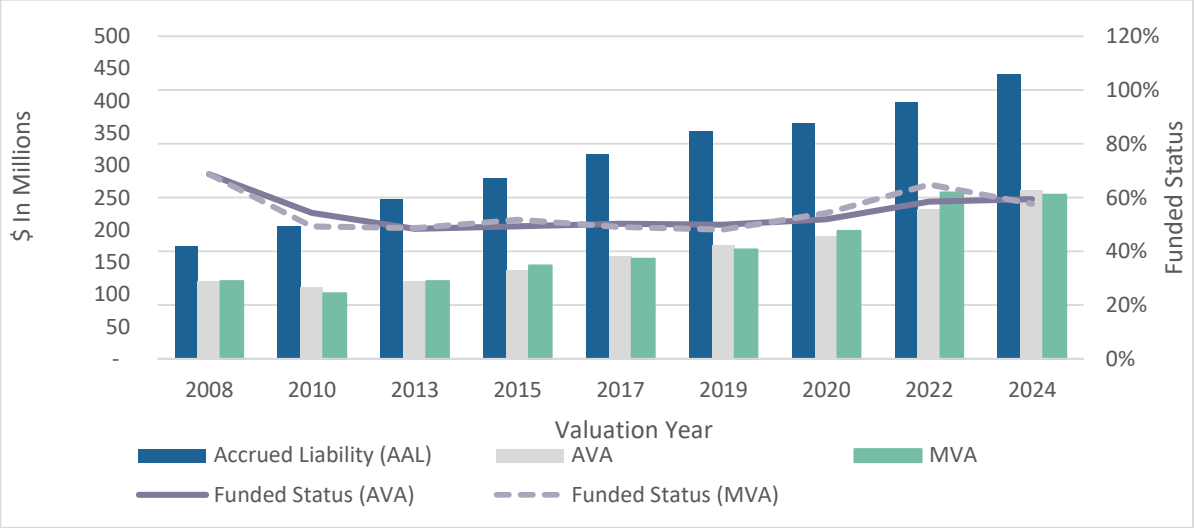
Since the last valuation, the total unfunded actuarial accrued liability of the System was expected to decrease from $165,200,866 as of January 1, 2022 to $154,321,369 as of January 1, 2024, for a total decrease of $10,879,497. The actual unfunded actuarial accrued liability, before any assumption or plan changes, was $179,412,217, resulting in an actuarial loss of $25,090,848. The actuarial loss was primarily due to an asset loss of approximately $1,130,000 and a demographic experience loss of approximately $23,961,000. The details of the gain and loss analysis are provided in Section 2, Actuarial Experience.

Change in Funded Status

The System's funded status, which is the Actuarial Value of Assets divided by the Actuarial Liabilities, increased from 58.4% as of January 1, 2022 to 59.3% as of January 1, 2024.

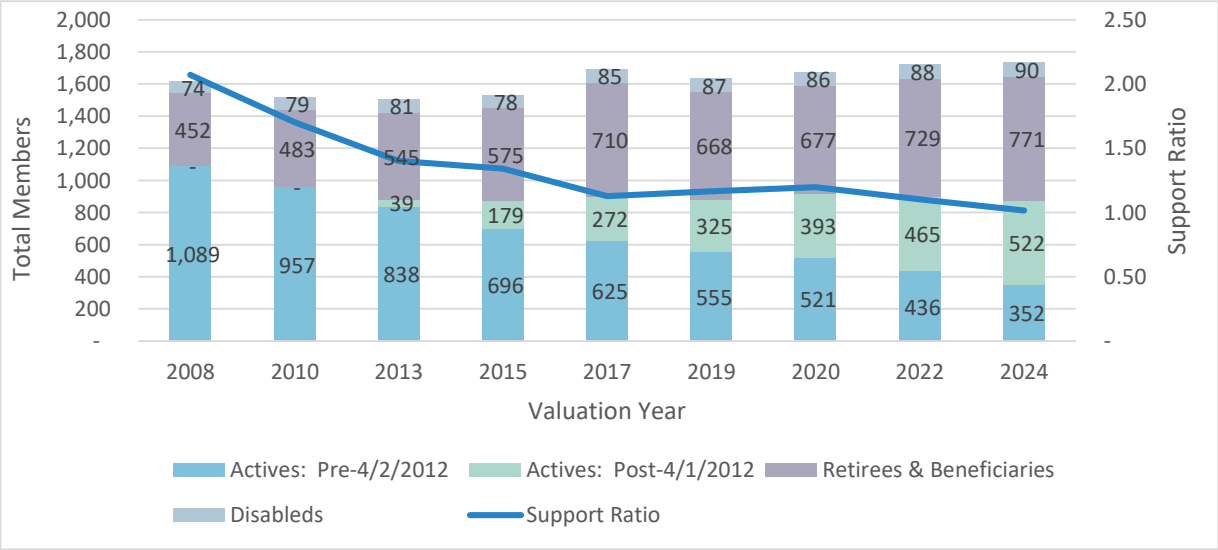
Historical Trends

Below are the accrued liabilities, asset values (actuarial and market) and funded status for each of the last 9 valuations. The purple solid line reflects the funded status on an actuarial value of assets (AVA) basis and the purple dotted line reflects the funded status on a market value (MVA) basis. Blue bars indicate actuarial accrued liabilities, grey bars indicate actuarial value of assets and green bars indicate market value of assets.



Historical Trends, continued

Below are the membership counts for each of the last 9 valuations. The blue line reflects the support ratio, which is the number of active members divided by the number of retirees.



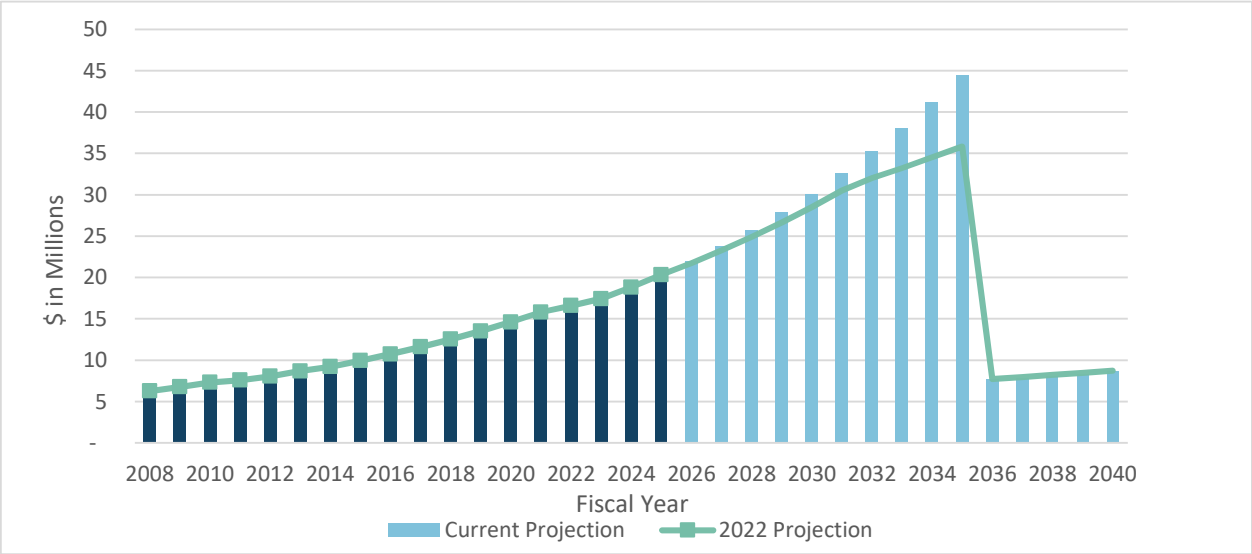
Appropriations

The funding appropriation for each year is computed as the sum of the normal cost, net 3(8)(c) reimbursements and an amortization payment to pay off the Unfunded Actuarial Liability, adjusted for annual payments of the appropriation made July 1. The appropriation calculated as of the January 1, 2024 valuation is $24,105,914, and is made up of a normal cost payment of $5,060,699, net 3(8)(c) reimbursements of $314,189, and an amortization payment of $18,731,026. The amortization method is an increasing amortization of the unfunded actuarial accrued liability at 4% over 11 years and is expected to fully pay the unfunded actuarial accrued liability by the year 2035. The development of the appropriation as of January 1, 2024 is presented in Section 3, Annual Appropriations.

For fiscal year 2025, we show the actual appropriation developed under the previous funding schedule and reported on the PERAC "Required Fiscal Year 2025 Appropriation" letter dated November 27, 2023 of $20,335,289. For fiscal year 2026, we developed an annual appropriation of $21,994,650, which is made up of a normal cost of $5,362,890, net 3(8)(c) reimbursements of $325,000 and payment toward the unfunded actuarial accrued liability of $16,306,760. The unfunded actuarial accrued liability is expected to be fully paid by 2035. The current funding schedule is shown in Section 3, Exhibit 3.1.

Appropriations, continued

The chart below shows the historical (navy bars) and projected (blue bars) annual appropriations compared to the projected amounts shown in the prior valuation and funding schedule (green line).



Plan Provisions

All Plan provisions used in this valuation are the same as those used in the prior valuation. The Plan provisions used in this valuation are summarized in Section 5, Summary of Plan Provisions.

Actuarial Assumptions and Methods

All Actuarial Assumptions and Methods used in this valuation are the same as those used in the prior valuation. The Actuarial Assumptions and Methods utilized in this valuation are detailed in Section 6, Actuarial Assumptions and Methods.

Census Data

As of January 1, 2024, there are 874 active members who may be eligible for benefits in the future, 771 retirees and beneficiaries, 245 inactives and 90 disabled retirees. Summaries of the active, retired and disabled employees are included in Section 7, Plan Member Information. We have examined the data for reasonableness and consistency in accordance with ASOP 23.

SECTION 1 - EXECUTIVE SUMMARY

A summary of principal valuation results from the current valuation and the prior valuation follows.

Valuation Date	January 1, 2024	January 1, 2022	% Change
Census Data			
Active Members	874	901	(3.0%)
Valuation Salary	$59,428,770	$53,625,493	10.8%
Average Salary	$67,996	$59,518	14.2%
Retired Members and Beneficiaries	771	729	5.8%
Total Annual Retirement Allowance	$21,182,473	$18,980,607	11.6%
Average Annual Retirement Allowance	$27,474	$26,037	5.5%
Disabled Members	90	88	2.3%
Total Annual Retirement Allowance	$3,986,309	$3,569,816	11.7%
Average Annual Retirement Allowance	$44,292	$40,566	9.2%
Inactive Members	245	181	35.4%
Annuity Savings Fund	$2,758,012	2,002,579	37.7%
Funded Status			
Actuarial Accrued Liability (AAL)	$440,960,524	$397,000,118	11.1%
Market Value of Assets (MVA)	$254,156,760	$257,554,724	(1.3%)
Unfunded Accrued Liability on MVA	$186,803,764	$139,445,394	34.0%
Funded Status on MVA	57.6%	64.9%	(11.2%)
Actuarial Value of Assets (AVA)	$261,548,307	$231,799,252	12.8%
Unfunded Accrued Liability on AVA	$179,412,217	$165,200,866	8.6%
Funded Status on AVA	59.3%	58.4%	1.5%
Appropriations			
Fiscal Year 2024	N/A	$18,828,972	N/A
Fiscal Year 2025	$20,335,290	$20,335,289	0.0%
Fiscal Year 2026	$21,994,650	$21,758,760	1.1%
Fiscal Year 2027	$23,789,412	$23,281,873	2.2%

Market Value of Assets

Asset information is reported annually to the Public Employee Retirement Administration Commission by the Plymouth Contributory Retirement Board. The Market Value of Assets for the three most recent calendar years are as follows:

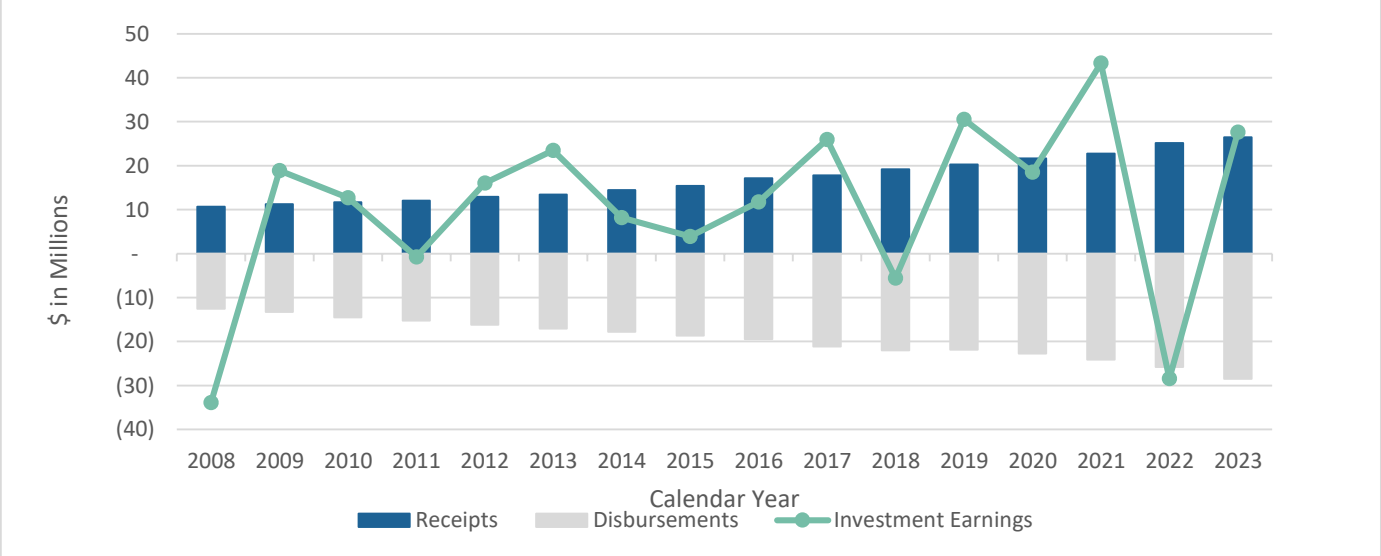
Calendar Year	2023	2022	2021
Trust Fund Composition at Year-End			
Cash	$3,496,198	$3,527,907	$3,725,763
Short-Term Investments	0	0	0
Fixed Income Securities	0	0	0
Equities	31,131,149	29,481,252	35,748,309
Pooled Short Term Funds	0	0	0
Pooled Domestic Equity Funds	39,846,992	35,702,443	49,382,254
Pooled International Equity Funds	45,851,230	33,573,796	35,918,387
Pooled Global Equity Funds	0	0	0
Pooled Domestic Fixed Income Funds	50,688,791	46,810,741	48,590,205
Pooled International Fixed Income Funds	0	0	0
Pooled Global Fixed Income Funds	0	0	0
Pooled Alternative Investments	32,603,551	30,316,693	31,618,512
Pooled Real Estate Funds	20,823,544	22,210,482	26,292,205
Pooled Domestic Balanced Funds	0	0	0
Pooled International Balanced Funds	10,824,701	9,333,517	10,470,592
Hedge Funds	12,192,003	11,039,217	11,267,497
PRIT Cash	0	0	0
PRIT Fund	6,785,112	6,662,967	4,580,572
Interest Due & Accrued	0	0	0
Prepaid Expenses	95,119	19,844	66,880
Accounts Receivable	24,981	15,535	14,138
Land	0	0	0
Buildings	0	0	0
Accumulated Depreciation - Buildings	0	0	0
Accounts Payable	(206,611)	(171,287)	(120,590)
Total Market Value of Assets	**$254,156,760**	**$228,523,107**	**$257,554,724**

SECTION 2 - PRINCIPAL VALUATION RESULTS

Market Value of Assets

Calendar Year	2023	2022	2021
Funds			
Annuity Savings Fund	$51,669,904	$49,573,065	$47,583,122
Annuity Reserve Fund	18,309,265	19,072,559	18,369,120
Special Military Service Fund	44,699	44,654	44,610
Pension Fund	28,533,178	5,498,572	5,845,568
Expense Fund	0	0	0
Pension Reserve Fund	155,599,714	154,334,257	185,712,304
Total Market Value of Assets	**$254,156,760**	**$228,523,107**	**$257,554,724**
Asset Activity			
Market Value as of Beginning of Year	$228,523,107	$257,554,724	$215,615,732
Contributions and Receipts	26,504,199	25,172,291	22,761,696
Benefit Payments and Expenses	(28,469,042)	(25,782,117)	(24,147,718)
Investment Return	27,598,496	(28,421,791)	43,325,014
Total Market Value of Assets	**$254,156,760**	**$228,523,107**	**$257,554,724**
Rate of Return	12.13%	-10.55%	21.19%

Below are the receipts and disbursements during the last 16 years. The green line reflects investment earnings, which vacillate as investment markets fluctuate. Blue bars indicate contributions, from employees and employers, and grey bars show benefit payments and administrative expenses.



Actuarial Value of Assets

The Actuarial Value of Assets is the market value of assets as of the valuation date adjusted to phase in investment gains and losses over a 4-year period, further constrained to be within 20% (10% prior to the 2024 valuation) of the market value of assets. Investment gains and losses are the excess or deficiency of the expected returns over the actual returns.

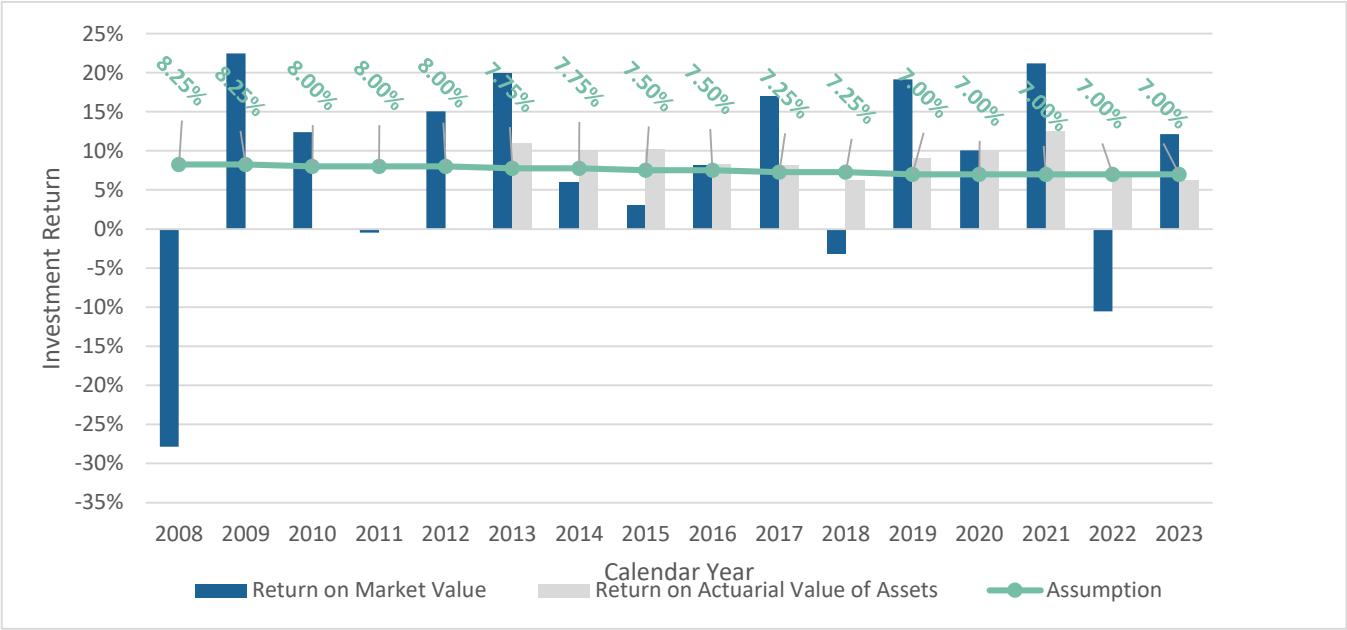
Valuation Date	January 1, 2024	January 1, 2023	January 1, 2022
1. Expected Market Value of Assets			
a. Market Value of Assets as of prior January 1	$228,523,107	$257,554,724	$215,615,732
b. Prior Year Contributions and Receipts	26,504,199	25,172,291	22,761,696
c. Prior Year Benefit Payments and Expenses	(28,469,042)	(25,782,117)	(24,147,718)
d. Expected Investment Return Rate	7.00%	7.00%	7.00%
e. Expected Investment Return	15,927,848	18,007,487	15,044,590
f. Expected Market Value of Assets	$242,486,112	$274,952,385	$229,274,300
2. Prior Year Gain/(Loss)			
a. Market Value of Assets as of January 1	$254,156,760	$228,523,107	$257,554,724
b. Expected Market Value of Assets	242,486,112	274,952,385	229,274,300
c. Prior Year Gain /(Loss)	$11,670,648	($46,429,278)	$28,280,424
3. Phase-In of Asset Gains and Losses			

	Calendar Year	Gain / (Loss)	Unrecognized Gain / (Loss)	Unrecognized Gain / (Loss)	Unrecognized Gain / (Loss)
a.	2023	$11,670,648	$8,752,986	$0	$0
b.	2022	(46,429,278)	(23,214,639)	(34,821,959)	0
c.	2021	28,280,424	7,070,106	14,140,212	21,210,318
d.	2020	4,701,979	0	1,175,495	2,350,990
e.	2019	18,774,938	0	0	4,693,735
f.	2018	(18,367,831)	0	0	0
g.	Total Deferred Gains/(Losses)		($7,391,547)	($19,506,252)	$28,255,043

Actuarial Value of Assets

Valuation Date	January 1, 2024	January 1, 2023	January 1, 2022
4. Actuarial Value of Assets			
a. Market Value of Assets	$254,156,760	$228,523,107	$257,554,724
b. Deferred Gains/(Losses)	(7,391,547)	(19,506,252)	28,255,043
c. Market Value of Assets Less Deferred Gains/(Losses)	$261,548,307	$248,029,359	$229,299,681
d. 80% (90% prior to 2024) of Market Value of Assets	203,325,408	205,670,796	231,799,252
e. 120% (110% prior to 2024) of Market Value of Assets	304,988,112	251,375,418	283,310,196
f. Actuarial Value of Assets, c., but not less than d. and not greater than e.	$261,548,307	$248,029,359	$231,799,252
g. Ratio of Actuarial Value of Assets to Market Value of Assets	102.9%	108.5%	90.0%
5. Rate of Return on Actuarial Value of Assets for Prior Calendar Year	6.27%	7.27%	12.53%

Below are the investment returns during the last 16 years. The green line reflects the investment return actuarial assumption. Blue bars indicate investment return rates on market value of assets, and grey bars show investment return rates on actuarial value of assets (unavailable for years prior to 2013.)



Actuarial Liabilities

The **Actuarial Present Value of Future Benefits** is the present value of the cost to finance all benefits payable in the future, discounted to reflect the probability of payment and the time value of money. Below is the Actuarial Present Value of Future Benefits from the current valuation and the prior valuation:

Valuation Date	January 1, 2024	January 1, 2022
Actives	265,407,149	$241,683,522
Retired Members and Beneficiaries	227,758,149	206,081,206
Disabled Members	48,905,453	42,766,436
Inactive Members	2,758,012	2,002,579
Total Present Value of Future Benefits	**$544,828,763**	**$492,533,743**

The **Actuarial Accrued Liability** is the portion of the Actuarial Present Value of Future Benefits which is allocated to all periods prior to a valuation year and therefore is not provided for by future Normal Costs. Below is the Actuarial Accrued Liability from the current valuation and the prior valuation:

Valuation Date	January 1, 2024	January 1, 2022
Actives	161,538,910	$146,149,897
Retired Members and Beneficiaries	227,758,149	206,081,206
Disabled Members	48,905,453	42,766,436
Inactive Members	2,758,012	2,002,579
Total Actuarial Accrued Liability	**$440,960,524**	**$397,000,118**

The **Unfunded Actuarial Accrued Liability** is the difference between the Actuarial Accrued Liability and the Actuarial Value of Assets as of the valuation date. The **Funded Status** is the Actuarial Value of Assets divided by the Actuarial Accrued Liability and is a point-in-time measurement of the amount of assets set aside to cover actuarial accrued liabilities. Below is the Unfunded Actuarial Accrued Liability and Funded Status from the current valuation and the prior valuation:

Valuation Date	January 1, 2024	January 1, 2022
Unfunded Actuarial Accrued Liability		
a. Actuarial Accrued Liability	$440,960,524	$397,000,118
b. Actuarial Value of Assets	261,548,307	231,799,252
c. Unfunded Actuarial Accrued Liability (a. - b.)	$179,412,217	$165,200,866
d. Funded Status (b. divided by a.)	59.3%	58.4%

Actuarial Liabilities

The **Normal Cost** is the portion of the Actuarial Present Value of Future Benefits which is allocated to a valuation year. Only active employees who have not reached Normal Retirement Age incur a Normal Cost. Below is the Normal Cost from the current valuation and the prior valuation:

Valuation Date	January 1, 2024	January 1, 2022
Total Normal Cost	10,154,369	$9,293,378
As of Percentage of Salary	17.1%	17.3%
Employee Normal Cost	$5,915,396	$5,264,666
As of Percentage of Salary	10.0%	9.8%
Administrative Expenses	$821,726	$821,726
As a Percentage of Salary	1.4%	1.5%
Net Employer Normal Cost	$5,060,699	$4,850,438
As a Percentage of Salary	8.5%	9.0%

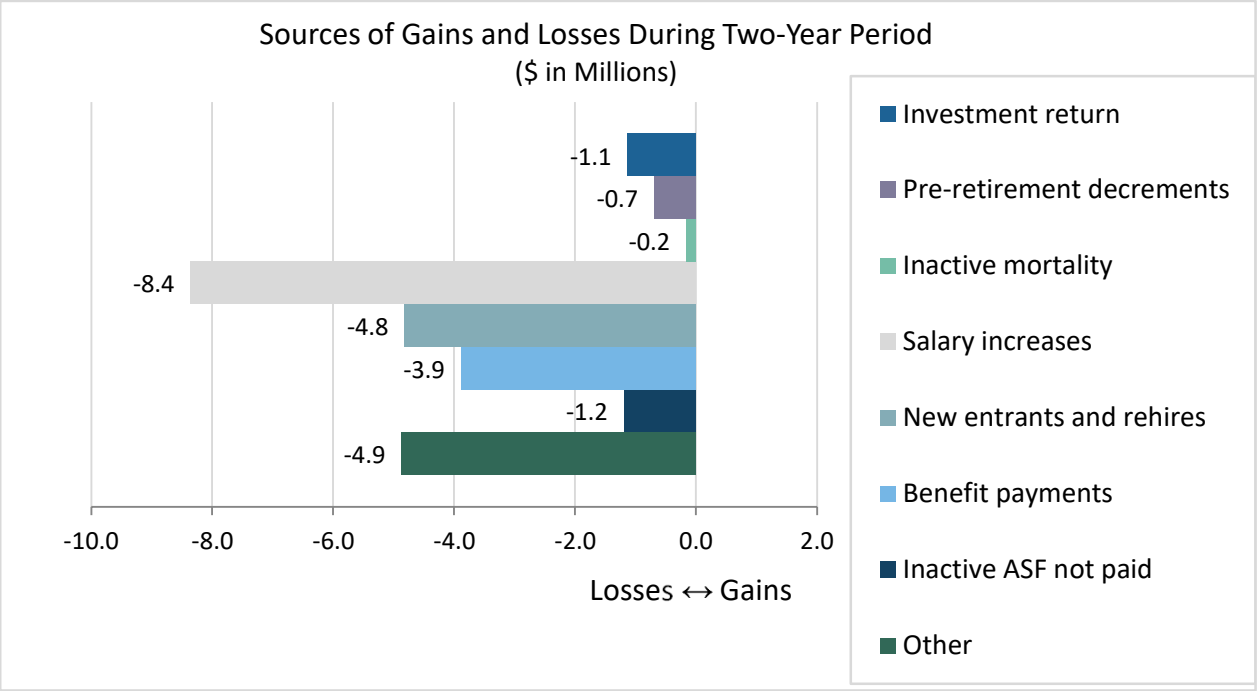
Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding mortality, retirement, disability and withdrawal rates as well as salary increases and investment returns. A comparison of the results of the current valuation and the prior valuation is made to determine how closely actual experience relates to expected. During the two years since the last valuation, the total unfunded actuarial accrued liability of the System was expected to decrease by $10,879,497. Below is the development of the Actuarial Loss for the current 2-year period:

Calendar Year Ending		December 31, 2023	December 31, 2022
Expected Unfunded Actuarial Accrued Liability			
1.	Unfunded Actuarial Accrued Liability, Beginning of Year	$160,655,520	$165,200,866
2.	Normal Cost, Beginning of Year	9,207,298	9,293,378
3.	Total Contributions	26,504,199	25,172,291
4.	Interest (full year on 1. and 2., one-half year on 3.)	10,962,750	11,333,567
5.	Expected Unfunded Actuarial Accrued Liability	$154,321,369	$160,655,520
6.	Unfunded Actuarial Accrued Liability (before changes)	179,412,217	
7.	(Gain)/Loss (6. - 5.)	$25,090,848	
Asset Gain/(Loss)			
1.	Actuarial Value of Assets, Beginning of Year	$248,029,359	$231,799,252
2.	Contributions and Receipts	26,504,199	25,172,291
3.	Benefit Payments and Expenses	(28,469,042)	(25,782,117)
4.	Assumed Rate of Return (prior valuation)	7.00%	7.00%
5.	Expected Return	17,293,286	16,204,604
6.	Actuarial Value of Assets, End of Year	$261,548,307	$248,029,359
7.	Actual Return	15,483,791	16,839,933
8.	Actual Rate of Return	6.27%	7.27%
9.	Asset Gain/(Loss) (7. - 5.)	(1,809,495)	635,329
10.	Total Asset Gain/(Loss), 2-Year Period	($1,129,692)	

Actuarial Experience

Below are the various sources of gains and losses over the 2-year period. The asset loss during the period was $1,129,692, and the total demographic loss during the period was $23,961,156, which totals to an overall loss of $25,090,848.



Unfunded Actuarial Accrued Liability

1.	Changes due to:	
	a. Asset Loss	1,129,692
	b. Demographic Experience Loss	23,961,156
	c. Total Loss Prior to Changes	25,090,848
	d. Plan Change	-
	e. Assumption Change	-
	f. Total Increase (including changes)	25,090,848
2.	Unfunded Actuarial Accrued Liability, End of Year	$179,412,217

Annual Appropriations

The Annual Appropriation is determined in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws ("M.G.L."). The appropriation is comprised of the annual employer normal cost and amortization payments to pay the unfunded actuarial accrued liability. Below are the details of the annual appropriations for the current and prior valuations, adjusted for annual payments made July 1. The appropriations shown are based on the results of the valuation and do not account for any adjustments made to appropriations in the selected funding schedule.

	Valuation Date	January 1, 2024	January 1, 2022
1.	Early Retirement Incentive Plan (2002)		
	Fully Funded Year	2028	2028
	Investment Return Rate	7.00%	7.00%
	Balance as of Valuation Date	$29,048	$39,083
	Amortization Amount	$7,548	$6,945
	Increasing Rate	4.25%	4.25%
	Remaining Payment Period from Valuation Date	4	6
2.	Unfunded Actuarial Accrued Liability		
	Fully Funded Year	2035	2035
	Investment Return Rate	7.00%	7.00%
	Balance as of Valuation Date	$179,383,169	$165,161,783
	Amortization Amount	$18,723,478	$14,983,494
	Increasing Rate	4.00%	4.00%
	Remaining Payment Period from Valuation Date	11	13
3.	Total Amortization Payments	$18,731,026	$14,990,439
4.	Normal Cost	$5,060,699	$4,850,438
5.	Net 3(8)(c) Reimbursements	$314,189	$314,189
6.	Total Appropriation as of January 1	$24,105,914	$20,155,065
7.	**Adjusted for Annual Payments as of July 1**	**$24,935,351**	**$20,848,562**

Exhibit 3.1 - 30-Year Forecast of Annual Appropriations

Fiscal Year Ending	Employer Normal Cost	Amortization Payment of UAL	Amortization Payment of ERI 2002	Net 3(8)(c) Reimbursements	Total Employer Cost	Increase over Prior Year	Unfunded Actuarial Accrued Liability
2025	$5,234,828	$14,767,654	$7,808	$325,000	$20,335,290		$179,412,217
2026	5,362,890	16,298,620	8,140	325,000	21,994,650	8.16%	176,687,216
2027	5,525,677	17,930,250	8,485	325,000	23,789,412	8.16%	172,187,478
2028	5,691,739	19,705,042	8,847	325,000	25,730,628	8.16%	165,684,630
2029	5,872,345	21,632,902	-	325,000	27,830,247	8.16%	156,890,349
2030	6,048,976	23,727,220	-	325,000	30,101,196	8.16%	145,495,425
2031	6,257,882	25,974,571	-	325,000	32,557,453	8.16%	131,136,478
2032	6,458,050	28,431,091	-	325,000	35,214,141	8.16%	113,447,726
2033	6,656,601	31,106,014	-	325,000	38,087,615	8.16%	91,979,718
2034	6,906,428	33,964,136	-	325,000	41,195,564	8.16%	66,241,987
2035	7,098,712	36,976,105	-	325,000	44,399,817	7.78%	35,746,150
2036	7,284,512	-	-	325,000	7,609,512	-82.86%	-
2037	7,528,696	-	-	325,000	7,853,696	3.21%	-
2038	7,776,976	-	-	325,000	8,101,976	3.16%	-
2039	8,013,313	-	-	325,000	8,338,313	2.92%	-
2040	8,275,649	-	-	325,000	8,600,649	3.15%	-
2041	8,559,643	-	-	325,000	8,884,643	3.30%	-
2042	8,825,149	-	-	325,000	9,150,149	2.99%	-
2043	9,095,481	-	-	325,000	9,420,481	2.95%	-
2044	9,404,339	-	-	325,000	9,729,339	3.28%	-
2045	9,738,708	-	-	325,000	10,063,708	3.44%	-
2046	10,058,532	-	-	325,000	10,383,532	3.18%	-
2047	10,426,431	-	-	325,000	10,751,431	3.54%	-
2048	10,796,707	-	-	325,000	11,121,707	3.44%	-
2049	11,172,827	-	-	325,000	11,497,827	3.38%	-
2050	11,555,204	-	-	325,000	11,880,204	3.33%	-
2051	11,924,196	-	-	325,000	12,249,196	3.11%	-
2052	12,348,840	-	-	325,000	12,673,840	3.47%	-
2053	12,767,076	-	-	325,000	13,092,076	3.30%	-
2054	13,207,383	-	-	325,000	13,532,383	3.36%	-

Exhibit 3.2 - 30-Year Forecast of Cash Flow

Calendar Year	Market Value of Assets, BOY	Benefit Payments	Employee Contributions	Employer Contributions	Investment Return	Market Value of Assets, EOY
2024	$254,156,760	$29,240,701	$5,915,396	$19,658,866	$18,557,747	$269,048,068
2025	269,048,068	27,552,053	6,175,757	21,263,030	19,789,758	288,724,560
2026	288,724,560	28,566,347	6,415,993	22,998,093	21,269,883	310,842,182
2027	310,842,182	29,666,242	6,666,980	24,874,737	22,928,554	335,646,211
2028	335,646,211	30,863,030	6,918,311	26,904,515	24,782,627	363,388,634
2029	363,388,634	32,020,619	7,188,391	29,099,924	26,856,665	394,512,995
2030	394,512,995	33,265,455	7,442,699	31,474,478	29,175,821	429,340,538
2031	429,340,538	34,586,189	7,721,424	34,042,795	31,766,816	468,285,384
2032	468,285,384	35,727,891	8,018,241	36,820,687	34,668,226	512,064,647
2033	512,064,647	37,001,704	8,282,594	39,825,255	37,917,015	561,087,807
2034	561,087,807	38,152,992	8,620,281	42,922,923	41,548,816	616,026,835
2035	616,026,835	39,869,877	8,982,561	7,356,393	42,870,160	635,366,072
2036	635,366,072	41,664,021	9,307,367	7,592,454	44,200,372	654,802,244
2037	654,802,244	43,538,902	9,647,843	7,832,475	45,535,918	674,279,578
2038	674,279,578	45,498,153	10,020,182	8,060,951	46,872,814	693,735,372
2039	693,735,372	47,545,570	10,388,415	8,314,561	48,206,589	713,099,367
2040	713,099,367	49,685,121	10,757,476	8,589,108	49,532,237	732,293,067
2041	732,293,067	51,920,951	11,166,935	8,845,783	50,844,172	751,229,006
2042	751,229,006	54,257,394	11,595,045	9,107,122	52,136,173	769,809,952
2043	769,809,952	56,698,977	12,010,039	9,405,707	53,401,335	787,928,056
2044	787,928,056	59,250,431	12,425,347	9,728,953	54,632,000	805,463,925
2045	805,463,925	61,916,700	12,880,565	10,038,139	55,819,700	822,285,629
2046	822,285,629	64,702,952	13,316,062	10,393,800	56,955,081	838,247,620
2047	838,247,620	67,614,585	13,776,951	10,751,760	58,027,833	853,189,579
2048	853,189,579	70,657,241	14,260,850	11,115,369	59,026,602	866,935,159
2049	866,935,159	73,836,817	14,768,364	11,485,026	59,938,910	879,290,642
2050	879,290,642	77,159,474	15,319,518	11,841,744	60,751,052	890,043,482
2051	890,043,482	80,631,650	15,848,647	12,252,263	61,448,000	898,960,742
2052	898,960,742	84,260,074	16,416,858	12,656,587	62,013,291	905,787,404
2053	905,787,404	88,051,777	16,997,771	13,082,248	62,428,907	910,244,553

Forecast Notes

Exhibit 3.1:

- The Total Normal Cost is assumed to increase 3.5% per year and the Employee Normal Cost is assumed to increase at a rate that reflects a total payroll increase of 3.5% per year and incorporates new entrants sufficient to maintain constant active membership.

- The Unfunded Actuarial Accrued Liability ("UAL") is computed as of January 1 of each year assuming no future gains or losses.

- The Amortization Payment of UAL is an increasing payment at 4% paid over 11 years through 2035.

- The Amortization Payment of the Early Retirement Incentive Plan (2002) is an increasing payment at 4.25% paid over 4 year(s) through 2028.

- Net 3(8)(c) reimbursements are a level dollar amount based on the net transfers expected to be paid by the Plymouth Contributory Retirement Board during the current year offset by the amount received during the same period.

- Total Employer Cost is the sum of the Employer Normal Cost, net 3(8)(c) reimbursements and the Amortization of the UAL, all computed as of January 1 of each year and adjusted for annual payments made on July 1.

- For fiscal year 2025, we show the actual appropriation developed under the previous funding schedule of $20,335,290. For fiscal years 2026 and later, the Board has selected a funding schedule that fully amortizes the unfunded actuarial accrued liability by 2035, with annual employer costs limited to increases of 8.16%.

- The funding schedule adopted by the Board results in amortization payments for every year up to and including the full funded date that are greater than the interest computed on the outstanding UAL from the prior year. This amortization method fully amortizes the UAL within a reasonable time period and reduces the UAL by a reasonable amount within a sufficiently short period.

Exhibit 3.2:

- Expected benefit payments include payments expected to be made to retired members, beneficiaries, disabled members and active members expected to retire. In addition, expected benefit payments include distribution of the annuity savings fund attributed to inactive members.

- Benefit payments exclude cost-of-living increases granted to members in pay status between 1982 and 1997. In addition, benefit payments are as expected for the first ten years of the forecast, then increase by the greater of 4.5% per year thereafter or the expected future payments for the current population projected by our computer model.

- Calendar year cash flow entries are developed as of each January 1.

SECTION 4 - DISCLOSURES

4.1 - GASB 67 and GASB 68 Disclosures

In June 2012, the GASB approved two related Statements that significantly changed the way pension plans and governments account and report pension liabilities. Effective for plans with fiscal years beginning after June 15, 2013, GASB Statement No. 67, *Financial Reporting for Pension Plans* , replaced the requirements of Statement No. 25 and effective for employers with fiscal years beginning after June 15, 2014, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions* , replaced the requirements of Statement No. 27.

The pension standards reflect changes from those previously in place regarding how governments calculate total pension liability and pension expense. Further, the standards contain requirements for disclosing information in the notes to financial statements and presenting required supplementary information following the notes.

GASB 67 requires defined benefit pension plans, such as the Plymouth Contributory Retirement System, to present a statement of fiduciary net position (pension plan assets) and a statement of changes in fiduciary net position. Further, the statement requires that notes to financial statements include descriptive information such as the types of benefits provided, the classes of plan members covered and the composition of the pension plan's retirement board. Finally, GASB 67 requires pension plans to present in required supplementary information the sources of the changes in the net pension liability and information about the actuarially determined contributions compared with the actual contributions made to the plan and related ratios.

GASB 67 and GASB 68 require projected benefit payments be discounted to their actuarial present value using the single rate that reflects:

(1) a long-term expected rate of return on pension plan investments *to the extent that the pension plan's assets are sufficient to pay benefits and pension plan assets are expected to be invested using a strategy to achieve that return and*

(2) a tax-exempt, high-quality municipal bond rate *to the extent that the conditions for use of the long-term expected rate of return are not met.*

GASB 68 establishes standards for measuring and recognizing liabilities, deferred outflows of resources, deferred inflows of resources and pension expense by state and local governments.

The effective date for GASB 67 is for plan years beginning after June 15, 2013, which is the fiscal year ending December 31, 2014 for the Plymouth Contributory Retirement System. The effective date for GASB 68 is for employers' fiscal years beginning after June 15, 2014. The GASB report, submitted under separate cover and prepared as of December 31, 2023 (the measurement date), presents information to assist the Plymouth Contributory Retirement Board in providing the required information under GASB 68 to participating employers.

SECTION 4 - DISCLOSURES

4.2 - PERAC Disclosure Information

The most recent actuarial valuation of the System was prepared by KMS Actuaries, LLC as of January 1, 2024.

Normal Cost - Employees	$5,915,396	10.0% of payroll
Normal Cost - Employers	$5,060,699	8.5% of payroll
Actuarial Liability - Active Members	$161,538,910	37% of total AAL
Actuarial Liability - Retired and Inactive Members	279,421,614	63% of total AAL
Total Actuarial Liability (AAL)	$440,960,524	
System Assets	$261,548,307	
Unfunded Actuarial Accrued Liability	$179,412,217	
Funded Status	59.3%	

Principal actuarial assumptions used in the valuation:

Investment Return	7.00%
Rate of Salary Increase	Based on service, 6% graded down to 4.25% for Group 1
	Based on service, 7% graded down to 4.75% for Group 4

4.3 - Risk Measures

The Plymouth Contributory Retirement System is subject to certain risks that could affect the plan's future financial condition. Here we identify the primary risks to the System, provide some background information about those risks, and provide an assessment of those risks in accordance with Actuarial Standards of Practice (ASOP) 51.

Risk is the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience. Examples of potential risks that may be reasonably anticipated to significantly affect the future financial condition of the plan include the following:

- **Investment Risk** - the potential that investment returns will be different than expected.
- **Asset/Liability Mismatch Risk** - the potential that changes in asset values are not matched by changes in the value of liabilities.
- **Interest Rate Risk** - the potential that interest rates will be different than expected.
- **Longevity and Other Demographic Risks** - the potential that mortality or other demographic experience will be different than expected.
- **Contribution Risk** - the potential of actual future contributions deviating from expected future contributions. For example, that actual contributions are not made in accordance with the plan's funding policy, that other anticipated payments to the plan are not made, or that material changes occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base.
- **Benefit Change Risk** - the potential for the provisions of the System to be changed such that the benefits and liabilities are changed materially.
- **Assumption Change Risk** - the potential for the environment to change such that future valuation assumptions are adjusted to be different than the current assumptions.

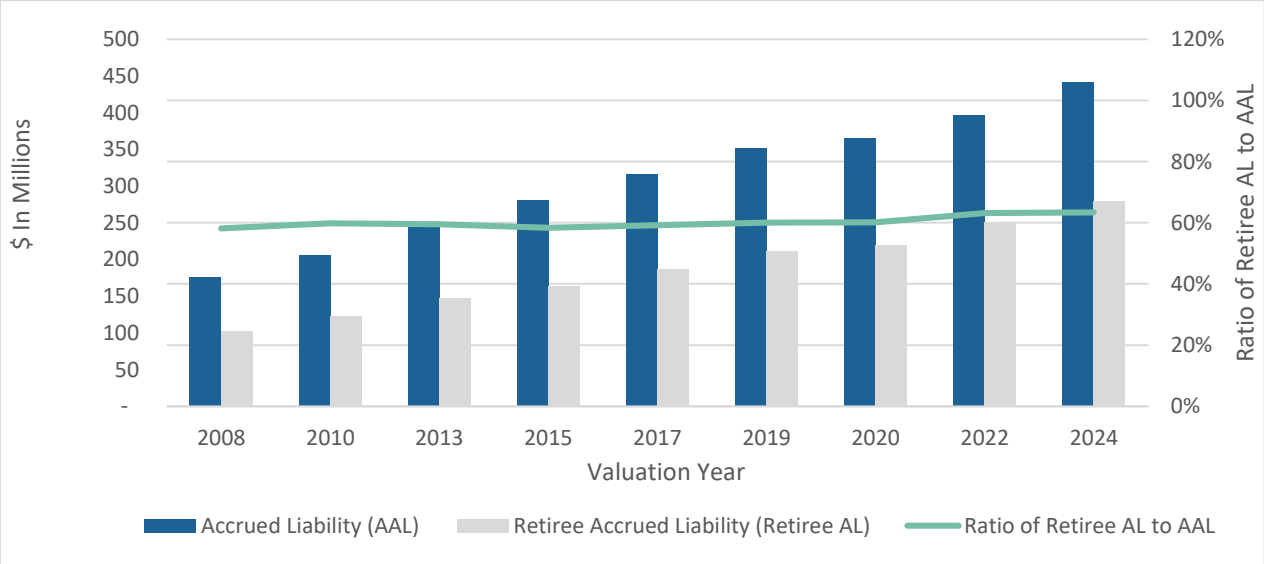
We have provided several risk measures in this section that we believe are most significant for the plan. However, we believe that a more rigorous assessment of risk would be beneficial to the Board to understand the risks identified above, such as:

- Scenario Test - a process for assessing the impact of one possible event, or several simultaneous or sequentially occurring possible events, on a plan's financial condition.
- Sensitivity Test - a process for assessing the impact of a change in an actuarial assumption on an actuarial measurement.
- Stochastic Modeling - a process for generating numerous potential outcomes by allowing for random variations in one or more inputs over time for the purpose of assessing the distribution of those outcomes.
- Stress Test - a process for assessing the impact of adverse changes in one or relatively few factors affecting a plan's financial condition.

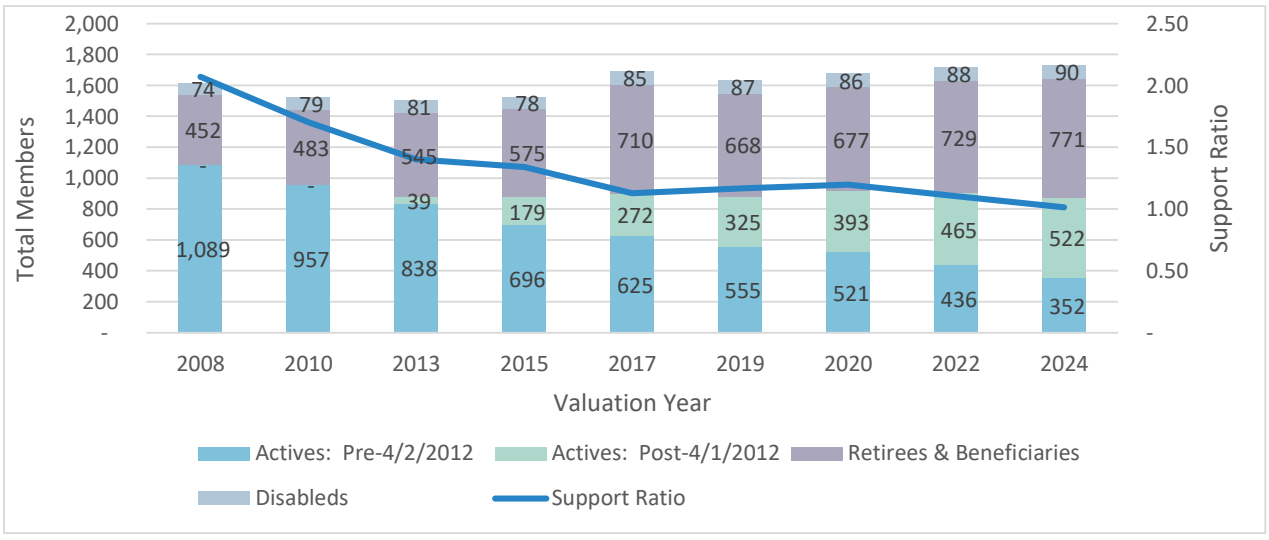
4.3 - Risk Measures

Maturity Measures

As retirement systems mature they become much more sensitive to risks. This is because a higher proportion of the actuarial liability is attributable to participants who are no longer active. Plan maturity measures are helpful in understanding the risks associated with a plan. One such maturity measure is the ratio of the system's retiree liability to its total liabiity. A retirement system in its infancy will have a very low ratio of retiree liability to total liability. As the system matures, the ratio starts increasing. A mature plan will often have a ratio above 60%. For the Plymouth Contributory Retirement System this ratio has been steady in recent years.



Another maturity measure is the ratio of actives to retirees, or support ratio. A retirement system in its infancy will have a very high ratio of active to retired members. As the system matures, and members retire, the support ratio starts declining. A mature system will often have a support ratio near or below one.



4.3 - Risk Measures

Volatility Indices

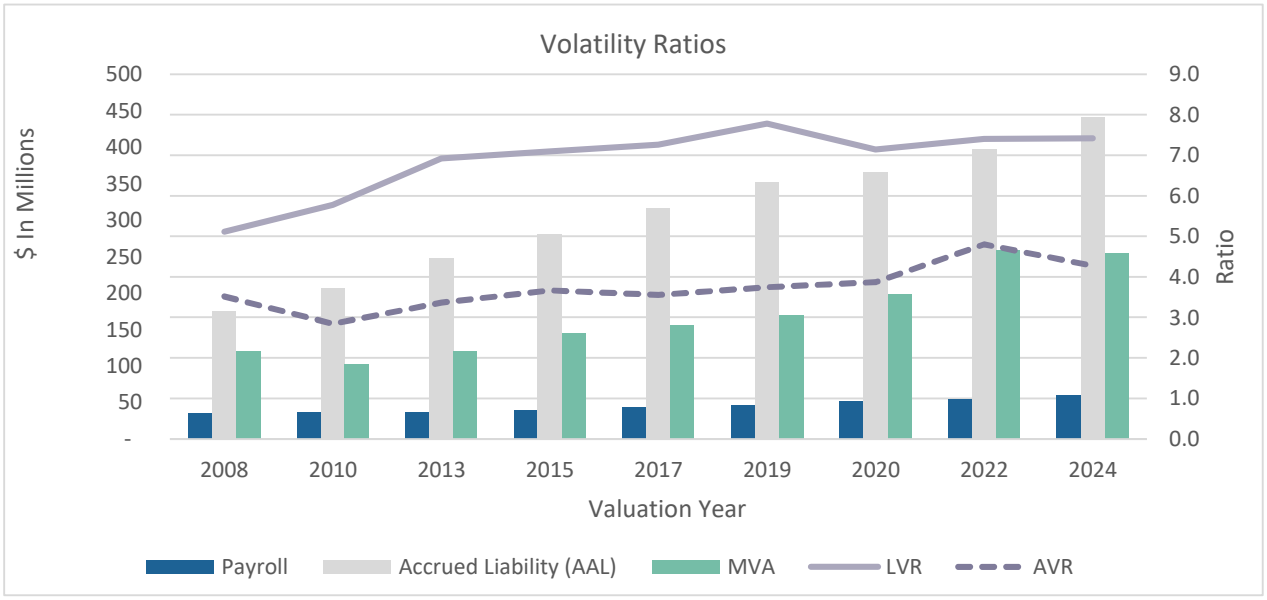
Volatility indices are measures of the relative sensitivity of employer contributions to changes in assets or liabilities. Below we present two such indices - the Asset Volatility Ratio (AVR) and the Liability Volatility Ratio (LVR):

Asset Volatility Ratio (AVR)

The Asset Volatility Ratio (AVR) is the ratio of the Market Value of Assets (MVA) to Payroll. Systems with a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. This ratio indicates a measure of the system's current contribution volatility. The AVR increases over time but generally tends to stabilize as the system matures.

Liability Volatility Ratio (LVR)

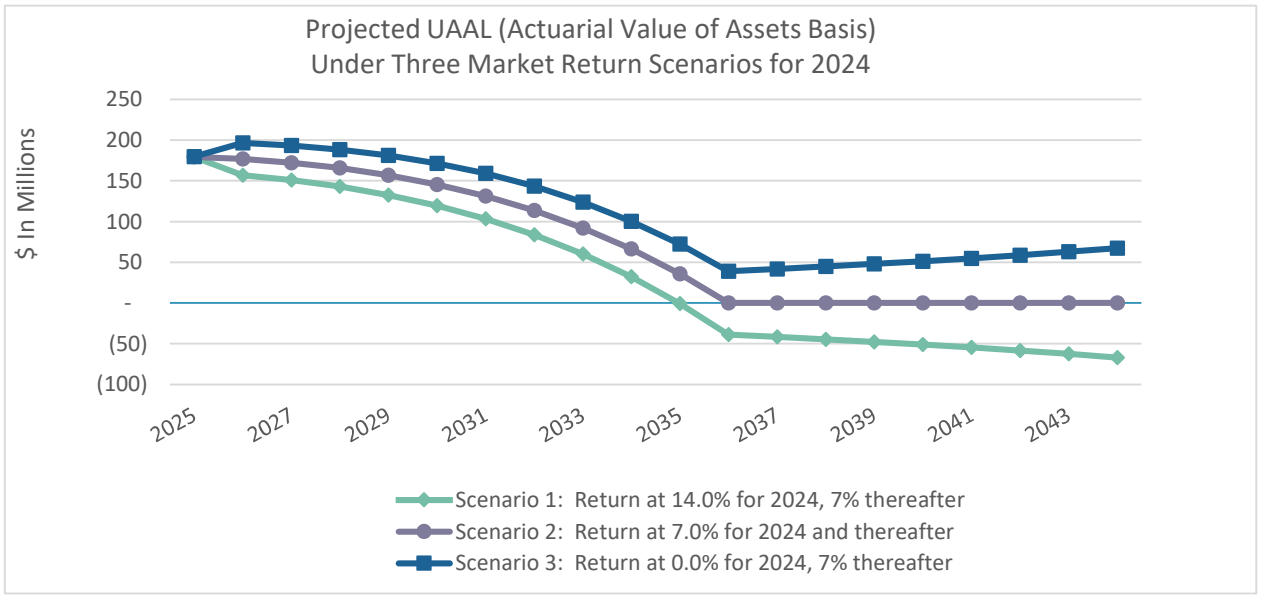
The Liability Volatility Ratio (LVR) is the ratio of the Actuarial Accrued Liability (AAL) to Payroll. Systems with a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to the investment return assumption and changes in liability. This ratio indicates a longer-term potential for contribution volatility. The AVR, described above, will tend to move close to the LVR as the system matures.



4.3 - Risk Measures

Market Return Scenarios

Below we illustrate the projected effect on funding levels of a single year of investment return above or below the assumed investment return. Scenario 1 assumes a one-year return of 2 times the assumed return and the expected return thereafter, Scenario 2 assumes assets earn the expected return every year and Scenario 3 assumes a one-year return of 0% and the expected return thereafter.



Sensitivity Analysis

The following presents the Actuarial Accrued Liability and Funded Status calculated using the investment return rate of 7%, as well as what the Actuarial Accrued Liability and Funded Status would be if it were calculated using an investment return rate 1-percentage point lower (6%) or 1-percentage point higher (8%) than the assumed investment return rate:

	1% Decrease (6.00%)	Current Investment Return Rate (7.00%)	1% Increase (8.00%)
Actuarial Accrued Liability	$492,215,987	$440,960,524	$397,797,202
% Change	12%		-10%
Actuarial Value of Assets	$261,548,307	$261,548,307	$261,548,307
Unfunded Actuarial Accrued Liability	230,667,680	179,412,217	136,248,895
% Change	29%	N/A	-24%
Funded Status	53.1%	59.3%	65.7%

4.3 - Risk Measures

Low-Default Risk Obligation Measure (LDROM)

The retirement plan invests in a diversified portfolio of stocks, bonds, real estate, and other assets with the objective of maximizing investment returns at a reasonable level of risk. The potential for investment returns to be different than expected is a key risk for the plan. Reducing the plan's investment risk by investing solely in bonds, however, would also likely reduce the plan's investment returns thereby increasing the amount of contributions needed over the long term. The Low-Default Risk Obligation Measure (LDROM) represents what the funding liability would be if the plan invested its assets solely in a portfolio of high-quality bonds whose cash flows approximately match future benefit payments. Consequently, the difference between the plan's Actuarial Accrued Liability and the LDROM can be thought of as representing the expected taxpayer savings from investing in the plan's diversified portfolio compared to investing only in high quality bonds.

The following presents the LDROM and Funded Status calculated using the LDROM investment return rate of 4.76%:

LDROM	$570,037,801
Actuarial Value of Assets	$261,548,307
Funded Status	45.88%

The LDROM investment return rate is based on the FTSE Pension Liability Index published as of December 31, 2023. The index represents the single discount rate that would produce the same present value as calculated by discounting a standardized set of liabilities using the Pension Discount Curve, which is a set of yields on hypothetical AA zero coupon bonds whose maturities range from 6 months up to 30 years.

The actuarial valuation reports the funded status and develops appropriations based on the expected return of the plan's investment portfolio. If instead, the plan switched to investing exclusively in high quality bonds, the LDROM illustrates that reported funded status would be lower (which also implies that the Actuarially Determined Contributions would be higher), perhaps significantly. Unnecessarily high appropriation requirements in the near term may not be affordable and could imperil plan sustainability and benefit security.

4.3 - Risk Measures

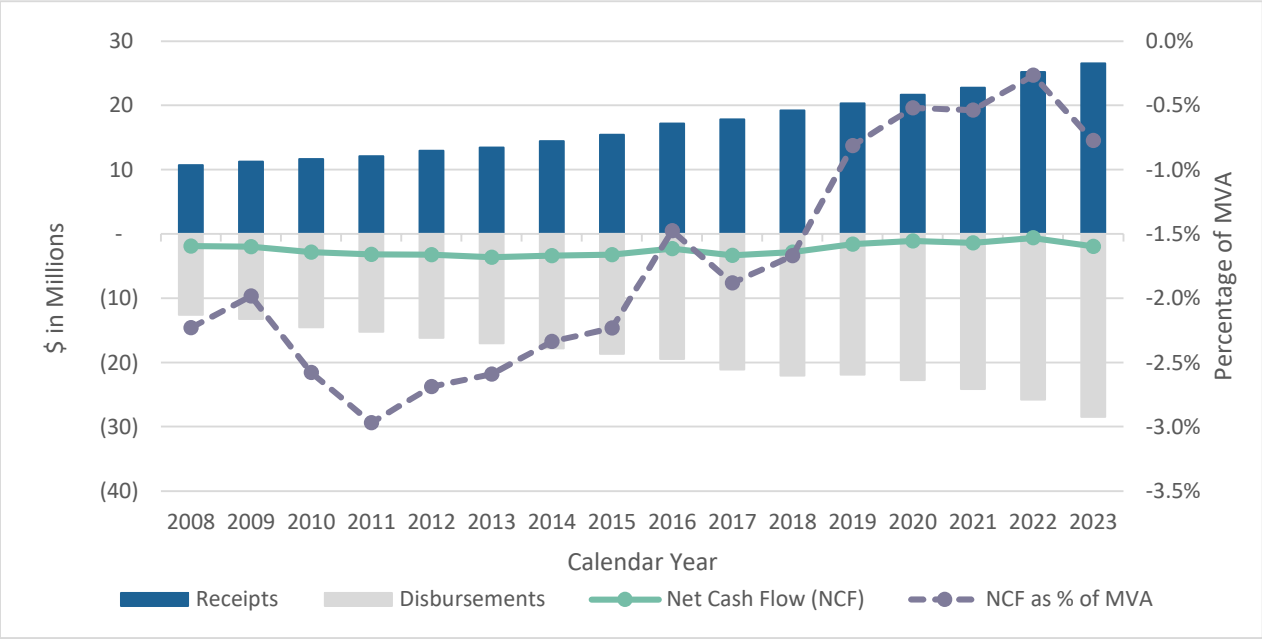
Duration

Duration is another measure that is used to describe how the present value of a cash flow series changes when small changes are made to the underlying interest rates. The duration of the Plymouth Contributory Retirement System is 11, and this represents an approximate percentage change in the Actuarial Accrued Liability for each 1% change to the investment return rate.

Net Cash Flow (NCF)

Net cash flow (NCF) during a year is the difference between contributions, both employer and employee, paid into the System and benefit payments and expenses paid from the System. If the level of benefit payments plus expenses is greater than contributions, then the System has negative NCF. Mature plans generally have a negative NCF as the number of retirees grows. When a System has negative NCF, then additional cash from existing assets are needed to pay the pension benefits.

Historical NCF since 2008 is shown in the next graph. Blue bars indicate contributions, from employees and employers, and grey bars show benefit payments and administrative expenses. The NCF is represented by the green line. The dashed purple line (which corresponds to the right-hand axis) provides the NCF as a percentage of the Market Value of Assets. As of December 31, 2023, the NCF was negative $1.96 million, which represents -0.8% of the Market Value of Assets. The NCF falls within the range of -3.0% to -0.5% of total assets over the 16-year period.



SECTION 5 - SUMMARY OF PLAN PROVISIONS

Administration

There are 104 contributory retirement systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by Chapter 32 of the Massachusetts General Laws and other applicable statutes. This law in general provides uniform benefits, uniform contribution requirements and a uniform accounting and funds structure for all systems.

Participation

Participation is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the local retirement board, and approved by PERAC. Membership is optional for certain elected officials.

Membership Groups

There are four membership groups in the Retirement System:

Group 1	General employees, including clerical, administrative, technical and all other employees not otherwise classified.
Group 2	Certain specified hazardous duty positions.
Group 3	State police officers and inspectors.
Group 4	Local police officers, firefighters and other specified hazardous positions.

For members in more than one group, participation will be proportional.

Member Contributions

Member contributions vary depending on the most recent date of membership:

Prior to 1975	5% of Salary
1975 – 1983	7% of Salary
1984 – June 30, 1996	8% of Salary
July 1, 1996 – present	9% of Salary
1979 – present	An additional 2% of Salary in excess of $30,000.
Group 1 members hired on or after April 2, 2012	6% of Salary with 30 or more years of creditable service.

Rate of Interest

Interest on regular deductions made after January 1, 1984 is a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average rates paid on individual savings accounts by a representative sample of at least ten financial institutions.

Retirement Age

The mandatory retirement age for some Group 2 and Group 4 members is age 65. Most Group 2 and Group 4 members may remain in service after reaching age 65. Group 4 members who are employed in certain public safety positions are required to retire at age 65. There is no mandatory retirement age for members in Group 1.

Salary

Gross regular compensation. This does not include bonuses, overtime, severance pay, unused sick leave credit or other similar compensation. For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. §401(a)(17). For 2024, the limit is 64% of $345,000, or $220,800.

Average Salary

Membership before April 2, 2012

- Average annual rate of regular compensation received during the three consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutive) preceding retirement.

Membership on or after April 2, 2012

- Average annual rate of regular compensation received during the five consecutive years that produce the highest average, or, if greater, during the last five years (whether or not consecutive) preceding retirement.

Creditable Service

The period during which a member contributes to the retirement system plus certain periods of military service and "purchased" service.

Benefit Rate

The benefit rate varies with the member's retirement age, Group, membership date and years of creditable service at retirement. Each year a member retires prior to the age at which the 2.5% maximum benefit rate applies, a reduction is applied to each year of age under the maximum age. The maximum age and reduction for each Group and membership date is as follows:

	Group 1	Group 2	Group 4
2.5% for Membership before April 2, 2012:			
Maximum age:	65	60	55
Reduction:	0.1%	0.1%	0.1%
2.5% for Membership on or after April 2, 2012 (less than 30 years of service):			
Maximum age:	67	62	57
Reduction:	0.15%	0.15%	0.15%
2.5% for Membership on or after April 2, 2012 (30+ years of service):			
Maximum age:	67	62	57
Reduction:	0.125%	0.125%	0.125%

Superannuation Retirement	Eligibility if membership before April 2, 2012	♦ completion of 20 years of Creditable Service, or ♦ attainment of age 55 if hired prior to 1978, or ♦ attainment of age 55 with 10 years of Creditable Service, if hired after 1978.
	Eligibility if membership on or after April 2, 2012	♦ attainment of age 60 with 10 years of Creditable Service if classified in Group 1 ♦ attainment of age 55 with 10 years of Creditable Service if classified in Group 2 ♦ attainment of age 55 if classified in Group 4
	Benefit Amount	Product of the member's Benefit Rate, Average Salary and Creditable Service.
	Maximum Benefit	80% of the member's Average Salary.
	Veteran's Benefit	Additional benefit of $15 per year of Creditable Service, up to a maximum of $300.
Deferred Vested	Eligibility	♦ completion of ten or more years of Creditable Service. ♦ elected officials hired prior to 1978, completion of six years of Creditable Service.
	Benefit Amount	Accrued benefit payable commencing at age 55, or the completion of 20 years of Creditable Service, or may be deferred until later at the participant's option.
Withdrawal of Contributions		Contributions may be withdrawn upon termination of employment. ♦ Members hired on or after January 1, 1984 who terminate with less than ten years of Creditable Service receive contributions plus interest on the Annuity Savings Account at an annual rate of 3%. ♦ All other withdrawals receive contributions plus 100% of the regular interest that has accrued to the Annuity Savings Account.

Ordinary Disability Retirement	Eligibility	Non-job related disability after completion of ten years of Creditable Service.
	Benefit Amount for Group 1 membership before April 2, 2012 or Group 2 or Group 4	Superannuation benefit determined if the member is age 55, up to a maximum of 80% of Average Salary over three years. If the member is a veteran, 50% of final rate of salary (final year) plus an annuity based on the accumulated member contributions plus credited interest, up to a maximum of 80% of Average Salary over five years.
	Benefit Amount for Group 1 membership on or after April 2, 2012	Superannuation benefit determined if the member is age 60, up to a maximum of 80% of Average Salary over three years. If the member is a veteran, 50% of final rate of salary (final year) plus an annuity based on the accumulated member contributions plus credited interest, up to a maximum of 80% of Average Salary over five years.
Accidental Disability Retirement	Eligibility	Disabled as a result of an accident in the performance of duties. There is no minimum age or service requirement.
	Benefit Amount	72% of Salary plus an annuity based on accumulated member contributions plus credited interest.
	Maximum Benefit	100% of Salary if hired before January 1, 1988, otherwise 75% of Salary.
	Veteran's Benefit	Additional allowance of $15 per year of Creditable Service, up to a maximum of $300.
	Supplemental Dependent Allowance	Additional allowance of $1,092.60 per year for each child until age 18 (or age 22 if a full-time student).
Non-Occupational Death	Eligibility	For members with at least two years of creditable service who die while in active service, but not due to occupational injury.
	Benefit Amount	Benefit as if Option C had been elected. Minimum benefit of $250 per month for surviving spouse, $120 per month for first child and $90 per month for each additional child.

Accidental Death	Eligibility	For members who die as a result of an occupational injury.
	Benefit Amount	72% of Salary plus an annuity based on accumulated member contributions plus credited interest.
	Maximum Benefit	100% of Salary if hired before January 1, 1988, otherwise 75% of Salary.
	Veteran's Benefit	Additional allowance of $15 per year of creditable service, up to a maximum of $300.
	Supplemental Dependent Allowance	Additional allowance of $1,092.60 per year for each child until age 18 (or age 22 if a full-time student).

Cost-of-Living Adjustment (COLA)

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a Cost-of-Living Adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees and beneficiaries who have been receiving benefit payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is $16,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the Commonwealth of Massachusetts and are not the liability of the Retirement System.

Optional Forms of Payment

A member may elect to receive his or her retirement allowance, payable in monthly installments, in one of three forms of payment:

- Option A – Total annual allowance commencing at retirement and terminating at member's death.

- Option B – A reduced annual allowance commencing at retirement with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member.

- Option C – A reduced annual allowance commencing at retirement with 66⅔% of benefit continued to designated beneficiary upon death of member. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases based on the factor used to determine the Option C benefit at retirement. For members who retired prior to January 12, 1988, if the System has accepted Section 288 of Chapter 194 of the Acts of 1998 and the beneficiary pre-deceases the retiree, the benefit payable increases based on the factor used to determine the Option C benefit at retirement.

SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

Valuation Date

January 1, 2024

Investment Return Rate

7.00% per year.

The investment return assumption is a long-term assumption based on capital market expectations by asset class, historical returns and professional judgment. We considered analysis prepared by PRIM's investment advisor and other reliable sources using a building block approach and using the target asset allocation, expected returns by asset class and risk analysis to determine a long-term expected average annual rate of return.

Low-Default Risk Obligation Measure (LDROM) Investment Return Rate

4.76% per year.

The LDROM investment return rate is based on the FTSE Pension Liability Index published as of December 31, 2023. The index represents the single discount rate that would produce the same present value as calculated by discounting a standardized set of liabilities using the Pension Discount Curve, which is a set of yields on hypothetical AA zero coupon bonds whose maturities range from 6 months up to 30 years.

Annuity Savings Fund Interest Rate

2.00% per year

Amortization Method

Unfunded Actuarial Accrued Liability (UAL):

Increasing dollar amount at 4% to reduce the Unfunded Actuarial Accrued Liability to zero on or before June 30, 2035. For fiscal years 2026 and later, the Board has selected a funding schedule that fully amortizes the unfunded actuarial accrued liability by 2035, with annual employer costs limited to increases of 8.16%.

Early Retirement Incentive Program (ERI) for 2002:

Increasing dollar amount at 4% to reduce the Unfunded Actuarial Accrued Liability attributable to the 2002 ERI to zero on or before June 30, 2028.

Output Smoothing Method

Total appropriation increases are limited to 8.16% per year.

Salary Scale

The assumed annual rates for salary increases including longevity are illustrated by the following rates:

Years of Service	Groups 1 and 2	Group 4
0	6.00%	7.00%
1	5.50%	6.50%
2	5.50%	6.00%
3	5.25%	5.75%
4	5.25%	5.25%
5	4.75%	5.25%
6	4.75%	4.75%
7	4.50%	4.75%
8	4.50%	4.75%
9+	4.25%	4.75%

Salary Scale, continued

The salary scale assumption is a long-term estimate derived from historical data, current and recent market expectations and professional judgment.

Cost-of-Living Allowance

Cost-of-Living Allowances (COLA) are assumed to be 3% of the pension amount, capped at $480 per year.

Inflation

2.5% per year, based on current economic data, analyses from economists and other experts, and professional judgment.

Payroll Growth

3.5% per year, based on historical data, current and recent market expectations and professional judgment.

Mortality Rates

RP-2014 Blue Collar Mortality Table with full generational mortality improvement using Scale MP-2018. For disabled members, RP-2014 Blue Collar Mortality Table set forward one year with full generational mortality improvement using Scale MP-2018.

General Employees: 55% of deaths are job-related.
Police and Fire: 90% of deaths are job-related.

PERAC completed a local system retiree mortality study in 2019 and selected the RP-2014 Blue Collar Mortality Table with full generational mortality improvement using Scale MP-2018. The underlying tables with generational mortality improvement selected reasonably reflect the mortality experience of the System as of the valuation date based on historical and current demographic data as well as professional judgement.

Turnover Rates

Illustrative turnover rates are shown below:

Creditable Service	Groups 1 and 2	Group 4
0	0.1500	0.0150
10	0.0540	0.0150
20	0.0200	0.0000
30	0.0000	0.0000

Disability Rates

Illustrative disability rates are shown below:

Attained Age	Groups 1 and 2	Group 4
20	0.0001	0.0010
30	0.0003	0.0030
40	0.0010	0.0030
50	0.0019	0.0125
60	0.0028	0.0085

General Employees: 55% of disabilities are accidental and 45% are ordinary.
Police and Fire: 90% of disabilities are accidental and 10% are ordinary.

Retirement Rates

Illustrative retirement rates are shown below:

Attained Age	Groups 1 and 2		Group 4
	Male	Female	Male & Female
50	0.0100	0.0150	0.0200
51	0.0100	0.0150	0.0200
52	0.0100	0.0200	0.0200
53	0.0100	0.0250	0.0500
54	0.0200	0.0250	0.0750
55	0.0200	0.0550	0.1500
56	0.0250	0.0650	0.1000
57	0.0250	0.0650	0.1000
58	0.0500	0.0650	0.1000
59	0.0650	0.0650	0.1500
60	0.1200	0.0500	0.2000
61	0.2000	0.1300	0.2000
62	0.3000	0.1500	0.2500
63	0.2500	0.1250	0.2500
64	0.2200	0.1800	0.3000
65	0.4000	0.1500	1.0000
66	0.2500	0.2000	1.0000
67	0.2500	0.2000	1.0000
68	0.3000	0.2500	1.0000
69	0.3000	0.2000	1.0000
70	1.0000	1.0000	1.0000

The turnover, disability and retirement rates are based on PERAC's most recent experience analysis of local retirement systems which reviewed age, gender and job group. The assumptions reflect this analysis as well as professional judgment.

SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Cost Method

Individual Entry Age Normal.

Actuarial Asset Method

The Actuarial Value of Assets is the market value of assets as of the valuation date reduced by the sum of:

a) 75% of gains and losses of the prior year,
b) 50% of gains and losses of the second prior year,
c) 25% of gains and losses of the third prior year.

Investment gains and losses are determined by the excess or deficiency of the expected return over the actual return on the market value. The actuarial valuation of assets is further constrained to be not less than 80% or more than 120% of market value. Previously, the actuarial valuation of assets corridor was 10%.

Census Data

Census data as of the valuation date were submitted by the Retirement Board.

Asset Data

Asset information is reported annually to the Public Employee Retirement Administration Commission by the Plymouth Contributory Retirement Board.

Dependents

80% of all members will be survived by a spouse. Age assumption for spouses is that males are assumed to be three years older than females.

Net Section 3(8)(c) Reimbursements

Reimbursements paid to and received from other retirement systems for that portion of a retiree's pension that is based on service earned in another retirement system. Net 3(8)(c) reimbursements are assumed to be $325,000 per year.

Administrative Expenses

For Fiscal Year 2025, the administrative expenses were assumed to be $850,000 and are anticipated to increase 3.5% per year.

The administrative expense assumption is based on information relating to the System's administrative expenses provided by the Retirement Board.

SECTION 7 - PLAN MEMBER INFORMATION

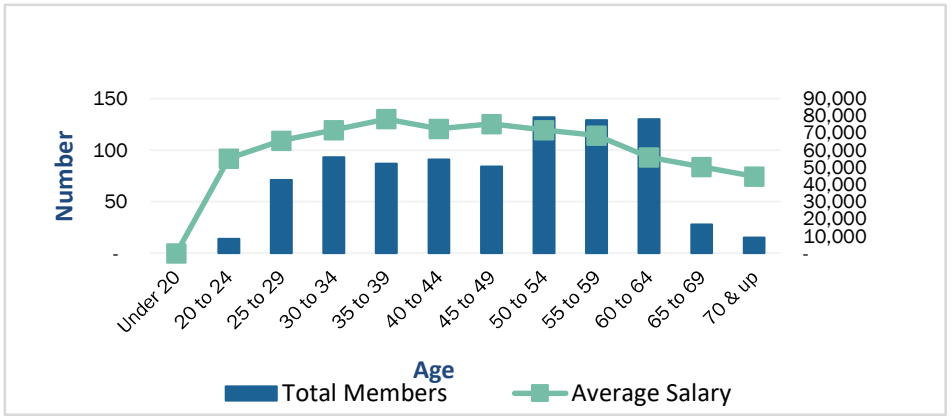
Exhibit 7.1 - Summary of Census Data as of January 1, 2024

Census data as of December 31, 2023 was provided to us by the Retirement Board. We performed edits on the data to ensure that it is reasonable and complete and made certain assumptions regarding any missing or invalid data so that results are not materially affected. Presented on the following pages are summaries of the demographic profile of active members (Exhibit 7.2) and retired plan members and beneficiaries and disabled plan members (Exhibit 7.3). Below, we present a comparison of the census data from the current and prior valuations:

Valuation Date	January 1, 2024	January 1, 2022	% Change
Census Data			
Active Members	874	901	(3.0%)
Average Age	47.9	47.5	0.9%
Average Service	11.4	11.3	1.1%
Valuation Salary	$59,428,770	$53,625,493	10.8%
Average Salary	$67,996	$59,518	14.2%
Retired Members and Beneficiaries	771	729	5.8%
Average Age	72.7	72.3	0.6%
Total Annual Retirement Allowance	$21,182,473	$18,980,607	11.6%
Average Annual Retirement Allowance	$27,474	$26,037	5.5%
State Reimbursed COLAs	$70,661	$78,898	(10.4%)
Total System-Funded Retirement Allowance	$21,111,812	$18,901,709	11.7%
Disabled Members	90	88	2.3%
Average Age	64.6	65.9	(2.0%)
Total Annual Retirement Allowance	$3,986,309	$3,569,816	11.7%
Average Annual Retirement Allowance	$44,292	$40,566	9.2%
State Reimbursed COLAs	$20,033	$24,803	(19.2%)
Total System-Funded Retirement Allowance	$3,966,276	$3,545,013	11.9%
Inactive Members	245	181	35.4%
Annuity Savings Fund	$2,758,012	2,002,579	37.7%

Exhibit 7.2 - Active Members by Age and Years of Service as of January 1, 2024

Attained Age	Years of Service 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total	Total Salary	Average Salary
Under 20	-	-	-	-	-	-	-	-	-	-	-	-
20 to 24	14	-	-	-	-	-	-	-	-	14	770,973	55,069
25 to 29	61	10	-	-	-	-	-	-	-	71	4,647,127	65,452
30 to 34	54	36	3	-	-	-	-	-	-	93	6,668,751	71,707
35 to 39	27	34	22	4	-	-	-	-	-	87	6,795,941	78,114
40 to 44	31	21	10	24	4	1	-	-	-	91	6,596,784	72,492
45 to 49	23	12	7	24	14	4	-	-	-	84	6,318,280	75,218
50 to 54	30	24	17	22	16	20	3	-	-	132	9,462,281	71,684
55 to 59	24	23	17	23	14	12	8	8	-	129	8,835,279	68,491
60 to 64	20	18	26	21	24	11	6	4	-	130	7,257,136	55,824
65 to 69	4	3	2	6	5	4	3	-	1	28	1,405,012	50,179
70 & up	2	1	1	5	2	2	1	1	-	15	671,208	44,747
Total	290	182	105	129	79	54	21	13	1	874	59,428,770	67,996
Average Salary	57,740	65,734	65,081	73,122	72,397	93,440	109,484	100,536	83,124			
					Average Age:		47.9	Average Service:		11.4		



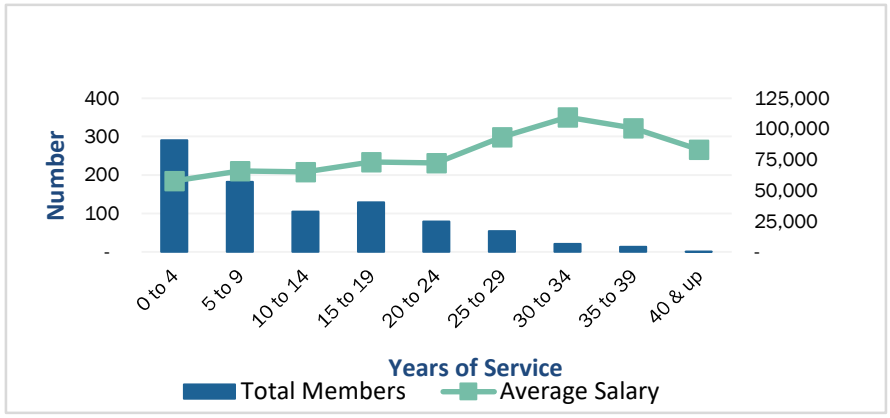
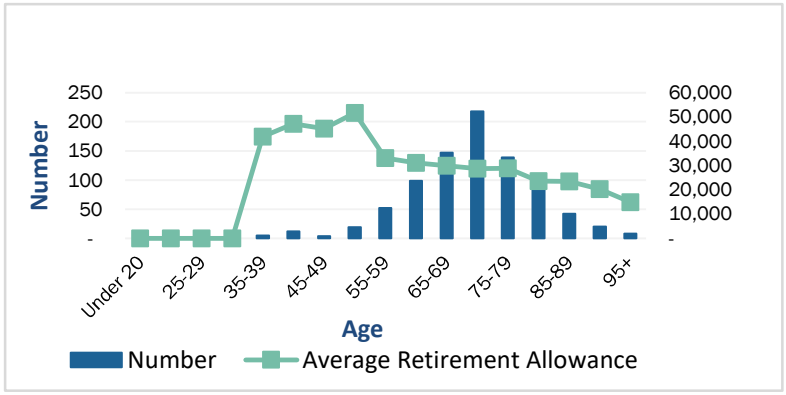
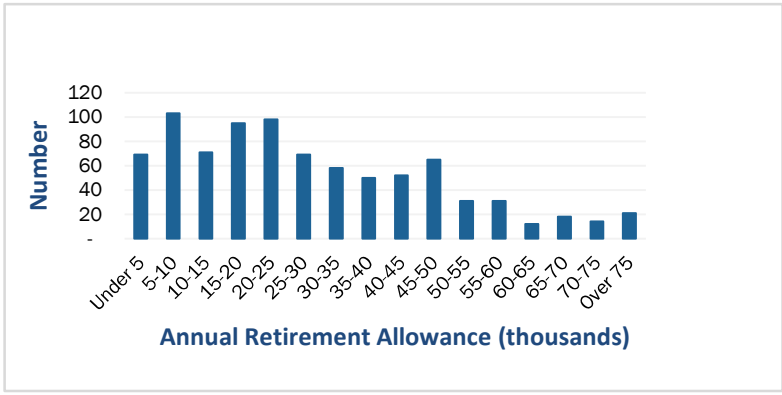


Exhibit 7.3 - Annual Retirement Allowances as of January 1, 2024

Attained Age	Service Retirements			Disability Retirements			Beneficiaries		
	Number	Annual Retirement Allowance	Average Retirement Allowance	Number	Annual Retirement Allowance	Average Retirement Allowance	Number	Annual Retirement Allowance	Average Retirement Allowance
Under 20	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	3	184,107	61,369	2	25,485	12,743
40-44	1	9,839	9,839	7	418,334	59,762	4	138,247	34,562
45-49	0	0	0	3	156,634	52,211	1	24,091	24,091
50-54	6	273,042	45,507	13	708,779	54,521	0	0	0
55-59	39	1,283,869	32,920	5	228,548	45,710	8	207,534	25,942
60-64	80	2,437,245	30,466	13	510,993	39,307	6	126,050	21,008
65-69	127	3,840,717	30,242	7	258,094	36,871	13	288,841	22,219
70-74	187	5,214,398	27,884	14	595,070	42,505	17	457,047	26,885
75-79	109	3,102,982	28,468	16	636,446	39,778	14	267,538	19,110
80-84	72	1,650,510	22,924	8	252,821	31,603	16	364,010	22,751
85-89	36	874,458	24,291	1	36,483	36,483	5	71,380	14,276
90-94	18	384,267	21,348	0	0	0	2	22,126	11,063
95+	5	87,952	17,590	0	0	0	3	30,845	10,282
Total	680	19,159,279	28,175	90	3,986,309	44,292	91	2,023,194	22,233
Average Age	72.7			64.6			72.0		





SECTION 8 - GLOSSARY OF TERMS

Actuarial Accrued Liability – That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

Actuarial Assumptions – Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the commencement, amount and duration of pension benefits, such as: changes in compensation, mortality, withdrawal, disablement and retirement; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

Actuarial Cost Method (or Funding Method) – A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the current year (Normal Cost) and the past (Actuarial Accrued Liability).

Actuarial Gain or Loss (or Experience Gain or Loss) – A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between the valuation date and the most recent immediately preceding valuation date.

Actuarial Present Value – The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

Actuarial Standard of Practice – Standards set by the Actuarial Standards Board for appropriate actuarial practice in the United States. These Standards describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.

Actuarial Valuation – The measurement of relevant pension obligations and, when applicable, the determination of periodic costs or actuarially determined contributions.

Amortization Payment – That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

Annual Statement – The statement submitted by the local retirement board to PERAC each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

Annuity Reserve Fund – The fund into which total accumulated Member Contributions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

Annuity Savings Fund – The fund in which Member Contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

Assets – The total value of the investments held by the Plan trust that are for the payment of promised benefits. Employer appropriations and Member Contributions, as well as investment earnings, are added to the Plan trust. Benefit payments and other disbursements are withdrawn from the Plan trust. For valuation purposes, assets are usually measured at market value.

SECTION 8 - GLOSSARY OF TERMS

Cost of Benefits – The estimated payment from the pension system for benefits for the fiscal year.

Expense Fund – The fund into which the appropriation for administrative expenses is paid and from which all such expenses are paid.

Funded Ratio – The Actuarial Value of Assets expressed as a percentage of the Actuarial Accrued Liability.

Funding Schedule – The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22D and Section 22F of M.G.L. Chapter 32.

GASB – Governmental Accounting Standards Board.

LDROM – Low-Default Risk Obligation Measure.

Normal Cost – Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits which is expected to accrue in the current fiscal year. The Employee Normal Cost is the amount of the expected Member Contributions for the current fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

Output Smoothing Method – A method to reduce volatility of the results of a contribution allocation procedure. Output smoothing methods include 1) phasing in the impact of assumption changes on contributions, 2) blending a prior valuation with a subsequent valuation to determine contributions, or 3) placing a corridor around changes in the dollar amount, contribution rate, or percentage change in contributions from year to year.

Pension Fund – The fund into which appropriation amounts as determined by PERAC are paid and from which pension benefits are paid.

Pension Reserve Fund – The fund which shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

Present Value of Future Benefits – The actuarial present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value of money and the probabilities of payment.

Special Fund for Military Service Credit – The fund which is credited with amounts paid by the retirement board equal to the amount which would have been contributed by a member during a military leave of absence as if the member had remained in active service of the retirement board. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

Total Pension Liability – The portion of the Actuarial Present Value attributable to past service in accordance with the Entry Age cost method as stipulated by GASB Statement Number 67 (GASB 67).

Unfunded Actuarial Accrued Liability – The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.