# ACTUARIAL SECTION

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October 23, 2023

Mr. Phillip Tencick, Executive Director
St. Paul Teachers' Retirement Fund Association
2550 University Avenue W, Suite 312N
St. Paul, Minnesota 55114

Dear Mr. Tencick:

We are pleased to present the report of the actuarial valuation of the St. Paul Teachers' Retirement Fund Association ("Fund") as of July 1, 2023. This report provides, among other things, the required annual contribution rate of the Fund for the Plan Year commencing July 1, 2023 and ending on June 30, 2024, according to prescribed assumptions. Note that the impact of GASB Statements No. 67 and No. 68 is provided in a separate report.

The valuation was based upon data and information through June 30, 2023 furnished by the Fund staff, concerning Retirement Fund benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. Their efforts in furnishing the materials needed are gratefully acknowledged. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Fund.

The report has been prepared at the request of the Fund's Board of Trustees in accordance with Section 356.215 of the Minnesota Statutes as well as the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement. To the best of our knowledge, this report is complete and accurate, and has been prepared in accordance with prescribed assumptions and generally accepted actuarial principles and practices. This report is intended for use by the Fund and those determined or approved by the Fund's Board of Trustees. This report may be provided to parties other than the Fund only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section 4 of this report. This report includes risk metrics beginning on page 9, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

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This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

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; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation, and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report should not be relied on for any purpose other than the purpose described in this report. Determinations of financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The combined effect of the assumptions, excluding prescribed assumptions or methods set by law, is expected to have no significant bias (i.e. not significantly optimistic or pessimistic). All actuarial assumptions and methods used in the valuation follow the guidance in the applicable Actuarial Standards of Practice. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of this report. The Fund is solely responsible for communicating to GRS any changes required thereto.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Bonita J. Wurst and Sheryl L. Christensen are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

We will be pleased to review this report with you at your convenience. Respectfully

submitted,
Gabriel, Roeder, Smith & Company

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, FCA, MAAA

Sheryl Christensen

Sheryl L. Christensen, FSA, EA, FCA, MAAA

# Summary of Valuation Results

# (Dollars in Thousands)

| | | July 1, 2022 Valuation | | July 1, 2023 Valuation | |
|---|---|---|---|---|---|
| A. CONTRIBUTIONS % OF PAYROLL (Table 11) | | | | | |
| 1. Statutory Contributions - Chapter 354A | | 25.13% | | 30.86% | ** |
| 2. Required Contributions - Chapter 356 | | 19.96% | | 24.50% | |
| 3. Sufficiency / (Deficiency) | | 5.17% | | 6.36% | |
| | | | | | |
| B. FUNDING RATIOS | | | | | |
| 1. Accrued Liability Funding Ratio | | | | | |
| a Current Assets (Table 1) | $ | 1,203,096 | $ | 1,234,225 | |
| b. Actuarial Accrued Liability (Table 9) | | 1,750,421 | | 1,891,617 | |
| c. Funding Ratio | | 68.73% | | 65.25% | |
| 2. Projected Benefit Funding Ratio (Table 8) | | | | | |
| a. Current and Expected Future Assets | $ | 2,183,758 | $ | 2,259,768 | |
| b. Current and Expected Future Benefit Obligations | | 1,971,549 | | 2,155,864 | |
| c. Funding Ratio | | 110.76% | | 104.82% | |
| | | | | | |
| C. PLAN PARTICIPANTS | | | | | |
| 1. Active Members | | | | | |
| a. Number (Table 3) | | 3,400 | | 3,360 | |
| b. Projected Annual Earnings* | $ | 313,824 | $ | 305,719 | |
| c. Average Annual Earnings (Projected dollars)* | $ | 87,941 | $ | 88,019 | |
| d. Average Age | | 44.6 | | 45.1 | |
| e. Average Service | | 12.9 | | 13.2 | |
| f. Members on Leave of Absence | | 128 | | 96 | |
| 2. Others | | | | | |
| a. Service Retirements (Table 4) | | 3,856 | | 3,905 | |
| b. Disability Retirements (Table 5) | | 22 | | 24 | |
| c. Survivors (Table 6) | | 375 | | 381 | |
| d. Deferred Retirements (Table 7) | | 2,514 | | 2,611 | |
| e. Terminated Other Non-Vested (Table 7) | | 2,915 | | 3,007 | |
| f. Total – Others | | 9,682 | | 9,928 | |
| 3. Grand Total (1.a + 1.f + 2.f) | | 13,210 | | 13,384 | |

** Projected Annual Earnings includes expected payroll for teachers hired after the valuation date to replace retirements in May and June prior to the valuation date; Average Annual Earnings excludes this new teacher payroll.*

*** Statutory contribution includes one-time state aid (25.71% without one-time state aid).*

# Accounting Balance Sheet
# as of June 30, 2023
# (Dollars in Thousands)

| | | Market Value |
|---|---|---|
| A. ASSETS | | |
| 1. Cash, Equivalents, Short-Term Securities | | $ 9,692 |
| 2. Investments | | |
| a. Fixed Income | | 169,178 |
| b. Equity | | 714,327 |
| c. Real Assets | | 79,692 |
| d. Alternative | | 187,133 |
| e. Cash and Cash Equivalents | | 56,541 |
| 3. Other Assets | | 7,051 |
| B. TOTAL ASSETS | | $ 1,223,614 |
| C. AMOUNTS CURRENTLY PAYABLE | | $ 6,861 |
| D. ASSETS AVAILABLE FOR BENEFITS | | |
| 1. Member Reserves | | $ 252,145 |
| 2. Employer Reserves | | 964,608 |
| 3. Total Assets Available for Benefits | | $ 1,216,753 |
| E. TOTAL AMOUNTS CURRENTLY PAYABLE AND ASSETS AVAILABLE FOR BENEFITS | | $ 1,223,614 |
| F. DETERMINATION OF ACTUARIAL VALUE OF ASSETS | | |
| 1. Market Value of Assets Available for Benefits (D.3) | | $ 1,216,753 |
| 2. Unrecognized Asset Returns (UAR) | | |
| a. June 30, 2023 | $ 25,514 | |
| b. June 30, 2022 | (191,444) | |
| c. June 30, 2021 | 229,203 | |
| d. June 30, 2020 | (73,490) | |
| 3. UAR Adjustment: .80 * 2(a) + .60 * 2(b) + .40 * 2(c) + .20 * 2(d) | | (17,472) |
| 4. Actuarial Value of Assets: (F.1 - F.3) | | $ 1,234,225 |

| DERIVATION OF OTHER ASSETS * | Market Value |
|---|---|
| Accounts Receivable | |
| Employer Contribution | $ 438 |
| Employee Contribution | 229 |
| Service Purchases Receivable | 55 |
| Pensions Receivable | 37 |
| State Contributions | 838 |
| Real Estate Income Receivable | 60 |
| Commission Recapture Receivable | 1,196 |
| Interest Receivable | 202 |
| Dividend Receivable | 0 |
| Misc. Receivable | 0 |
| Sale of Securities | 3,996 |
| Total Accounts Receivable | $ 7,051 |
| Fixed Assets | 0 |
| Total Other Assets | $ 7,051 |

**Numbers may not add due to rounding.*

# Changes in Assets Available for Benefits
# as of June 30, 2023
# (Dollars in Thousands)

| | | | Market Value |
|---|---|---|---|
| A. | ASSETS AVAILABLE AT BEGINNING OF PERIOD | $ | 1,154,427 |
| | | | |
| B. | OPERATING REVENUES | | |
| 1. | Member Contributions | $ | 22,420 |
| 2. | Employer Contributions | | 38,586 |
| 3. | Supplemental Contributions | | 15,665 |
| 4. | Reemployed Annuitant Employer Contributions | | 437 |
| 5. | Investment Income | | 15,599 |
| 6. | Investment Expenses | | (4,523) |
| 7. | Net Realized Gain / (Loss) | | 6,796 |
| 8. | Other | | 0 |
| 9. | Net Change in Unrealized Gain / (Loss) | | 92,425 |
| 10. | Total Operating Revenue | $ | 187,405 |
| | | | |
| C. | OPERATING EXPENSES | | |
| 1. | Service Retirements | $ | 109,272 |
| 2. | Disability Benefits | | 470 |
| 3. | Survivor Benefits | | 12,577 |
| 4. | Refunds | | 1,539 |
| 5. | Benefit Payment Adjustment | | 28 |
| 6. | Administrative Expenses | | 1,193 |
| 7. | Total Operating Expenses | $ | 125,079 |
| | | | |
| D. | OTHER CHANGES IN RESERVES | $ | 0 |
| | | | |
| E. | ASSETS AVAILABLE AT END OF PERIOD | $ | 1,216,753 |
| | | | |
| F. | DETERMINATION OF CURRENT YEAR UNRECOGNIZED ASSET RETURN | | |
| 1. | Average Balance | | |
| | (a) Assets available at BOY | $ | 1,154,427 |
| | (b) Assets available at EOY | | 1,216,753 |
| | (c) Average balance {[(a) + (b) - Net Investment Income] / 2} | | 1,130,442 |
| | {Net investment income: B.5+B.6+B.7+B.9} | | |
| 2. | Expected Return: .075 * F.1 | | 84,783 |
| 3. | Actual Return | | 110,297 |
| 4. | Current Year Gross Asset Gain/(Loss): F.3 - F.2 | $ | 25,514 |

# Actuarial Balance Sheet
# as of July 1, 2023
# (Dollars in Thousands)

| | | |
|---|---|---|
| A. CURRENT ASSETS (TABLE 1; Line F.4) | $ | 1,234,225 |
| B. EXPECTED FUTURE ASSETS | | |
| 1. Present Value of Expected Future Statutory Supplemental Contributions* | $ | 761,296 |
| 2. Present Value of Future Normal Costs | | 264,247 |
| 3. Total Expected Future Assets | $ | 1,025,543 |
| C. TOTAL CURRENT AND EXPECTED FUTURE ASSETS | $ | 2,259,768 |
| D. TOTAL CURRENT AND EXPECTED FUTURE BENEFIT OBLIGATIONS | $ | 2,155,864 |
| E. CURRENT AND FUTURE UNFUNDED ACTUARIAL LIABILITY (D - C) | $ | (103,904) |

* *Includes the effect of scheduled employee and employer contribution increases and supplemental state contributions.*

# Determination of Unfunded Actuarial Accrued Liability (UAAL) and Supplemental Contribution Rate as of July 1, 2023 (Dollars in Thousands)

| | Actuarial Present Value of Projected Benefits | Actuarial Present Value of Future Normal Costs | Actuarial Accrued Liability |
|---|---|---|---|
| A. DETERMINATION OF ACTUARIAL ACCRUED LIABILITY (AAL) | | | |
| 1. Active Members* | | | |
| a. Retirement Benefits | $ 793,507 | $ 184,633 | $ 608,874 |
| b. Disability Benefits | $ 11,915 | $ 4,112 | $ 7,803 |
| c. Surviving Spouse and Child Benefits | $ 6,181 | $ 1,876 | $ 4,305 |
| d. Vested Withdrawals | $ 37,304 | $ 52,429 | $ (15,125) |
| e. Refund Liability Due to Death or Withdrawal | $ 2,120 | $ 21,197 | $ (19,077) |
| f. Total | $ 851,027 | $ 264,247 | $ 586,780 |
| 2. Deferred Retirements | $ 125,048 | $ 0 | $ 125,048 |
| 3. Former Members without Vested Rights | $ 3,252 | $ 0 | $ 3,252 |
| 4. Annuitants | $ 1,173,727 | $ 0 | $ 1,173,727 |
| 5. One-Time Non-Compounding Benefit Increase | $ 2,810 | $ 0 | $ 2,810 |
| 6. Total | $ 2,155,864 | $ 264,247 | $ 1,891,617 |
| B. DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL) | | | |
| 1. Actuarial Accrued Liability (A.5) | | | $ 1,891,617 |
| 2. Current Assets (Table 1; Line F.4) | | | $ 1,234,225 |
| 3. Unfunded Actuarial Accrued Liability (B.1 - B.2) | | | $ 657,392 |
| C. DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE** | | | |
| 1. Present Value of Future Payrolls Through the Amortization Date of June 30, 2048*** | | | $ 4,613,907 |
| 2. Supplemental Contribution Rate (B.3 / C.1) | | | 14.25% |

* *Includes members on leave of absence.*

** *The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method would result in initial payments less than the "interest only" payment on the UAAL; however, expected contributions to the plan are projected to reduce the UAAL due to the current contribution sufficiency. Payments less than the interest only amount would result in the UAAL increasing for an initial period of time.*

*** *Calculated using 7.0% annual investment return rate.*

# Changes in Unfunded Actuarial Accrued Liability (UAAL)
# as of July 1, 2023
# (Dollars in Thousands)

| | Year Ending June 30, 2023 | | |
|---|---|---|---|
| | Actuarial Accrued Liability | Current Assets | Unfunded Actuarial Accrued Liability |
| A. UAAL AT BEGINNING OF YEAR | $ 1,750,421 | $ 1,203,096 | $ 547,325 |
| B. CHANGE DUE TO INTEREST REQUIREMENTS AND CURRENT RATE OF FUNDING | | | |
| 1. Normal Cost and Expenses | 27,366 | 0 | 27,366 |
| 2. Benefit Payments | (123,886) | (123,886) | 0 |
| 3. Contributions | 0 | 77,108 | (77,108) |
| 4. Interest on A., B.1., B.2. and B.3. | 127,662 | 88,478 | 39,184 |
| 5. Total (B.1. + B.2. + B.3. + B.4.) | $ 31,142 | $ 41,700 | $ (10,558) |
| C. EXPECTED VALUES AT END OF YEAR (A + B.5) | $ 1,781,563 | $ 1,244,796 | $ 536,767 |
| D. INCREASE / (DECREASE) DUE TO ACTUARIAL LOSSES / (GAINS) BECAUSE OF EXPERIENCE DEVIATIONS FROM EXPECTED | | | |
| 1. Age and Service Retirements | | | $ 1,692 |
| 2. Disability Retirements | | | (354) |
| 3. Death-in-Service Benefits | | | 111 |
| 4. Withdrawals | | | (4,653) |
| 5. Salary Increases | | | (8,405) |
| 6. Investment Income | | | 10,571 |
| 7. Mortality of Annuitants | | | 105 |
| 8. Other Items | | | (5,297) |
| 9. Total | | | $ (6,230) |
| E. UAAL AT END OF YEAR BEFORE PLAN AMENDMENTS AND CHANGES IN ACTUARIAL ASSUMPTIONS (C + D.9) | | | $ 530,537 |
| F. CHANGE IN UAAL DUE TO PLAN AMENDMENTS | | | 42,650 |
| G. CHANGE IN UAAL DUE TO CHANGES IN ACTUARIAL ASSUMPTIONS | | | 84,205 |
| H. UAAL AT END OF YEAR (E + F + G) | | | $ 657,392 |

# Determination of Contribution Sufficiency
# as of July 1, 2023
# (Dollars in Thousands)

| | Percent-of-Payroll | | Dollar Amount |
|---|---|---|---|
| A. STATUTORY CONTRIBUTIONS - CHAPTER 354A | | | |
| 1. Employee Contributions | 7.75% | $ | 23,693 |
| 2. Employer Contributions | 9.00% | | 27,515 |
| a. Regular | | | |
| b. Additional | 3.84% | | 11,740 |
| 3. Supplemental Contribution | | | |
| a. 1996 Legislation | 0.27% | | 838 |
| b. 1997 Legislation | 0.92% | | 2,827 |
| c. 2014 Legislation | 2.29% | | 7,000 |
| d. 2018 Legislation | 1.64% | | 5,000 |
| e. One-Time, Direct State Aid | 5.15% | | 15,747 |
| 4. Total | 30.86% | $ | 94,360 |
| B. REQUIRED CONTRIBUTIONS - CHAPTER 356 | | | |
| 1. Normal Cost | | | |
| a. Retirement Benefits | 7.03% | $ | 21,492 |
| b. Disability Benefits | 0.15% | | 459 |
| c. Surviving Spouse and Child Benefits | 0.07% | | 214 |
| d. Vested Withdrawals | 1.86% | | 5,686 |
| e. Refund Liability Due to Death or Withdrawal | 0.76% | | 2,323 |
| f. Total | 9.87% | $ | 30,174 |
| 2. Supplemental Contribution Amortization | 14.25% | | 43,565 |
| 3. Allowance for Administrative Expenses | 0.38% | | 1,162 |
| 4. Total | 24.50% | $ | 74,901 |
| C. CONTRIBUTION SUFFICIENCY / (DEFICIENCY) (A.4 - B.4)* | 6.36% | | 19,459 |
| Projected Annual Payroll for Fiscal Year Beginning on the Valuation Date (determined by increasing reported pay for each member by one full year of assumed pay increase, according to the actuarial salary scale, as prescribed by the LCPR Standards for Actuarial Work), plus replacement payroll (described in the Actuarial Methods and Assumptions.) | | $ | 305,719 |

- *Contribution sufficiency without one-time direct state aid is 1.21%.*

# Actuarial Methods and Assumptions as of July 1, 2023

## I. ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this valuation for all purposes is the Entry Age Actuarial Cost Method. Under this Method, a Normal Cost is developed by amortizing the actuarial value of benefits expected to be received by each active participant (as a level percentage of pay) over the total working lifetime of that participant, from hire to termination. Years of Service for valuation purposes was provided by the Retirement Fund. Age as of the valuation date was calculated based on the dates of birth provided by the Retirement Fund. Entry Age for valuation purposes was calculated as the age on the valuation date minus the years of service on the valuation date.

To the extent that current assets and future Normal Costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued liability ("UAAL") develops. The UAAL is amortized over the closed statutory amortization period ending June 30, 2048 using level percent-of-payroll assuming total payroll increases 2.50% per annum. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

## II. CURRENT ACTUARIAL ASSUMPTIONS

Assumptions are based on an experience study for the five-year period of July 1, 2016 to June 30, 2021, as well as a legislated change to the investment return assumption effective July 1, 2023. Note that significant plan changes effective July 1, 2023 and July 1, 2025 may ultimately result in behavior changes not anticipated in the actuarial assumptions.

### *A. Demographic Assumptions*

Mortality:

1. Healthy and Disabled Annuitant Mortality:
    a. Male: Pub-2010 Male Healthy Teacher Retiree Mortality Table, adjusted for mortality improvements using projection scale MP-2021 from 2010. Rates are multiplied by a factor of 1.03.
    b. Female: Pub-2010 Female Healthy Teacher Retiree Mortality Table, adjusted for mortality improvements using projection scale MP-2021 from 2010. Rates are multiplied by a factor of 1.03.
2. Employee Mortality:
    a. Male: Pub-2010 Male Healthy Teacher Employee Mortality Table, adjusted for mortality improvements using projection scale MP-2021 from 2010.
    b. Female: Pub-2010 Female Healthy Teacher Employee Mortality Table, adjusted for mortality improvements using projection scale MP-2021 from 2010.

# Actuarial Methods and Assumptions as of July 1, 2023

| Age in | Post-Retirement Mortality | |
|---|---|---|
| 2023 | Male | Female |
| 55 | 22 | 20 |
| 56 | 24 | 22 |
| 57 | 27 | 24 |
| 58 | 30 | 26 |
| 59 | 34 | 28 |
| 60 | 38 | 31 |
| 61 | 42 | 33 |
| 62 | 46 | 35 |
| 63 | 51 | 38 |
| 64 | 56 | 41 |
| 65 | 61 | 44 |
| 66 | 67 | 47 |
| 67 | 74 | 51 |
| 68 | 82 | 56 |
| 69 | 91 | 62 |
| 70 | 102 | 69 |
| 71 | 114 | 78 |
| 72 | 128 | 88 |
| 73 | 144 | 100 |
| 74 | 163 | 115 |
| 75 | 185 | 131 |
| 76 | 210 | 151 |
| 77 | 239 | 174 |
| 78 | 272 | 200 |
| 79 | 310 | 230 |
| 80 | 353 | 264 |
| 81 | 402 | 303 |
| 82 | 458 | 347 |
| 83 | 523 | 398 |
| 84 | 597 | 455 |
| 85 | 681 | 520 |
| 86 | 775 | 594 |
| 87 | 881 | 676 |
| 88 | 999 | 769 |
| 89 | 1,130 | 873 |
| 90 | 1,274 | 989 |
| 91 | 1,432 | 1,120 |
| 92 | 1,600 | 1,263 |
| 93 | 1,778 | 1,420 |
| 94 | 1,963 | 1,587 |

# Actuarial Methods and Assumptions as of July 1, 2023

| Age in | Pre-Retirement Mortality | |
|---|---|---|
| 2022 | Male | Female |
| 25 | 2 | 1 |
| 26 | 2 | 1 |
| 27 | 2 | 1 |
| 28 | 3 | 1 |
| 29 | 3 | 2 |
| 30 | 3 | 2 |
| 31 | 3 | 2 |
| 32 | 4 | 2 |
| 33 | 4 | 2 |
| 34 | 4 | 3 |
| 35 | 5 | 3 |
| 36 | 5 | 3 |
| 37 | 5 | 3 |
| 38 | 5 | 3 |
| 39 | 6 | 4 |
| 40 | 6 | 4 |
| 41 | 6 | 4 |
| 42 | 6 | 4 |
| 43 | 7 | 4 |
| 44 | 7 | 4 |
| 45 | 7 | 5 |
| 46 | 8 | 5 |
| 47 | 8 | 5 |
| 48 | 9 | 6 |
| 49 | 10 | 6 |
| 50 | 10 | 7 |
| 51 | 11 | 7 |
| 52 | 12 | 8 |
| 53 | 14 | 9 |
| 54 | 15 | 10 |
| 55 | 16 | 11 |
| 56 | 18 | 12 |
| 57 | 20 | 13 |
| 58 | 22 | 14 |
| 59 | 24 | 15 |
| 60 | 27 | 17 |
| 61 | 30 | 18 |
| 62 | 33 | 20 |
| 63 | 36 | 22 |
| 64 | 40 | 24 |

# Actuarial Methods and Assumptions as of July 1, 2023

Rates of Disability:

*Disability Expressed as the Number of Occurrences per 10,000:*

| Age | Disability | Age | Disability |
|---|---|---|---|
| 20 | 1 | 45 | 4 |
| 21 | 1 | 46 | 4 |
| 22 | 1 | 47 | 4 |
| 23 | 1 | 48 | 4 |
| 24 | 1 | 49 | 4 |
| 25 | 1 | 50 | 6 |
| 26 | 1 | 51 | 6 |
| 27 | 1 | 52 | 6 |
| 28 | 1 | 53 | 6 |
| 29 | 1 | 54 | 6 |
| 30 | 2 | 55 | 12 |
| 31 | 2 | 56 | 12 |
| 32 | 2 | 57 | 12 |
| 33 | 2 | 58 | 12 |
| 34 | 2 | 59 | 12 |
| 35 | 2 | 60 | 20 |
| 36 | 2 | 61 | 20 |
| 37 | 2 | 62 | 20 |
| 38 | 2 | 63 | 20 |
| 39 | 2 | 64 | 20 |
| 40 | 2 | | |
| 41 | 2 | | |
| 42 | 2 | | |
| 43 | 2 | | |
| 44 | 2 | | |

# Actuarial Methods and Assumptions as of July 1, 2023

**Rates of Termination:**

| Year | Number of Terminations per 1,000 Active Members | |
|---|---|---|
| | Male | Female |
| 1 | 450 | 450 |
| 2 | 235 | 200 |
| 3 | 160 | 120 |
| 4 | 75 | 95 |
| 5 | 65 | 75 |
| 6 | 55 | 70 |
| 7 | 40 | 60 |
| 8 | 35 | 50 |
| 9 | 30 | 50 |
| 10 | 30 | 50 |
| 11 | 30 | 40 |
| 12 | 30 | 30 |
| 13 | 30 | 25 |
| 14 | 25 | 20 |
| 15 | 25 | 20 |
| 16 | 25 | 20 |
| 17 | 20 | 20 |
| 18 | 10 | 18 |
| 19 | 10 | 15 |
| 20 Over | 10 | 10 |

**Rates of Retirement:**

*Assumed Retirements Expressed as the Number of Occurrences per 10,000*

| Age | Male Coordinated Members Eligible for Unreduced Early Retirement | Female Coordinated Members Eligible for Unreduced Early Retirement | Male Coordinated Members Not Eligible for Unreduced Early Retirement | Female Coordinated Members Not Eligible for Unreduced Early Retirement |
|---|---|---|---|---|
| 55 | 2,500 | 3,500 | 500 | 500 |
| 56 | 3,500 | 3,000 | 500 | 500 |
| 57 | 3,000 | 2,000 | 500 | 500 |
| 58 | 2,500 | 2,500 | 700 | 500 |
| 59 | 2,500 | 3,000 | 700 | 700 |
| 60 | 2,500 | 3,000 | 1,200 | 900 |
| 61 | 3,000 | 3,000 | 800 | 1,000 |
| 62 | 5,000 | 3,500 | 2,000 | 1,800 |
| 63 | 3,000 | 3,000 | 2,500 | 2,100 |
| 64 | 2,500 | 2,500 | 2,500 | 2,100 |
| 65 | 10,000 | 10,000 | 3,000* | 4,500* |
| 66 | 10,000 | 10,000 | 3,500 | 5,000 |
| 67 | 10,000 | 10,000 | 4,000 | 4,500 |
| 68 | 10,000 | 10,000 | 3,500 | 3,000 |
| 69 | 10,000 | 10,000 | 3,500 | 2,500 |
| 70 & Over | 10,000 | 10,000 | 10,000 | 10,000 |

** 2,800 for male members and 3,200 for female members hired after June 30, 1989 with a Normal Retirement Age equal to 66.*

Note: Members reaching age 62 with 30 years of service prior to age 65 are assumed to retire at the same rate as Rule of 90 retirements.

# Actuarial Methods and Assumptions
# as of July 1, 2023

### *B. Economic Assumptions*

| | |
|---|---|
| Investment Return Rate: | 7.00% |
| Price Inflation: | 2.50% per year |
| Payroll Growth (Wage Inflation): | 3.00% per year |
| Future Salary Increases: | Service-based rates shown below: |

*Annual Salary Increases*

| Year | Ultimate Rate of Annual Salary | Year | Ultimate Rate of Annual Salary |
|---|---|---|---|
| 1 | 8.00% | 21 | 2.70% |
| 2 | 6.75% | 22 | 2.50% |
| 3 | 6.50% | 23 & Over | 2.50% |
| 4 | 6.25% | | |
| 5 | 6.00% | | |
| 6 | 5.75% | | |
| 7 | 5.50% | | |
| 8 | 5.25% | | |
| 9 | 5.00% | | |
| 10 | 4.75% | | |
| 11 | 4.50% | | |
| 12 | 4.25% | | |
| 13 | 4.00% | | |
| 14 | 3.75% | | |
| 15 | 3.50% | | |
| 16 | 3.40% | | |
| 17 | 3.30% | | |
| 18 | 3.20% | | |
| 19 | 3.10% | | |
| 20 | 2.90% | | |

Asset Value: The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value). At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year. The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above. The investment gain or (loss) is recognized over five years at 20% per year. The asset value is the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

# Actuarial Methods and Assumptions as of July 1, 2023

### *C. Other Assumptions*

| | |
|---|---|
| Marital Status: | It is assumed that 75% of male members and 60% of female members have an eligible spouse. The male spouse is assumed to be two years older than the female spouse. Married members are assumed to have two dependent children. |
| Deferred Benefit Commencement: | Basic Plan members who terminate vested are assumed to commence benefits at age 61. Coordinated Plan members are assumed to commence benefits at age 63. If the member is already past the assumed deferral age, the member is assumed to commence benefits one year from the valuation date. |
| Administrative Expenses: | Prior year administrative expenses (excluding investment expenses) are expressed as a percentage-of-payroll and then applied to current projected payroll. |
| Refund of Contributions: | All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until the assumed benefit commencement date and are discounted back to the valuation date. |
| Allowance for Combined Service Annuity: | 20.0% load on liabilities for former, vested members.<br>9.0% load on liabilities for former, non-vested members. |
| Missing Salary and Salary Minimums: | Active members with reported salaries of $100 or less were assumed to have the average non-zero active salary. Active members with salaries less than those reported at the prior valuation date are valued using their prior salary amount. Active members who have been hired within one year of the valuation date have had their pay annualized by dividing by months of service credited, not to exceed the average non-zero active salary. For members on leave of absence at valuation date who were not on leave at the prior valuation date, the prior year's valuation pay was used. |
| Missing Data for Deferred Vested Members: | Deferred vested members without a reported benefit and without salary information were assumed to have a final average salary of $40,000. |
| Decrement Timing: | Retirement and Termination: end of valuation year – consistent with retirements and terminations occurring at the end of the school year.<br>Death and Disability: middle of valuation year. |
| Eligibility Testing: | Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur. |
| Service Credit Accruals: | It is assumed that members accrue one year of service credit per year. Exact fractional service is used to determine the amount of benefit payable. |

# Actuarial Methods and Assumptions as of July 1, 2023

| | |
|---|---|
| Supplemental Contributions: | 1996 legislation provides for a variable amortization aid contribution paid annually on July 15. We assumed the annual amortization aid contribution will equal $838,000, which was the actual contribution for the most recent fiscal year. Additionally, annual supplemental contributions equal to $14,827,000 are scheduled to be paid each October 1.<br><br>The contributions described herein will continue until the plan is 100% funded or until June 30, 2048, whichever occurs earlier. |
| Projected Annual Payroll Calculation: | The census data as of July 1, 2023 reflects retirements and terminations occurring during the months of May and June; however, it does not necessarily reflect the replacements hired to fill their positions who may have hire dates in August and September. We assumed that May and June retirements are replaced by members coming in at the B.A. entry salary level of $49,181; the Projected Annual Payroll for the fiscal year ending June 30, 2024 includes this replacement salary amount. |
| Changes in Actuarial Methods and Assumptions Since the Prior Valuation: | The statutory investment return rate was changed from 7.5% to 7.0%.<br><br>The assumed wage inflation assumption was changed from 3.0% to 2.5%.<br><br>Additional demographic assumption changes, as recommended in the most recent experience study, dated December 8, 2022: |

- The base mortality table was changed from RP-2014 mortality table with adjustments to Pub-2010 for Teachers, with adjustments, and future improvement projected using MP-2021.
- Revised rates of retirement which generally result in more expected normal retirements and fewer early retirements.
- Revised rates of termination are generally lower, especially after the first year of employment for males and females.
- Reduced rates of disability.
- Retirement age assumption for Coordinated deferred members was changed from age 62 to age 63.
- Revised merit and seniority salary increase rates are 19 basis points lower in total. When combined with the change in wage inflation, gross salary increase rates are 69 basis points lower in total.

Members reaching age 62 with 30 years of service prior to age 65 are assumed to retire at the same rate as Rule of 90 retirements.

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