# Minnesota State Retirement System

## State Employees Retirement Fund
## GASB Statement Nos. 67 and 68
## Accounting and Financial Reporting for Pensions
## June 30, 2021

| P: 800.521.0498 | www.grsconsulting.com

November 24, 2021

Minnesota State Retirement System
State Employees Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the State Employees Retirement Fund ("SERF"), as amended by GASB Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to GASB Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report may not be applicable for purposes of funding the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 and No. 68 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2021 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the State Employees Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

This report reflects the impact of COVID-19 through June 30, 2021. It does not reflect the ongoing impact of COVID-19, which is likely to influence demographic and investment experience, at least in the short term. We will continue to monitor these developments and their impact on the plan.

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

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Brian B Murphy

Brian B. Murphy, FSA, EA, FCA, MAAA, PhD

Bonita J. Wurst

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

BBM/BJW:ah

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# SECTION A

## EXECUTIVE SUMMARY

# Executive Summary
# as of June 30, 2021 (Dollars in Thousands)

| | 2021 |
|---|---|
| Actuarial Valuation Date | June 30, 2021 |
| Measurement Date of the Net Pension Liability | June 30, 2021 |
| **Membership** | |
| Number of | |
| - Service Retirements | 39,335 |
| - Survivors | 4,357 |
| - Disability Retirements | 1,738 |
| - Deferred Retirements | 17,317 |
| - Terminated other non-vested | 9,562 |
| - Active Members | 50,889 |
| - Total | 123,198 |
| Covered-employee Payroll | $ 3,325,417 [1] |
| **Net Pension Liability** | |
| Total Pension Liability | $ 17,521,580 |
| Plan Fiduciary Net Position | 17,440,051 |
| Net Pension Liability | $ 81,529 |
| Plan Fiduciary Net Position as a Percentage of Total Pension Liability | 99.53% |
| Net Pension Liability as a Percentage of Covered-employee Payroll | 2.45% |
| **Development of the Single Discount Rate** | |
| Single Discount Rate | 6.50% |
| Long-Term Expected Rate of Investment Return | 6.50% |
| Long-Term Municipal Bond Rate | 1.92% [2] |
| Last year ending June 30 in the 2022 to 2121 projection period for which projected benefit payments are fully funded | 2121 |
| **Total Pension Expense/ (Income)** | $ (2,098,087) |

**Deferred Outflows and Deferred Inflows by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses**

| | Deferred Outflows of Resources | Deferred Inflows of Resources |
|---|---|---|
| Difference between expected and actual experience in the measurement of the Total Pension Liability | $ 20,178 | $ 9,414 |
| Changes in assumptions | 1,500,143 | 1,123,181 |
| Net difference between projected and actual earnings on pension plan investments | 279,424 | 2,534,117 |
| Totals | $ 1,799,745 | $ 3,666,712 |

[1] *Assumed equal to actual member contributions divided by employee contribution rate.*

[2] *Based on the 20-Year Municipal GO Index of mixed maturity general obligation municipal bonds as of the weekly rate closest to but not later than the Measurement Date.*

# Discussion

## Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans,* establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions,* establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. GASB Statement No. 82, Pension Issues, is an amendment to GASB Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

## Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to SERF subsequent to the measurement date of June 30, 2021.

The pension expense or income recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the total pension liability, assumption changes, and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

## Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The classes of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's Board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the State Employees Retirement Fund can be found online at www.msrs.state.mn.us/annual-reports-fy-2021 or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, Minnesota, 55103 or requested via email at info@msrs.us or telephone at 1.800.657.5757.

## Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

## Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

## General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if there are no changes in benefits, Chapter 356 required contributions are made, and all actuarial assumptions are met (including the assumption of the plan earning 7.5% on an actuarial value of assets basis, as prescribed by statutes), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain approximately level as a percentage of payroll, and
2. The funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 27 years, and
3. The unfunded liability will grow initially as a dollar amount before beginning to decline.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

## Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the market value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
2. The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3. The measurement would produce a different result if the actuarial value of assets were used instead of the market value of assets.

## Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

## Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. For employer reporting, the net pension liability and pension expense should be measured as of a date (measurement date) no earlier than the end of the employer's prior fiscal year, consistently applied from period to period. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2021 and a measurement date of June 30, 2021.

## Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 6.50%; the municipal bond rate is 1.92% (based on the weekly rate closest to but not later than the measurement date of the "20-Year Municipal GO AA Index" as published by Fidelity); and the resulting single discount rate is 6.50%.

# SECTION B

## FINANCIAL STATEMENTS

# Statement of Pension Expense Under GASB Statement No. 68
# Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

| | | |
|---|---|---|
| **A. Expense/(Income)** | | |
| 1. Service Cost | $ | 270,993 |
| 2. Interest on the Total Pension Liability | | 1,113,853 |
| 3. Current-Period Benefit Changes | | - |
| 4. Employee Contributions | | (199,525) |
| 5. Projected Earnings on Plan Investments | | (1,019,910) |
| 6. Pension Plan Administrative Expense | | 10,779 |
| 7. Other Changes in Plan Fiduciary Net Position | | (27,024) |
| 8. Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability | | |
| *Arising from Current Reporting Period* | | 2,726 |
| 9. Recognition of Outflow (Inflow) of Resources due to assumption changes | | |
| *Arising from Current Reporting Period* | | 375,036 |
| 10. Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments | | |
| *Arising from Current Reporting Period* | | (615,644) |
| **11. Increases/(Decreases) from Experience in the Current Reporting Period** | **$** | **(88,716)** |
| 12. Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability | | |
| *Arising from Prior Reporting Periods* | $ | 10,344 |
| 13. Recognition of Outflow (Inflow) of Resources due to assumption changes | | |
| *Arising from Prior Reporting Periods* | | (1,875,178) |
| 14. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments | | |
| *Arising from Prior Reporting Periods* | | (144,537) |
| **15. Total Pension Expense/ (Income)** | **$** | **(2,098,087)** |

Differences between expected and actual experience and changes in assumptions are recognized in pension expense using a systematic and rational method over a closed period equal to the average of the expected remaining service lives of all employees that are provided with pension through the pension plan (active employees and inactive employees) determined as of the beginning of the measurement period.

At the beginning of the current measurement period, the expected remaining service lives of all active employees in the plan was approximately 580,912 years. Additionally, the total plan membership (active employees and inactive employees) was 122,664. As a result, the average of the expected remaining service lives for purposes of recognizing the applicable deferred outflows and inflows of resources established in the current measurement period is 5.0000 years (rounded).

Additionally, differences between projected and actual earnings on plan investments should be recognized in pension expense using a systematic and rational method over a closed five-year period. For this purpose, the deferred outflows and inflows of resources are recognized in the pension expense as a level dollar amount over the closed period identified above.

# Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

| | |
|---|---|
| **A. Outflows (Inflows) of Resources due to Liabilities** | |
| 1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses | $ 13,632 |
| 2. Assumption Changes (gains) or losses | 1,875,179 |
| 3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years, rounded to the nearest whole number} | 5 |
| 4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience in the measurement of the Total Pension Liability | 2,726 |
| 5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes | 375,036 |
| 6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities | $ 377,762 |
| 7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability | $ 10,906 |
| 8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes | 1,500,143 |
| 9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities | $ 1,511,049 |
| **B. Outflows (Inflows) of Resources due to Assets** | |
| 1. Net difference between projected and actual earnings on pension plan investments (gains) or losses | $ (3,078,219) |
| 2. Recognition period for Assets {in years} | 5 |
| 3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets | (615,644) |
| 4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets | $ (2,462,575) |

# Statement of Outflows and Inflows
# Arising from Current and Prior Reporting Periods
# Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

**A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense**

| | Outflows of Resources | Inflows of Resources | Net Outflows/(Inflows) of Resources |
|---|---|---|---|
| 1. Due to Liabilities | $ 392,329 | $ 1,879,401 | $ (1,487,072) |
| 2. Due to Assets | 95,210 | 855,391 | (760,181) |
| **3. Total** | $ 487,539 | $ 2,734,792 | $ (2,247,253) |

**B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense**

| | Outflows of Resources | Inflows of Resources | Net Outflows/(Inflows) of Resources |
|---|---|---|---|
| 1. Differences between expected and actual experience | $ 17,293 | $ 4,223 | $ 13,070 |
| 2. Assumption Changes | 375,036 | 1,875,178 | (1,500,142) |
| 3. Net Difference between projected and actual earnings on pension plan investments | 95,210 | 855,391 | (760,181) |
| **4. Total** | $ 487,539 | $ 2,734,792 | $ (2,247,253) |

**C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses**

| | Deferred Outflows of Resources | Deferred Inflows of Resources | Net Deferred Outflows/ (Inflows) of Resources |
|---|---|---|---|
| 1. Differences between expected and actual experience | $ 20,178 | $ 9,414 | $ 10,764 |
| 2. Assumption Changes | 1,500,143 | 1,123,181 | 376,962 |
| 3. Net Difference between projected and actual earnings on pension plan investments* | 279,424 | 2,534,117 | (2,254,693) |
| **4. Total** | $ 1,799,745 | $ 3,666,712 | $ (1,866,967) |

**D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses**

| Year Ending June 30 | Net Deferred Outflows/ (Inflows) of Resources |
|---|---|
| 2022 | $ (1,150,737) |
| 2023 | (233,754) |
| 2024 | (244,595) |
| 2025 | (237,881) |
| 2026 | - |
| Thereafter | - |
| **Total** | $ (1,866,967) |

** Paragraph 71(b) of GASB Statement No. 68 requires deferred outflows and inflows arising from differences between projected and actual earnings on pension plan investments to be aggregated and shown as a net amount. For purposes of this valuation, amounts are shown separately for calculation purposes.*

# Recognition of Deferred Outflows and Inflows of Resources
# Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

| Year Established | Initial Amount | Initial Recognition Period | Current Year Recognition | Remaining Recognition | Remaining Recognition Period |
|---|---|---|---|---|---|
| **Deferred Outflow (Inflow) Due to Differences Between Expected and Actual Experience on Liabilities** | | | | | |
| 2017 | $ 49,659 | 5.0000 | $ 9,931 | $ 0 | 0.0000 |
| 2018 | (8,132) | 5.0000 | (1,627) | (1,627) | 1.0000 |
| 2019 | 23,180 | 5.0000 | 4,636 | 9,272 | 2.0000 |
| 2020 | (12,979) | 5.0000 | (2,596) | (7,787) | 3.0000 |
| 2021 | 13,632 | 5.0000 | 2,726 | 10,906 | 4.0000 |
| **Total** | | | **$ 13,070** | **$ 10,764** | |
| **Deferred Outflow (Inflow) Due to Assumption Changes** | | | | | |
| 2017 | $ (4,691,209) | 5.0000 | $ (938,241) | $ 0 | 0.0000 |
| 2018 | (4,219,074) | 5.0000 | (843,815) | (843,814) | 1.0000 |
| 2020 | (465,611) | 5.0000 | (93,122) | (279,367) | 3.0000 |
| 2021 | 1,875,179 | 5.0000 | 375,036 | 1,500,143 | 4.0000 |
| **Total** | | | **$ (1,500,142)** | **$ 376,962** | |
| **Deferred Outflow (Inflow) Due to Differences Between Projected and Actual Earnings on Plan Investments** | | | | | |
| 2017 | $ (841,021) | 5.0000 | $ (168,205) | $ 0 | 0.0000 |
| 2018 | (357,707) | 5.0000 | (71,542) | (71,542) | 1.0000 |
| 2019 | 31,034 | 5.0000 | 6,207 | 12,413 | 2.0000 |
| 2020 | 445,017 | 5.0000 | 89,003 | 267,011 | 3.0000 |
| 2021 | (3,078,219) | 5.0000 | (615,644) | (2,462,575) | 4.0000 |
| **Total** | | | **$ (760,181)** | **$ (2,254,693)** | |
| **Deferred Outflow (Inflow) due to All Sources** | | | | | |
| **Total** | | | **$ (2,247,253)** | **$ (1,866,967)** | |

# Statement of Fiduciary Net Position as of June 30, 2021 (Dollars in Thousands)

| **Assets** | **June 30, 2021** |
|---|---|
| Cash & Short-term Investments | $ 268,962 |
| Receivables | 34,429 |
| Investment Pools (at fair value) | 17,132,800 |
| Securities Lending Collateral | 1,110,330 |
| Capital Assets | 13,583 |
| **Total Assets** | **$ 18,560,104** |
| | |
| **Total Deferred Outflows of Resources** | **$ -** |
| **Total Liabilities** | **$ (1,120,053)** |
| **Total Deferred Inflows of Resources** | **$ -** |
| | |
| **Net Position Restricted for Pensions** | **$ 17,440,051** |

# Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2021 (Dollars in Thousands)

| | | |
|---|---|---|
| **1.** | **Net Position at market value at beginning of year** | **$ 13,855,691** |
| **Additions** | | |
| 2. | Contributions | |
| | a. Employee | $ 199,525 |
| | b. Employer | 206,381 |
| | c. Other sources | - |
| | d. Total contributions | $ 405,906 |
| 3. | Investment income | |
| | a. Investment income/(loss) | $ 4,114,673 |
| | b. Investment expenses | (16,544) |
| | c. Net investment income/(loss) | $ 4,098,129 |
| 4. | Other Additions | 27,052 |
| **5.** | **Total Additions (2.d.) + (3.c.) + (4.)** | **$ 4,531,087** |
| **Deductions** | | |
| 6. | Benefits Paid | |
| | a. Annuity benefits | $ (923,364) |
| | b. Refunds | (12,556) |
| | c. Total benefits paid | $ (935,920) |
| 7. | Expenses | |
| | a. Other deductions | $ (28) |
| | b. Administrative | (10,779) |
| | c. Total expenses | $ (10,807) |
| **8.** | **Total deductions (6.c.) + (7.c.)** | **$ (946,727)** |
| **9.** | **Net increase/(decrease) in fiduciary net position (5.) + (8.)** | **$ 3,584,360** |
| **10.** | **Net position at market value at end of year (1.) + (9.)** | **$ 17,440,051** |
| 11. | State Board of Investment calculated annual investment return for the State Employees Retirement Fund* | 30.3% |

** The fiscal year 2021 investment return for the Combined Funds is 30.3%.*

# SECTION C

## REQUIRED SUPPLEMENTARY INFORMATION

# Schedule of Changes in Net Pension Liability and Related Ratios
# Current Period
# Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

| | | |
|---|---|---|
| **A. Total pension liability** | | |
| 1. Service Cost | $ | 270,993 |
| 2. Interest on the Total Pension Liability | | 1,113,853 |
| 3. Changes of benefit terms | | - |
| 4. Difference between expected and actual experience of the Total Pension Liability | | 13,632 |
| 5. Changes of assumptions | | 1,875,179 |
| 6. Benefit payments, including refunds of employee contributions | | (935,920) |
| 7. Net change in total pension liability | $ | 2,337,737 |
| 8. Total pension liability – beginning | | 15,183,843 |
| 9. Total pension liability – ending | **$** | **17,521,580** |
| **B. Plan fiduciary net position** | | |
| 1. Contributions – employer | $ | 206,381 |
| 2. Contributions – employee | | 199,525 |
| 3. Net investment income | | 4,098,129 |
| 4. Benefit payments, including refunds of employee contributions | | (935,920) |
| 5. Pension Plan Administrative Expense | | (10,779) |
| 6. Other changes | | 27,024 |
| 7. Net change in plan fiduciary net position | $ | 3,584,360 |
| 8. Plan fiduciary net position – beginning | | 13,855,691 |
| 9. Plan fiduciary net position – ending | **$** | **17,440,051** |
| **C. Net pension liability,** *A.9. - B.9.* | **$** | **81,529** |
| **D. Plan fiduciary net position as a percentage of the total pension liability,** *B.9. / A.9.* | | **99.53%** |
| **E. Covered-employee payroll** | **$** | **3,325,417** [1] |
| **F. Net pension liability as a percentage of covered-employee payroll,** *C. / E.* | | **2.45%** |

*(1)* *Assumed equal to actual member contributions divided by employee contribution rate.*

# Schedule of Changes in Net Pension Liability and Related Ratios Multiyear
# (Dollars in Thousands)

### Last 10 Fiscal Years (which will be built prospectively)

| Fiscal year ending June 30, | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Pension Liability** | | | | | | | | | | |
| Service Cost | $ 270,993 | $ 267,779 | $ 255,056 | $ 455,709 | $ 619,666 | $ 211,491 | $ 210,545 | $ 256,155 | | |
| Interest on the Total Pension Liability | 1,113,853 | 1,114,756 | 1,078,390 | 1,069,154 | 982,066 | 1,020,925 | 1,018,035 | 922,181 | | |
| Benefit Changes | - | - | - | (1,711,128) | 83,490 | - | - | - | | |
| Difference between Expected and Actual Experience | 13,632 | (12,979) | 23,180 | (8,132) | 49,659 | 21,209 | (493,197) | (44,023) | | |
| Assumption Changes | 1,875,179 | (465,611) | - | (4,219,074) | (4,691,209) | 9,911,319 | - | (1,477,308) | | |
| Benefit Payments | (923,364) | (885,517) | (841,776) | (797,027) | (750,526) | (707,361) | (665,821) | (623,942) | | |
| Refunds | (12,556) | (13,725) | (15,199) | (13,533) | (11,576) | (13,345) | (12,026) | (11,986) | | |
| **Net Change in Total Pension Liability** | $ 2,337,737 | $ 4,703 | $ 499,651 | $ (5,224,031) | $ (3,718,430) | $10,444,238 | $ 57,536 | $ (978,923) | | |
| **Total Pension Liability - Beginning** | 15,183,843 | 15,179,140 | 14,679,489 | 19,903,520 | 23,621,950 | 13,177,712 | 13,120,176 | 14,099,099 | | |
| **Total Pension Liability - Ending (a)** | **$17,521,580** | **$ 15,183,843** | **$15,179,140** | **$14,679,489** | **$19,903,520** | **$23,621,950** | **$13,177,712** | **$13,120,176** | | |
| **Plan Fiduciary Net Position** | | | | | | | | | | |
| Employer Contributions | $ 206,381 | $ 204,006 | $ 182,939 | $ 164,233 | $ 158,352 | $ 151,168 | $ 146,333 | $ 128,037 | | |
| Employee Contributions | 199,525 | 197,897 | 182,210 | 166,726 | 161,670 | 153,854 | 149,293 | 131,033 | | |
| Pension Plan Net Investment Income | 4,098,129 | 569,670 | 948,366 | 1,276,550 | 1,667,562 | (9,633) | 501,185 | 1,829,621 | | |
| Benefit Payments | (923,364) | (885,517) | (841,776) | (797,027) | (750,526) | (707,361) | (665,821) | (623,942) | | |
| Refunds | (12,556) | (13,725) | (15,199) | (13,533) | (11,576) | (13,345) | (12,026) | (11,986) | | |
| Pension Plan Administrative Expense | (10,779) | (10,261) | (9,877) | (9,564) | (10,165) | (10,196) | (8,719) | (8,125) | | |
| Other Changes | 27,024 | 21,332 | 32,204 | 20,423 | 47,232 | 20,259 | 29,470 | 20,528 | | |
| **Net Change in Plan Fiduciary Net Position** | $ 3,584,360 | $ 83,402 | $ 478,867 | $ 807,808 | $ 1,262,549 | $ (415,254) | $ 139,715 | $ 1,465,166 | | |
| **Plan Fiduciary Net Position - Beginning** | 13,855,691 | 13,772,289 | 13,293,422 | 12,485,614 | 11,223,065 | 11,638,319 | 11,498,604 | 10,033,438 | | |
| **Plan Fiduciary Net Position - Ending (b)** | **$17,440,051** | **$ 13,855,691** | **$13,772,289** | **$13,293,422** | **$12,485,614** | **$11,223,065** | **$11,638,319** | **$11,498,604** | | |
| **Net Pension Liability - Ending (a) - (b)** | **$ 81,529** | **$ 1,328,152** | **$ 1,406,851** | **$ 1,386,067** | **$ 7,417,906** | **$12,398,885** | **$ 1,539,393** | **$ 1,621,572** | | |
| **Plan Fiduciary Net Position as a Percentage of Total Pension Liability** | **99.53 %** | **91.25 %** | **90.73 %** | **90.56 %** | **62.73 %** | **47.51 %** | **88.32 %** | **87.64 %** | | |
| **Covered-Employee Payroll [1]** | **$ 3,325,417** | **$ 3,298,283** | **$ 3,168,870** | **$ 3,031,382** | **$ 2,939,455** | **$ 2,797,345** | **$ 2,714,418** | **$ 2,620,660** | | |
| **Net Pension Liability as a Percentage of Covered-Employee Payroll** | **2.45 %** | **40.27 %** | **44.40 %** | **45.72 %** | **252.36 %** | **443.24 %** | **56.71 %** | **61.88 %** | | |

**Notes to Schedule:**

*(1) Assumed equal to actual member contribution divided by employee contribution rate.*

# Schedule of Net Pension Liability Multiyear
# (Dollars in Thousands)

### Last 10 Fiscal Years (which will be built prospectively)

| Fiscal Year Ending June 30, | Total Pension Liability | Plan Net Position | Net Pension Liability | Plan Net Position as a % of Total Pension Liability | Covered-employee Payroll | Net Pension Liability as a % of Covered-employee Payroll |
|---|---|---|---|---|---|---|
| | ( a ) | ( b ) | ( a ) - ( b ) = ( c ) | ( b ) / ( a ) | ( d ) | ( c ) / ( d ) |
| 2014 | $ 13,120,176 | $ 11,498,604 | $ 1,621,572 | 87.64% | $ 2,620,660 | 61.88% |
| 2015 | 13,177,712 | 11,638,319 | 1,539,393 | 88.32 | 2,714,418 | 56.71 |
| 2016 | 23,621,950 | 11,223,065 | 12,398,885 | 47.51 | 2,797,345 | 443.24 |
| 2017 | 19,903,520 | 12,485,614 | 7,417,906 | 62.73 | 2,939,455 | 252.36 |
| 2018 | 14,679,489 | 13,293,422 | 1,386,067 | 90.56 | 3,031,382 | 45.72 |
| 2019 | 15,179,140 | 13,772,289 | 1,406,851 | 90.73 | 3,168,870 | 44.40 |
| 2020 | 15,183,843 | 13,855,691 | 1,328,152 | 91.25 | 3,298,283 | 40.27 |
| 2021 | 17,521,580 | 17,440,051 | 81,529 | 99.53 | 3,325,417 | 2.45 |

# Schedule of Contributions Multiyear (Dollars in Thousands)

## Last 10 Fiscal Years

| Fiscal Year Ending June 30, | Actuarially Determined Contribution (1) | Actual Contributions | Contribution Deficiency (Excess) | Covered-Employee Payroll (2) | Actual Contribution as a % of Covered-Employee Payroll |
|---|---|---|---|---|---|
| | ( a ) | ( b ) | ( a ) - ( b ) = ( c ) | ( d ) | ( b ) / ( d ) |
| 2012 | $ 142,740 | $ 115,159 | $ 27,581 | $ 2,367,160 | 4.86% |
| 2013 | 181,756 | 121,673 | 60,083 | 2,483,000 | 4.90 |
| 2014 | 195,239 | 128,037 | 67,202 | 2,620,660 | 4.89 |
| 2015 | 198,695 | 146,333 | 52,362 | 2,714,418 | 5.39 |
| 2016 | 194,136 | 151,168 | 42,968 | 2,797,345 | 5.40 |
| 2017 | 264,257 | 158,352 | 105,905 | 2,939,455 | 5.39 |
| 2018 | 234,629 | 164,233 | 70,396 | 3,031,382 | 5.42 |
| 2019 | 183,161 | 182,939 | 222 | 3,168,870 | 5.77 |
| 2020 | 184,044 | 204,006 | (19,962) | 3,298,283 | 6.19 |
| 2021 | 151,639 | 206,381 | (54,742) | 3,325,417 | 6.21 |

# Notes to Schedule of Contributions

**Methods and Assumptions Used to Determine Fiscal Year Ending June 30, 2021 Contribution Rates Reported in this Schedule:**

| | |
|---|---|
| **Notes** | (1) Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date.<br>(2) Assumed equal to actual member contributions divided by employee contribution rate. |
| Valuation Date | June 30, 2020 |
| Actuarial Cost Method | Entry Age Normal |
| Amortization Method | Level Percentage of Payroll, Closed |
| Remaining Amortization Period | 28 years |
| Asset Valuation Method | 5-Year smoothed market; no corridor |
| Inflation | 2.25% |
| Payroll Growth | 3.00% |
| Salary Increases | Service based table of rates ranging from 13.00% with one year of service to 3.00% with 29 or more years of service, including inflation |
| Investment Rate of Return | 7.50% |
| Retirement Age | Experience-based table of rates that are specific to the type of eligibility condition. |
| Healthy Post-retirement Mortality | Pub-2010 General Retiree Mortality Table adjusted for mortality improvements using projection scale MP-2018. Rates are multiplied by a factor of 1.04 for males and 1.10 for females. |
| **Other Information** | |
| Benefit Increases After Retirement | The post-retirement increase is 1.00% from January 1, 2019 through December 31, 2023, and 1.50% from January 1, 2024 and onward. |

See separate funding actuarial valuation report as of July 1, 2020 for additional detail. To obtain this report, contact MSRS as noted on page 3. This report is also available online at: https://www.msrs.state.mn.us/annual-reports-fy-2020

# Schedule of Investment Returns Multiyear

## Last 10 Fiscal Years

| Fiscal Year Ending June 30, | Annual Return[1] | |
|---|---|---|
| 2012 | | |
| 2013 | | |
| 2014 | 18.7 | % |
| 2015 | 4.5 | |
| 2016 | -0.1 | |
| 2017 | 15.2 | |
| 2018 | 10.5 | |
| 2019 | 7.3 | |
| 2020 | 4.2 | |
| 2021 | 30.3 | |

*[1] Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

### Rate of Return

For the fiscal year ended June 30, 2021, the annual money-weighted rate of return for the State Employees Retirement Fund was 30.3%. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

### Ten-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at 651.296.3328.

# SECTION D

## ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

# Asset Allocation

## Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce a geometric, long-term expected rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each major asset class that is included in the pension fund's target asset allocation as of June 30, 2021, these estimates are summarized in the following table:

| Asset Class | Target Allocation | Long-Term Expected Real Rate of Return (Geometric Mean) |
|---|---|---|
| Domestic Equity | 33.5% | 5.10% |
| International Equity | 16.5% | 5.30% |
| Private Markets | 25.0% | 5.90% |
| Fixed Income | 25.0% | 0.75% |
| Total | 100.0% | |

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

For purposes of this valuation, the long-term expected rate of return assumption is 6.50%. This assumption is based on a review of inflation and investment return assumptions in our report dated June 24, 2021.

# Single Discount Rate

A Single Discount Rate of 6.50% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 6.50%. The projection of cash flows used to determine this Single Discount Rate assumed that employee and employer contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. As a result, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 6.50%, as well as what the fund's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (5.50%) or 1-percentage-point higher (7.50%) than the current rate.

## Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

*(Dollars in Thousands)*

| | 1% Decrease 5.50% | Current Single Discount Rate Assumption 6.50% | 1% Increase 7.50% |
|---|---|---|---|
| Total Pension Liability | $ 19,791,300 | $ 17,521,580 | $ 15,646,401 |
| Net Position Restricted for Pensions | 17,440,051 | 17,440,051 | 17,440,051 |
| Net Pension Liability | **$ 2,351,249** | **$ 81,529** | **$ (1,793,650)** |

For more information on the calculation of the single discount rate, refer to Section G of this report.

Note that we believe the 7.5% interest rate assumption does not comply with Actuarial Standards of Practice.

# GASB Statement No. 68 Reconciliation (Dollars in Thousands)

| | Total Pension Liability (a) | Plan Fiduciary Net Position (b) | Net Pension Liability (a) - (b) | Deferred Outflows | Deferred Inflows | Total Pension Expense |
|---|---|---|---|---|---|---|
| **Balance Beginning of Year** | **$ 15,183,843** | **$ 13,855,691** | **$ 1,328,152** | **$ 398,473** | **$ 3,323,285** | |
| **Changes for the Year:** | | | | | | |
| Service Cost | $ 270,993 | | $ 270,993 | | | $ 270,993 |
| Interest on Total Pension Liability | 1,113,853 | | 1,113,853 | | | 1,113,853 |
| Interest on Fiduciary Net Position | | $ 1,019,910 (1) | (1,019,910) | | | (1,019,910) |
| Changes in Benefit Terms | - | | - | | | - |
| Liability Experience Gains and Losses | 13,632 | | 13,632 | $ 10,906 | $ - | 2,726 |
| Changes in Assumptions | 1,875,179 | | 1,875,179 | 1,500,143 | - | 375,036 |
| Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods | | | | | | |
| Liability Experience Gains/(Losses) | | | | (14,567) | (4,223) | 10,344 |
| Assumption Changes | | | | - | (1,875,178) | (1,875,178) |
| Investment Gains/(Losses) | | | | (95,210) | (239,747) | (144,537) |
| Contributions - Employer | | 206,381 | (206,381) | | | |
| Contributions - Employees | | 199,525 | (199,525) | | | (199,525) |
| Asset Gain/(Loss) | | 3,078,219 (1) | (3,078,219) | - | 2,462,575 | (615,644) |
| Benefit Payments and Refunds | (935,920) | (935,920) | - | | | |
| Administrative Expenses | | (10,779) | 10,779 | | | 10,779 |
| Other changes | | 27,024 | (27,024) | | | (27,024) |
| **Net Changes** | **$ 2,337,737** | **$ 3,584,360** | **$ (1,246,623)** | **$ 1,401,272** | **$ 343,427** | **$ (2,098,087)** |
| **Balance End of Year** | **$ 17,521,580** | **$ 17,440,051** | **$ 81,529** | **$ 1,799,745** | **$ 3,666,712** | |

*(1) The sum of these items in column (b) equals the net investment income of $4,098,129.*

# Summary of Population Statistics

| | | Terminated* | | Recipients** | | | |
|---|---|---|---|---|---|---|---|
| | Actives | Deferred Retirement | Other Non-Vested | Service Retirement | Disability Retirement | Survivor | Total |
| **Members on July 1, 2020** | **51,742** | **17,333** | **9,670** | **37,898** | **1,784** | **4,237** | **122,664** |
| New members | 3,693 | 0 | 0 | 0 | 0 | 0 | **3,693** |
| Return to active | 421 | (205) | (216) | 0 | 0 | 0 | **0** |
| Terminated non-vested | (1,662) | 0 | 1,662 | 0 | 0 | 0 | **0** |
| Service retirements | (1,720) | (664) | 0 | 2,384 | 0 | 0 | **0** |
| Unclassified retirements | 0 | 0 | 0 | 106 | 0 | 0 | **106** |
| Terminated deferred | (879) | 879 | 0 | 0 | 0 | 0 | **0** |
| Terminated refund/transfer | (607) | (152) | (1,703) | 0 | 0 | 0 | **(2,462)** |
| Deaths | (74) | (40) | (7) | (1,098) | (86) | (241) | **(1,546)** |
| New beneficiary | 0 | 0 | 0 | 0 | 0 | 385 | **385** |
| Disabled | (25) | 0 | 0 | 0 | 25 | 0 | **0** |
| Data adjustments | 0 | 166 | 156 | 45 | 15 | (24) | **358** |
| Net change | (853) | (16) | (108) | 1,437 | (46) | 120 | **534** |
| **Members on July 1, 2021** | **50,889** | **17,317** | **9,562** | **39,335** | **1,738** | **4,357** | **123,198** |

* *Includes members in the General and Military Affairs Plans.*
** *Includes members in the General, Military Affairs and Unclassified Plans.*

# SECTION E

## SUMMARY OF BENEFITS

# Summary of Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

| | |
|---|---|
| **Plan Year** | July 1 through June 30. |
| **Eligibility** | State employees, non-academic staff of the University of Minnesota and employees of certain Metro level government units, unless excluded by law. |
| **Contributions** | Shown as a percent of salary:<br><br>**Effective as of** / **Member** / **Employer**<br>July 1, 2019 / 6.00% / 6.25%<br><br>Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h). |
| **Allowable Service** | Service during which member contributions were made. May also include certain leaves of absence, military service and periods while temporary Worker's Compensation is paid. Excludes lump sum vacation and severance pay at termination. |
| **Average Salary** | Average of the five highest successive years of Salary. Average Salary is based on all Allowable Service if less than five years. |
| **Salary** | Includes wages, allowances and fees. Excludes lump sum payments at separation, employer contributions to deferred compensation and tax-sheltered annuity plans and benevolent vacation and sick leave donation programs. |
| **Retirement** | |
| **Normal retirement benefit** | |
| **Age/Service requirement** | First hired before July 1, 1989:<br>(a.) Age 65 and three years of Allowable Service.<br>(b.) Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.<br>First hired after June 30, 1989:<br>(a.) The greater of age 65 or the age eligible for full Social Security retirement benefits (but not higher than age 66) and three years of Allowable Service (five years if hired after June 30, 2010).<br>(b.) Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service. |
| **Amount** | 1.70% of Average Salary for each year of Allowable Service. |

| | |
|---|---|
| **Retirement (Continued)** | |
| **Early retirement** | |
| **Age/Service requirement** | First hired before July 1, 1989:<br>(a.) Age 55 and three years of Allowable Service.<br>(b.) Any age with 30 years of Allowable Service.<br>(c.) Rule of 90: Age plus Allowable Service totals 90.<br>First hired after June 30, 1989:<br>(a.) Age 55 and three years (five years if hired after June 30, 2010) of Allowable Service. |
| **Amount** | First hired before July 1, 1989:<br>The greater of (a) or (b):<br>(a.) 1.20% of Average Salary for each of the first ten years of Allowable Service and 1.70% of Average Salary for each subsequent year with reduction of 0.25% for each month the member is under age 65 at time of retirement or under age 62 if 30 or more years of Allowable Service. No reduction if age plus years of Allowable Service totals 90.<br>(b.) 1.70% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3.00% per year and actuarial reduction for each month the member is under age 65. Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024.<br>First hired after June 30, 1989:<br>1.70% of Average Salary for each year of Allowable Service assuming augmentation to the age eligible for full Social Security retirement benefit (but not higher than age 66) at 3.00% (2.50% if hired after June 30, 2006) per year and actuarial reduction for each month the member is under the normal retirement age. Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024. |
| **Form of payment** | Life annuity with return on death of any balance of member contributions over aggregate monthly payments. Actuarially equivalent options are:<br>(a.) 50%, 75%, or 100% Joint and Survivor with bounce back feature without additional reduction.<br>(b.) 15-year Certain and Life. |
| **Benefit increases** | Through December 31, 2018: 2.0%<br>January 1, 2019 – December 31, 2023: 1.0%<br>January 1, 2024 and after: 1.5%<br>For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, disability benefit recipients, or survivors). |

# Summary of Plan Provisions (Continued)

**Retirement (Continued)**

| | |
|---|---|
| **Benefit increases (Continued)** | A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.<br><br>Prior to 2002, members who retired under the laws in effect before July 1, 1973, received an additional lump sum payment each year. In 1989, this lump sum payment was the greater of $25 times each full year of Allowable Service or $400 per full year of service less any Social Security benefits received or annuity from a Minnesota public employee pension plan. In each following year, the lump sum payment was increased by the same percentage increase that was applied to regular annuities paid from the Minnesota Post Retirement Investment Fund. Effective January 1, 2002, the annual lump sum payment was divided by 12 and paid as a monthly life annuity in the annuity form elected. |

**Disability**

| | |
|---|---|
| **Disability benefit** | |
| **Age/Service requirement** | Total and permanent disability before normal retirement age with three years of Allowable Service (five years if hired after June 30, 2010). |
| **Amount** | Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age.<br><br>Payments stop if disability ceases or death occurs. Payments revert to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment. |
| **Retirement after disability** | |
| **Age/Service requirement** | Normal retirement age with continued disability. |
| **Amount** | Any optional annuity continues. Otherwise, a normal retirement benefit equal to the disability benefit paid before normal retirement age, or an actuarially equivalent optional annuity. |
| **Form of payment** | Same as for retirement. |
| **Benefit Increases** | Same as for retirement, except benefit increases are paid prior to Normal Retirement. |

# Summary of Plan Provisions (Continued)

**Death**

**<u>Surviving spouse optional benefit</u>**

| | |
|---|---|
| **Age/Service requirement** | Member or former member who dies before retirement or disability benefits commence with three years of Allowable Service (five years if hired after June 30, 2010). If a former member dies before age 55 and has less than 30 years of Allowable Service, benefits commence when the former member would have been age 55. If an active member dies, benefits may commence immediately, regardless of age. |
| **Amount** | Surviving spouse receives the 100% joint and survivor benefits using the Normal Retirement formula above. If commencement is prior to age 55, the appropriate early retirement formula described above applies except that one-half the monthly reduction factor is used from age 55 to the commencement age and the Rule of 90 does not apply. In lieu of this benefit, the surviving spouse may elect a refund of member contributions with interest or an actuarially equivalent term certain annuity.<br>If a member dies prior to July 1, 1997, and the beneficiary was not eligible to commence a survivor benefit as of July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. |
| **Benefit increases** | Same as for retirement, except benefit increases are paid prior to Normal Retirement. |

**<u>Surviving dependent children's benefit</u>**

| | |
|---|---|
| **Age/Service requirement** | If no surviving spouse, all children (biological or adopted) below age 20 who are dependent for more than half of their support on deceased member. |
| **Amount** | Actuarially equivalent 100% joint and survivor annuity to surviving spouse payable to the later of age 20 or five years. The amount is proportionally divided among surviving children. |
| **Benefit increases** | Same as for retirement, except benefit increases are paid prior to Normal Retirement. |

**<u>Refund of contributions</u>**

| | |
|---|---|
| **Age/Service requirement** | Active member dies and survivor benefits are not payable or a former member dies before annuity begins or former member who is not entitled to an annuity dies. |
| **Amount** | Member's contributions with 6.00% interest through June 30, 2011. Beginning July 1, 2011, a member's contributions increase at 4.00% interest. Beginning July 1, 2018, a member's contributions increase at 3.00% interest. |

# Summary of Plan Provisions (Continued)

| | |
|---|---|
| **Death (Continued)** | |
| **Refund of contributions (Continued)** | |
| **Age/Service requirement** | Retired or disabled annuitant who did not select an optional annuity dies, or the remaining recipient of an option dies. |
| **Amount** | The excess of the member's contributions over all benefits paid. |
| **Unclassified Plan Provision** | Eligible members credited with employee shares in the Unclassified Plan may elect to terminate participation in the Unclassified Plan and be covered by the State Employees Retirement Fund prior to termination of covered employment assuming that the member has acquired at least 10 years of allowable state service (no more than seven years of service if hired after June 30, 2010). |
| **Termination** | |
| **Refund of contributions** | |
| **Age/Service requirement** | Termination of state service. |
| **Amount** | Member's contributions with 6.00% interest through June 30, 2011. Beginning July 1, 2011, a member's contributions increase at 4.00% interest. Beginning July 1, 2018, a member’s contributions increase at 3.00% interest. If a member is vested, a deferred annuity may be elected in lieu of a refund. |
| **Deferred benefit** | |
| **Age/Service requirement** | Three years of Allowable Service if hired prior to June 30, 2010, five years of Allowable Service if hired after June 30, 2010. |
| **Amount** | Benefit computed under law in effect at termination and increased by the following annual augmentation percentage:<br>(a.) 0.00% before July 1, 1971;<br>(b.) 5.00% from July 1, 1971 to January 1, 1981;<br>(c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1 of the year following attainment of age 55 or January 1, 2012, whichever is earlier;<br>(d.) 5.00% thereafter until the annuity begins (2.50% if hired after June 30, 2006), but before January 1, 2012;<br>(e.) 2.00% from January 1, 2012 through December 31, 2018; and<br>(f.) 0.00% from January 1, 2019, thereafter.<br>Amount is payable at normal or early retirement.<br>If a member terminated employment prior to July 1, 1997, but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. |

# Summary of Plan Provisions (Concluded)

| | |
|---|---|
| **Combined Service Annuity** | Members are eligible for combined service benefits if they:<br>(a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement;<br>(b.) Have at least six months of allowable service credit in each plan worked under; and<br>(c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year.<br>Members who meet the above requirements must have their benefit based on the following:<br>(a.) Allowable service in all covered plans is combined in order to determine eligibility for early retirement.<br>(b.) Average salary is based on the high five consecutive years during their entire service in all covered plans. |
| **Actuarial Equivalent Factors** | Actuarially equivalent factors based on RP-2014 mortality for healthy annuitants, white collar adjustment, male rates set forward two years, projected to 2019 using Scale MP-2015, blended 50% males, 5.88% post-retirement interest, and 7.50% pre-retirement interest. Based upon statutory requirements; joint and survivor factors are based on an interest assumption of 6.50%. |
| **Changes in Plan Provisions** | There have been no changes in plan provisions since the previous valuation. |

# SECTION F

## ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

# Actuarial Methods Used for the Determination of Total Pension Liability and Related Values

## Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) The annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

## Asset Valuation Method

Fair value of assets.

# Summary of Actuarial Assumptions Used for the Determination of Total Pension Liability and Related Values

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the last experience study, dated June 27, 2019, and a review of inflation and investment return assumptions dated June 24, 2021. The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

| | |
|---|---|
| **Investment return** | 6.50% per annum. |
| **Single discount rate** | 6.50% per annum. |
| **Salary increases** | Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service. |
| **Inflation** | 2.25% per year. |
| **Payroll growth** | 3.00% per year. |
| **Mortality rates** | |
| **Healthy Pre-retirement** | Pub-2010 General Employee Mortality Table adjusted for mortality improvements using projection scale MP-2018. Rates are multiplied by a factor of 0.97 for males and 1.06 for females. |
| **Healthy Post-retirement** | Pub-2010 Healthy Retired General Mortality Table, adjusted for mortality improvements using projection scale MP-2018. Rates are multiplied by a factor of 1.04 for males and 1.10 for females. |
| **Disabled** | Pub-2010 General/Teacher Disabled Retiree Mortality Table, adjusted for mortality improvements using projection scale MP-2018. Rates are set forward two years for males and set forward five years for females. |
| **Notes** | The Pub-2010 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 18 to 80 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have extended the annuitant mortality table as needed for members and beneficiaries younger than age 50 who are receiving a benefit by deriving rates based on the employee table and the juvenile table. Similarly, we have extended the employee table as needed for members older than age 80 by deriving rates based on the annuitant table. |
| **Retirement** | Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year. Note that significant plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates. |
| **Withdrawal** | Service-related rates based on experience; see table of sample rates. |

# Summary of Actuarial Assumptions (Continued)

| | |
|---|---|
| **Disability** | Age-related rates based on experience; see table of sample rates. |
| **Allowance for combined service annuity** | Liabilities for former, vested members are increased by 4.00%, and liabilities for former, non-vested members are increased by 5.00% to account for the effect of some participants having eligibility for a Combined Service Annuity. |
| **Administrative expenses** | In the valuation year, equal to prior year administrative expenses expressed as a percent of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group. |
| **Refund of contributions** | For non-vested members, account balances accumulate interest until the assumed commencement date and are discounted back to the valuation date. Active members decrementing after becoming eligible for a benefit are assumed to take the contributions accumulated with interest if larger than the value of the benefit. |
| **Commencement of deferred benefits** | Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at normal retirement age. |
| **Percentage married** | 80% of active male members and 60% of female members are assumed to be married. Actual marital status is used for members in payment status. |
| **Age of spouse** | Male members are assumed to have a beneficiary two years younger and female members are assumed to have a beneficiary two years older. |
| **Form of payment** | Married members retiring from active status are assumed to elect subsidized Joint and Survivor form of annuity as follows:<br><br>Males: 10% elect 50% Joint & Survivor option<br>15% elect 75% Joint & Survivor option<br>65% elect 100% Joint & Survivor option<br>Females: 15% elect 50% Joint & Survivor option<br>10% elect 75% Joint & Survivor option<br>40% elect 100% Joint & Survivor option<br><br>Remaining married members and unmarried members are assumed to elect the Straight Life option. Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a life annuity. |
| **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. |
| **Decrement operation** | Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year. |
| **Service credit accruals** | It is assumed that members accrue one year of service credit per year. |
| **Pay increases** | Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date. |
| **Unclassified plan reversion** | Liabilities for active members are increased by 0.05% to account for the effect of Unclassified members who elect coverage under the State Employees Retirement Fund. |

# Summary of Actuarial Assumptions (Continued)

| | |
|---|---|
| **Unknown data for certain members** | To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided.<br><br>In cases where submitted data was missing or incomplete, the following assumptions were applied:<br><br><u>Data for active members:</u><br><br>There were 200 members reported with zero or invalid salary (<$100). We used prior year salary (121 members), if available, otherwise, high five salary with a 10% load to account for salary increases (68 members). If neither pay or high five salary was available, we assumed a value of $45,000 (11 members).<br><br>There were 15 members reported with zero or negative service. Due to the small number of members with zero service, and based on direction from MSRS, we used service of 0 years for these members.<br><br>There were also 106 members reported without a gender and 17 members reported with a missing or invalid date of birth. We assumed the member was hired at age 37 and female gender.<br><br><u>Data for terminated members:</u><br><br>There were 247 members reported with a missing or invalid benefit. If available, we calculated benefits for these members using the reported Average Salary, Credited Service and Termination Date provided. If Average Salary was not reported or invalid (242 members), we assumed a value of $40,000. If termination date was not reported (3 members), we assumed the member terminated at age 40 (or current age if younger than 40). If credited service was either not reported or invalid (6 members), we assumed a value of 5.0 years.<br><br>There were no members with a missing date of birth, and one member with an invalid gender. We assumed female gender for the valuation.<br><br><u>Data for members receiving benefits:</u><br><br>There were 52 members reported without a gender. We assumed female gender for the valuation. No retired members were reported with an invalid date of birth.<br><br>There were 8 members reported without a benefit. Due to the small number of members with missing benefits, we made no adjustment to the reported data for members receiving benefits.<br><br>There were 14 survivor members reported with a certain and life option but with a certain end date prior to the valuation date. These members were excluded from the valuation.<br><br>There were 102 retirees reported with a survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the increase to the life annuity (i.e. "bounce back,") if applicable. |

# Summary of Actuarial Assumptions (Continued)

| | |
|---|---|
| **Unknown data for certain members (Concluded)** | Data for members receiving benefits:<br>There were 103 retirees reported with a bounceback annuity but were not reported with a reasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively.<br>There were retired members reported with a survivor option and an invalid or missing survivor gender (3,324 members) and/or survivor date of birth (2,867 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid. |
| **Changes in actuarial assumptions** | The long-term investment rate of return and single discount rates were decreased from 7.50% to 6.50%. |

# Summary of Actuarial Assumptions (Continued)

| | Percent of Members Dying Each Year* | | | | | |
|---|---|---|---|---|---|---|
| | Healthy Post-Retirement Mortality** | | Healthy Pre-Retirement Mortality** | | Disability Mortality** | |
| Age in 2021 | Male | Female | Male | Female | Male | Female |
| 20 | 0.04% | 0.01% | 0.04% | 0.01% | 0.34% | 0.17% |
| 25 | 0.03% | 0.01% | 0.03% | 0.01% | 0.29% | 0.29% |
| 30 | 0.05% | 0.02% | 0.04% | 0.02% | 0.49% | 0.50% |
| 35 | 0.06% | 0.03% | 0.06% | 0.03% | 0.68% | 0.80% |
| 40 | 0.08% | 0.04% | 0.08% | 0.04% | 0.89% | 1.11% |
| 45 | 0.11% | 0.07% | 0.09% | 0.06% | 1.19% | 1.44% |
| 50 | 0.28% | 0.23% | 0.13% | 0.08% | 1.65% | 1.67% |
| 55 | 0.43% | 0.33% | 0.20% | 0.14% | 2.19% | 2.04% |
| 60 | 0.66% | 0.44% | 0.32% | 0.21% | 2.75% | 2.37% |
| 65 | 0.96% | 0.65% | 0.46% | 0.30% | 3.38% | 2.75% |
| 70 | 1.49% | 1.05% | 0.64% | 0.47% | 4.07% | 3.60% |
| 75 | 2.51% | 1.87% | 0.96% | 0.77% | 5.35% | 5.41% |
| 80 | 4.47% | 3.42% | 1.51% | 1.30% | 7.72% | 8.63% |
| 85 | 8.15% | 6.43% | 6.39% | 5.32% | 11.49% | 12.87% |
| 90 | 14.08% | 11.93% | 13.14% | 11.50% | 17.65% | 18.22% |

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. The adjustment has no material effect on results.*

** *Rates are adjusted for mortality improvements using Scale MP-2018 from a base year of 2010.*

| | Percent of Members Decrementing Each Year | |
|---|---|---|
| | Disability Retirement | |
| Age | Male | Female |
| 20 | 0.01% | 0.01% |
| 25 | 0.01 | 0.01 |
| 30 | 0.01 | 0.01 |
| 35 | 0.01 | 0.01 |
| 40 | 0.04 | 0.04 |
| 45 | 0.08 | 0.08 |
| 50 | 0.15 | 0.15 |
| 55 | 0.22 | 0.22 |
| 60 | 0.33 | 0.33 |
| 65 | 0.00 | 0.00 |

# Summary of Actuarial Assumptions (Continued)

| | Percent Retiring Each Year | | |
|---|---|---|---|
| Age | Rule of 90 Eligible | Hired prior to 7/1/1989 | Hired after 6/30/1989 |
| 55 | 16.0% | 3.0% | 4.0% |
| 56 | 12.5 | 3.0 | 4.0 |
| 57 | 12.5 | 4.0 | 4.0 |
| 58 | 11.5 | 4.0 | 4.0 |
| 59 | 12.5 | 5.0 | 4.0 |
| 60 | 14.0 | 7.0 | 5.0 |
| 61 | 15.0 | 8.0 | 7.5 |
| 62 | 25.0 | 16.0 | 13.0 |
| 63 | 22.0 | 16.0 | 13.0 |
| 64 | 20.0 | 16.0 | 13.0 |
| 65 | 35.0 | 35.0 | 20.0 |
| 66 | 35.0 | 35.0 | 35.0 |
| 67 | 30.0 | 30.0 | 30.0 |
| 68 | 25.0 | 25.0 | 25.0 |
| 69 | 25.0 | 25.0 | 25.0 |
| 70 | 30.0 | 30.0 | 30.0 |
| 71+ | 100.0 | 100.0 | 100.0 |

# Summary of Actuarial Assumptions (Concluded)

| Salary Scale | | | Percent of Members Terminating (Withdrawing) Each Year | | |
|---|---|---|---|---|---|
| Year | Increase | | Year | Males | Females |
| 1 | 13.00% | | 1 | 20.00% | 20.50% |
| 2 | 9.00 | | 2 | 15.00 | 17.00 |
| 3 | 5.80 | | 3 | 10.00 | 13.00 |
| 4 | 5.40 | | 4 | 8.50 | 10.50 |
| 5 | 5.00 | | 5 | 7.50 | 9.50 |
| 6 | 4.90 | | 6 | 7.00 | 8.50 |
| 7 | 4.80 | | 7 | 6.00 | 8.00 |
| 8 | 4.60 | | 8 | 4.75 | 6.75 |
| 9 | 4.50 | | 9 | 4.25 | 6.00 |
| 10 | 4.20 | | 10 | 4.00 | 5.00 |
| 11 | 4.10 | | 11 | 3.50 | 4.50 |
| 12 | 4.00 | | 12 | 3.00 | 4.25 |
| 13 | 3.90 | | 13 | 2.75 | 4.00 |
| 14 | 3.80 | | 14 | 2.50 | 3.75 |
| 15 | 3.70 | | 15 | 2.25 | 3.50 |
| 16 | 3.60 | | 16 | 2.25 | 3.25 |
| 17 | 3.50 | | 17 | 2.25 | 2.75 |
| 18 | 3.50 | | 18 | 2.25 | 2.50 |
| 19 | 3.50 | | 19 | 2.00 | 2.50 |
| 20 | 3.40 | | 20 | 1.50 | 2.50 |
| 21 | 3.30 | | 21 | 1.25 | 2.50 |
| 22 | 3.30 | | 22 | 1.25 | 2.40 |
| 23 | 3.20 | | 23 | 1.00 | 2.30 |
| 24 | 3.20 | | 24 | 1.00 | 2.20 |
| 25 | 3.20 | | 25 | 1.00 | 2.10 |
| 26 | 3.20 | | 26 | 1.00 | 2.00 |
| 27 | 3.10 | | 27 | 1.00 | 1.75 |
| 28 | 3.10 | | 28 | 1.00 | 1.75 |
| 29 | 3.00 | | 29 | 1.00 | 1.50 |
| 30+ | 3.00 | | 30+ | 1.00 | 1.00 |

# SECTION G

## CALCULATION OF THE SINGLE DISCOUNT RATE

# Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 6.50%; the municipal bond rate is 1.92% (based on the weekly rate closest to but not later than the measurement date of the “20-Year Municipal GO Index” as published by Fidelity). **The resulting single discount rate as of June 30, 2021 is 6.50%.** In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities.

The tables in this section provide background for the development of the Single Discount Rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

# Single Discount Rate Development
# Projection of Contributions (Dollars in Thousands)

| Fiscal Year Ending | Projected Covered-Employee Payroll: Payroll for Current Employees | Payroll for New Employees | Total Employee Payroll | Projected Contributions: Contributions from Current Employees | Employer Contributions for Current Employees | Contributions on Future Payroll toward current UAL* | Total Contributions |
|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) = (a) + (b) | (d) = (a) * 6.0% | (e) = (a) * 6.25% | (f) | (g) = (d) + (e) + (f) |
| 2021 | $ 3,325,417 | | $ 3,325,417 | | | | |
| 2022 | 3,291,002 | $ 90,805 | 3,381,807 | $ 197,460 | $ 205,688 | $ 1,852 | $ 405,000 |
| 2023 | 3,122,488 | 360,773 | 3,483,261 | 187,349 | 195,155 | 7,360 | 389,864 |
| 2024 | 2,964,626 | 623,133 | 3,587,759 | 177,878 | 185,289 | 12,712 | 375,879 |
| 2025 | 2,834,455 | 860,937 | 3,695,392 | 170,067 | 177,153 | 17,563 | 364,783 |
| 2026 | 2,714,783 | 1,091,470 | 3,806,253 | 162,887 | 169,674 | 22,266 | 354,827 |
| 2027 | 2,604,090 | 1,316,351 | 3,920,441 | 156,245 | 162,756 | 26,854 | 345,855 |
| 2028 | 2,500,668 | 1,537,386 | 4,038,054 | 150,040 | 156,292 | 31,363 | 337,695 |
| 2029 | 2,402,847 | 1,756,349 | 4,159,196 | 144,171 | 150,178 | 35,830 | 330,179 |
| 2030 | 2,308,936 | 1,975,036 | 4,283,972 | 138,536 | 144,308 | 40,291 | 323,135 |
| 2031 | 2,218,275 | 2,194,216 | 4,412,491 | 133,097 | 138,642 | 44,762 | 316,501 |
| 2032 | 2,130,879 | 2,413,987 | 4,544,866 | 127,853 | 133,180 | 49,245 | 310,278 |
| 2033 | 2,046,193 | 2,635,019 | 4,681,212 | 122,772 | 127,887 | 53,754 | 304,413 |
| 2034 | 1,963,411 | 2,858,237 | 4,821,648 | 117,805 | 122,713 | 58,308 | 298,826 |
| 2035 | 1,882,072 | 3,084,225 | 4,966,297 | 112,924 | 117,630 | 62,918 | 293,472 |
| 2036 | 1,801,910 | 3,313,376 | 5,115,286 | 108,115 | 112,619 | 67,593 | 288,327 |
| 2037 | 1,723,385 | 3,545,360 | 5,268,745 | 103,403 | 107,712 | 72,325 | 283,440 |
| 2038 | 1,646,902 | 3,779,905 | 5,426,807 | 98,814 | 102,931 | 77,110 | 278,855 |
| 2039 | 1,571,760 | 4,017,851 | 5,589,611 | 94,306 | 98,235 | 81,964 | 274,505 |
| 2040 | 1,496,580 | 4,260,720 | 5,757,300 | 89,795 | 93,536 | 86,919 | 270,250 |
| 2041 | 1,420,084 | 4,509,935 | 5,930,019 | 85,205 | 88,755 | 92,003 | 265,963 |
| 2042 | 1,342,334 | 4,765,585 | 6,107,919 | 80,540 | 83,896 | 97,218 | 261,654 |
| 2043 | 1,264,300 | 5,026,857 | 6,291,157 | 75,858 | 79,019 | 102,548 | 257,425 |
| 2044 | 1,185,793 | 5,294,099 | 6,479,892 | 71,148 | 74,112 | 108,000 | 253,260 |
| 2045 | 1,105,950 | 5,568,338 | 6,674,288 | 66,357 | 69,122 | 113,594 | 249,073 |
| 2046 | 1,024,529 | 5,849,988 | 6,874,517 | 61,472 | 64,033 | 119,340 | 244,845 |
| 2047 | 942,394 | 6,138,359 | 7,080,753 | 56,544 | 58,900 | 125,223 | 240,667 |
| 2048 | 860,828 | 6,432,347 | 7,293,175 | 51,650 | 53,802 | 131,220 | 236,672 |
| 2049 | 780,297 | 6,731,673 | 7,511,970 | 46,818 | 48,769 | 137,326 | 232,913 |
| 2050 | 701,175 | 7,036,154 | 7,737,329 | 42,071 | 43,823 | 143,538 | 229,432 |
| 2051 | 624,267 | 7,345,182 | 7,969,449 | 37,456 | 39,017 | 149,842 | 226,315 |
| 2052 | 550,573 | 7,657,960 | 8,208,533 | 33,034 | 34,411 | 156,222 | 223,667 |
| 2053 | 480,744 | 7,974,045 | 8,454,789 | 28,845 | 30,047 | 162,671 | 221,563 |
| 2054 | 415,558 | 8,292,874 | 8,708,432 | 24,933 | 25,972 | 169,175 | 220,080 |
| 2055 | 355,239 | 8,614,446 | 8,969,685 | 21,314 | 22,202 | 175,735 | 219,251 |
| 2056 | 299,595 | 8,939,181 | 9,238,776 | 17,976 | 18,725 | 182,359 | 219,060 |
| 2057 | 248,950 | 9,266,989 | 9,515,939 | 14,937 | 15,559 | 189,047 | 219,543 |
| 2058 | 203,616 | 9,597,801 | 9,801,417 | 12,217 | 12,726 | 195,795 | 220,738 |
| 2059 | 163,460 | 9,932,000 | 10,095,460 | 9,808 | 10,216 | 202,613 | 222,637 |
| 2060 | 128,434 | 10,269,890 | 10,398,324 | 7,706 | 8,027 | 209,506 | 225,239 |
| 2061 | 98,398 | 10,611,875 | 10,710,273 | 5,904 | 6,150 | 216,482 | 228,536 |
| 2062 | 73,241 | 10,958,341 | 11,031,582 | 4,394 | 4,578 | 223,550 | 232,522 |
| 2063 | 52,978 | 11,309,551 | 11,362,529 | 3,179 | 3,311 | 230,715 | 237,205 |
| 2064 | 36,943 | 11,666,462 | 11,703,405 | 2,217 | 2,309 | 237,996 | 242,522 |
| 2065 | 24,685 | 12,029,822 | 12,054,507 | 1,481 | 1,543 | 245,408 | 248,432 |
| 2066 | 15,860 | 12,400,282 | 12,416,142 | 952 | 991 | 252,966 | 254,909 |
| 2067 | 9,650 | 12,778,977 | 12,788,627 | 579 | 603 | 260,691 | 261,873 |
| 2068 | 5,394 | 13,166,891 | 13,172,285 | 324 | 337 | 268,605 | 269,266 |
| 2069 | 2,719 | 13,564,735 | 13,567,454 | 163 | 170 | 276,721 | 277,054 |
| 2070 | 1,218 | 13,973,260 | 13,974,478 | 73 | 76 | 285,054 | 285,203 |
| 2071 | 519 | 14,393,193 | 14,393,712 | 31 | 32 | 293,621 | 293,684 |

* *Equal to total contributions (12.25% of payroll for new employees) net of normal cost and expenses (10.21% of payroll).*

# Single Discount Rate Development
# Projection of Contributions (Dollars in Thousands, Concluded)

| Fiscal Year Ending | Projected Covered-Employee Payroll: Payroll for Current Employees | Payroll for New Employees | Total Employee Payroll | Projected Contributions: Contributions from Current Employees | Employer Contributions for Current Employees | Contributions on Future Payroll toward current UAL* | Total Contributions |
|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) = (a) + (b) | (d) = (a) * 6.0% | (e) = (a) * 6.25% | (f) | (g) = (d) + (e) + (f) |
| 2072 | $ 216 | $ 14,825,307 | $ 14,825,523 | $ 13 | $ 13 | $ 302,436 | $ 302,462 |
| 2073 | 76 | 15,270,213 | 15,270,289 | 5 | 5 | 311,512 | 311,522 |
| 2074 | 27 | 15,728,371 | 15,728,398 | 2 | 2 | 320,859 | 320,863 |
| 2075 | 11 | 16,200,239 | 16,200,250 | 1 | 1 | 330,485 | 330,487 |
| 2076 | 3 | 16,686,254 | 16,686,257 | - | - | 340,400 | 340,400 |
| 2077 | - | 17,186,845 | 17,186,845 | - | - | 350,612 | 350,612 |
| 2078 | - | 17,702,450 | 17,702,450 | - | - | 361,130 | 361,130 |
| 2079 | - | 18,233,524 | 18,233,524 | - | - | 371,964 | 371,964 |
| 2080 | - | 18,780,529 | 18,780,529 | - | - | 383,123 | 383,123 |
| 2081 | - | 19,343,945 | 19,343,945 | - | - | 394,616 | 394,616 |
| 2082 | - | 19,924,264 | 19,924,264 | - | - | 406,455 | 406,455 |
| 2083 | - | 20,521,992 | 20,521,992 | - | - | 418,649 | 418,649 |
| 2084 | - | 21,137,651 | 21,137,651 | - | - | 431,208 | 431,208 |
| 2085 | - | 21,771,781 | 21,771,781 | - | - | 444,144 | 444,144 |
| 2086 | - | 22,424,934 | 22,424,934 | - | - | 457,469 | 457,469 |
| 2087 | - | 23,097,682 | 23,097,682 | - | - | 471,193 | 471,193 |
| 2088 | - | 23,790,613 | 23,790,613 | - | - | 485,329 | 485,329 |
| 2089 | - | 24,504,331 | 24,504,331 | - | - | 499,888 | 499,888 |
| 2090 | - | 25,239,461 | 25,239,461 | - | - | 514,885 | 514,885 |
| 2091 | - | 25,996,645 | 25,996,645 | - | - | 530,332 | 530,332 |
| 2092 | - | 26,776,544 | 26,776,544 | - | - | 546,242 | 546,242 |
| 2093 | - | 27,579,841 | 27,579,841 | - | - | 562,629 | 562,629 |
| 2094 | - | 28,407,236 | 28,407,236 | - | - | 579,508 | 579,508 |
| 2095 | - | 29,259,453 | 29,259,453 | - | - | 596,893 | 596,893 |
| 2096 | - | 30,137,236 | 30,137,236 | - | - | 614,800 | 614,800 |
| 2097 | - | 31,041,354 | 31,041,354 | - | - | 633,244 | 633,244 |
| 2098 | - | 31,972,594 | 31,972,594 | - | - | 652,241 | 652,241 |
| 2099 | - | 32,931,772 | 32,931,772 | - | - | 671,808 | 671,808 |
| 2100 | - | 33,919,725 | 33,919,725 | - | - | 691,962 | 691,962 |
| 2101 | - | 34,937,317 | 34,937,317 | - | - | 712,721 | 712,721 |
| 2102 | - | 35,985,436 | 35,985,436 | - | - | 734,103 | 734,103 |
| 2103 | - | 37,064,999 | 37,064,999 | - | - | 756,126 | 756,126 |
| 2104 | - | 38,176,949 | 38,176,949 | - | - | 778,810 | 778,810 |
| 2105 | - | 39,322,258 | 39,322,258 | - | - | 802,174 | 802,174 |
| 2106 | - | 40,501,926 | 40,501,926 | - | - | 826,239 | 826,239 |
| 2107 | - | 41,716,983 | 41,716,983 | - | - | 851,026 | 851,026 |
| 2108 | - | 42,968,493 | 42,968,493 | - | - | 876,557 | 876,557 |
| 2109 | - | 44,257,548 | 44,257,548 | - | - | 902,854 | 902,854 |
| 2110 | - | 45,585,274 | 45,585,274 | - | - | 929,940 | 929,940 |
| 2111 | - | 46,952,832 | 46,952,832 | - | - | 957,838 | 957,838 |
| 2112 | - | 48,361,417 | 48,361,417 | - | - | 986,573 | 986,573 |
| 2113 | - | 49,812,260 | 49,812,260 | - | - | 1,016,170 | 1,016,170 |
| 2114 | - | 51,306,628 | 51,306,628 | - | - | 1,046,655 | 1,046,655 |
| 2115 | - | 52,845,826 | 52,845,826 | - | - | 1,078,055 | 1,078,055 |
| 2116 | - | 54,431,201 | 54,431,201 | - | - | 1,110,397 | 1,110,397 |
| 2117 | - | 56,064,137 | 56,064,137 | - | - | 1,143,708 | 1,143,708 |
| 2118 | - | 57,746,061 | 57,746,061 | - | - | 1,178,020 | 1,178,020 |
| 2119 | - | 59,478,443 | 59,478,443 | - | - | 1,213,360 | 1,213,360 |
| 2120 | - | 61,262,797 | 61,262,797 | - | - | 1,249,761 | 1,249,761 |
| 2121 | - | 63,100,680 | 63,100,680 | - | - | 1,287,254 | 1,287,254 |

* *Equal to total contributions (12.25% of payroll for new employees) net of normal cost and expenses (10.21% of payroll).*

# Single Discount Rate Development
# Projection of Plan Fiduciary Net Position (Dollars in Thousands)

| Fiscal Year Ending | Projected Beginning Plan Net Fiduciary Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | Projected Investment Earnings at 6.50% | Projected Ending Plan Fiduciary Net Position |
|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 2022 | $ 17,440,051 | $ 405,000 | $ 984,791 | $ 10,531 | $ 1,114,720 | $ 17,964,449 |
| 2023 | 17,964,449 | 389,864 | 1,024,826 | 9,992 | 1,147,058 | 18,466,554 |
| 2024 | 18,466,554 | 375,879 | 1,067,547 | 9,487 | 1,177,897 | 18,943,295 |
| 2025 | 18,943,295 | 364,783 | 1,106,459 | 9,070 | 1,207,299 | 19,399,849 |
| 2026 | 19,399,849 | 354,827 | 1,145,807 | 8,687 | 1,235,410 | 19,835,592 |
| 2027 | 19,835,592 | 345,855 | 1,185,087 | 8,333 | 1,262,201 | 20,250,227 |
| 2028 | 20,250,227 | 337,695 | 1,222,535 | 8,002 | 1,287,704 | 20,645,089 |
| 2029 | 20,645,089 | 330,179 | 1,257,586 | 7,689 | 1,312,019 | 21,022,011 |
| 2030 | 21,022,011 | 323,135 | 1,290,396 | 7,389 | 1,335,253 | 21,382,615 |
| 2031 | 21,382,615 | 316,501 | 1,321,023 | 7,098 | 1,357,510 | 21,728,504 |
| 2032 | 21,728,504 | 310,278 | 1,349,615 | 6,819 | 1,378,888 | 22,061,236 |
| 2033 | 22,061,236 | 304,413 | 1,375,547 | 6,548 | 1,399,507 | 22,383,061 |
| 2034 | 22,383,061 | 298,826 | 1,399,508 | 6,283 | 1,419,489 | 22,695,584 |
| 2035 | 22,695,584 | 293,472 | 1,421,952 | 6,023 | 1,438,922 | 23,000,003 |
| 2036 | 23,000,003 | 288,327 | 1,443,435 | 5,766 | 1,457,866 | 23,296,994 |
| 2037 | 23,296,994 | 283,440 | 1,462,999 | 5,515 | 1,476,396 | 23,588,316 |
| 2038 | 23,588,316 | 278,855 | 1,479,993 | 5,270 | 1,494,650 | 23,876,558 |
| 2039 | 23,876,558 | 274,505 | 1,494,028 | 5,030 | 1,512,805 | 24,164,810 |
| 2040 | 24,164,810 | 270,250 | 1,505,977 | 4,789 | 1,531,031 | 24,455,324 |
| 2041 | 24,455,324 | 265,963 | 1,517,417 | 4,544 | 1,549,419 | 24,748,745 |
| 2042 | 24,748,745 | 261,654 | 1,527,725 | 4,295 | 1,568,031 | 25,046,410 |
| 2043 | 25,046,410 | 257,425 | 1,536,789 | 4,046 | 1,586,962 | 25,349,962 |
| 2044 | 25,349,962 | 253,260 | 1,544,371 | 3,795 | 1,606,326 | 25,661,381 |
| 2045 | 25,661,381 | 249,073 | 1,551,634 | 3,539 | 1,626,210 | 25,981,491 |
| 2046 | 25,981,491 | 244,845 | 1,559,140 | 3,278 | 1,646,650 | 26,310,567 |
| 2047 | 26,310,567 | 240,667 | 1,566,532 | 3,016 | 1,667,678 | 26,649,363 |
| 2048 | 26,649,363 | 236,672 | 1,573,034 | 2,755 | 1,689,372 | 26,999,619 |
| 2049 | 26,999,619 | 232,913 | 1,578,673 | 2,497 | 1,711,847 | 27,363,208 |
| 2050 | 27,363,208 | 229,432 | 1,583,697 | 2,244 | 1,735,216 | 27,741,914 |
| 2051 | 27,741,914 | 226,315 | 1,587,543 | 1,998 | 1,759,617 | 28,138,305 |
| 2052 | 28,138,305 | 223,667 | 1,589,945 | 1,762 | 1,785,229 | 28,555,495 |
| 2053 | 28,555,495 | 221,563 | 1,590,415 | 1,538 | 1,812,271 | 28,997,374 |
| 2054 | 28,997,374 | 220,080 | 1,588,433 | 1,330 | 1,841,015 | 29,468,707 |
| 2055 | 29,468,707 | 219,251 | 1,583,894 | 1,137 | 1,871,777 | 29,974,705 |
| 2056 | 29,974,705 | 219,060 | 1,577,270 | 959 | 1,904,878 | 30,520,414 |
| 2057 | 30,520,414 | 219,543 | 1,568,340 | 797 | 1,940,656 | 31,111,476 |
| 2058 | 31,111,476 | 220,738 | 1,556,255 | 652 | 1,979,504 | 31,754,811 |
| 2059 | 31,754,811 | 222,637 | 1,541,438 | 523 | 2,021,860 | 32,457,347 |
| 2060 | 32,457,347 | 225,239 | 1,524,064 | 411 | 2,068,167 | 33,226,278 |
| 2061 | 33,226,278 | 228,536 | 1,503,573 | 315 | 2,118,912 | 34,069,838 |
| 2062 | 34,069,838 | 232,522 | 1,479,698 | 234 | 2,174,637 | 34,997,065 |
| 2063 | 34,997,065 | 237,205 | 1,452,138 | 170 | 2,235,940 | 36,017,902 |
| 2064 | 36,017,902 | 242,522 | 1,420,796 | 118 | 2,303,469 | 37,142,978 |
| 2065 | 37,142,978 | 248,432 | 1,385,724 | 79 | 2,377,911 | 38,383,518 |
| 2066 | 38,383,518 | 254,909 | 1,347,060 | 51 | 2,459,991 | 39,751,307 |
| 2067 | 39,751,307 | 261,873 | 1,305,713 | 31 | 2,550,443 | 41,257,880 |
| 2068 | 41,257,880 | 269,266 | 1,262,354 | 17 | 2,649,994 | 42,914,768 |
| 2069 | 42,914,768 | 277,054 | 1,217,230 | 9 | 2,759,385 | 44,733,968 |
| 2070 | 44,733,968 | 285,203 | 1,170,637 | 4 | 2,879,384 | 46,727,915 |
| 2071 | 46,727,915 | 293,684 | 1,122,829 | 2 | 3,010,791 | 48,909,560 |

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.

# Single Discount Rate Development
# Projection of Plan Fiduciary Net Position (Dollars in Thousands, Concluded)

| Fiscal Year Ending | Projected Beginning Plan Net Fiduciary Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | Projected Investment Earnings at 6.50% | Projected Ending Plan Fiduciary Net Position |
|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 2072 | $ 48,909,560 | $ 302,462 | $ 1,074,064 | $ 1 | $ 3,154,439 | $ 51,292,397 |
| 2073 | 51,292,397 | 311,522 | 1,024,501 | - | 3,311,199 | 53,890,616 |
| 2074 | 53,890,616 | 320,863 | 974,235 | - | 3,481,990 | 56,719,233 |
| 2075 | 56,719,233 | 330,487 | 923,375 | - | 3,667,785 | 59,794,129 |
| 2076 | 59,794,129 | 340,400 | 872,041 | - | 3,869,612 | 63,132,100 |
| 2077 | 63,132,100 | 350,612 | 820,373 | - | 4,088,560 | 66,750,898 |
| 2078 | 66,750,898 | 361,130 | 768,544 | - | 4,325,776 | 70,669,260 |
| 2079 | 70,669,260 | 371,964 | 716,765 | - | 4,582,472 | 74,906,931 |
| 2080 | 74,906,931 | 383,123 | 665,271 | - | 4,859,925 | 79,484,707 |
| 2081 | 79,484,707 | 394,616 | 614,320 | - | 5,159,478 | 84,424,482 |
| 2082 | 84,424,482 | 406,455 | 564,184 | - | 5,482,546 | 89,749,298 |
| 2083 | 89,749,298 | 418,649 | 515,145 | - | 5,830,618 | 95,483,419 |
| 2084 | 95,483,419 | 431,208 | 467,486 | - | 6,205,262 | 101,652,403 |
| 2085 | 101,652,403 | 444,144 | 421,484 | - | 6,608,131 | 108,283,195 |
| 2086 | 108,283,195 | 457,469 | 377,401 | - | 7,040,969 | 115,404,231 |
| 2087 | 115,404,231 | 471,193 | 335,476 | - | 7,505,616 | 123,045,565 |
| 2088 | 123,045,565 | 485,329 | 295,918 | - | 8,004,021 | 131,238,996 |
| 2089 | 131,238,996 | 499,888 | 258,900 | - | 8,538,244 | 140,018,228 |
| 2090 | 140,018,228 | 514,885 | 224,553 | - | 9,110,472 | 149,419,032 |
| 2091 | 149,419,032 | 530,332 | 192,968 | - | 9,723,029 | 159,479,424 |
| 2092 | 159,479,424 | 546,242 | 164,189 | - | 10,378,384 | 170,239,861 |
| 2093 | 170,239,861 | 562,629 | 138,220 | - | 11,079,167 | 181,743,437 |
| 2094 | 181,743,437 | 579,508 | 115,027 | - | 11,828,181 | 194,036,099 |
| 2095 | 194,036,099 | 596,893 | 94,544 | - | 12,628,416 | 207,166,864 |
| 2096 | 207,166,864 | 614,800 | 76,671 | - | 13,483,060 | 221,188,052 |
| 2097 | 221,188,052 | 633,244 | 61,284 | - | 14,395,519 | 236,155,531 |
| 2098 | 236,155,531 | 652,241 | 48,227 | - | 15,369,431 | 252,128,977 |
| 2099 | 252,128,977 | 671,808 | 37,322 | - | 16,408,680 | 269,172,142 |
| 2100 | 269,172,142 | 691,962 | 28,371 | - | 17,517,416 | 287,353,150 |
| 2101 | 287,353,150 | 712,721 | 21,159 | - | 18,700,077 | 306,744,789 |
| 2102 | 306,744,789 | 734,103 | 15,463 | - | 19,961,399 | 327,424,829 |
| 2103 | 327,424,829 | 756,126 | 11,061 | - | 21,306,447 | 349,476,341 |
| 2104 | 349,476,341 | 778,810 | 7,735 | - | 22,740,628 | 372,988,043 |
| 2105 | 372,988,043 | 802,174 | 5,283 | - | 24,269,714 | 398,054,648 |
| 2106 | 398,054,648 | 826,239 | 3,521 | - | 25,899,870 | 424,777,235 |
| 2107 | 424,777,235 | 851,026 | 2,289 | - | 27,637,670 | 453,263,643 |
| 2108 | 453,263,643 | 876,557 | 1,451 | - | 29,490,130 | 483,628,879 |
| 2109 | 483,628,879 | 902,854 | 897 | - | 31,464,729 | 515,995,565 |
| 2110 | 515,995,565 | 929,940 | 542 | - | 33,569,442 | 550,494,404 |
| 2111 | 550,494,404 | 957,838 | 321 | - | 35,812,766 | 587,264,687 |
| 2112 | 587,264,687 | 986,573 | 187 | - | 38,203,758 | 626,454,830 |
| 2113 | 626,454,830 | 1,016,170 | 108 | - | 40,752,066 | 668,222,959 |
| 2114 | 668,222,959 | 1,046,655 | 62 | - | 43,467,971 | 712,737,523 |
| 2115 | 712,737,523 | 1,078,055 | 36 | - | 46,362,423 | 760,177,965 |
| 2116 | 760,177,965 | 1,110,397 | 22 | - | 49,447,087 | 810,735,426 |
| 2117 | 810,735,426 | 1,143,708 | 13 | - | 52,734,388 | 864,613,509 |
| 2118 | 864,613,509 | 1,178,020 | 8 | - | 56,237,561 | 922,029,082 |
| 2119 | 922,029,082 | 1,213,360 | 5 | - | 59,970,704 | 983,213,140 |
| 2120 | 983,213,140 | 1,249,761 | 3 | - | 63,948,832 | 1,048,411,730 |
| 2121 | 1,048,411,730 | 1,287,254 | 2 | - | 68,187,940 | 1,117,886,921 |

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.

# Single Discount Rate Development
# Present Values of Projected Benefits (Dollars in Thousands)

| Fiscal Year Ending | Projected Beginning Plan Fiduciary Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf) | Present Value of Benefit Payments using Single Discount Rate (sdr) |
|---|---|---|---|---|---|---|---|
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf ^((a)-.5) | (h)=(c)/(1+sdr)^(a-.5) |
| 2022 | $ 17,440,051 | $ 984,791 | $ 984,791 | $ - | $ 954,265 | $ - | $ 954,265 |
| 2023 | 17,964,449 | 1,024,826 | 1,024,826 | - | 932,450 | - | 932,450 |
| 2024 | 18,466,554 | 1,067,547 | 1,067,547 | - | 912,038 | - | 912,038 |
| 2025 | 18,943,295 | 1,106,459 | 1,106,459 | - | 887,589 | - | 887,589 |
| 2026 | 19,399,849 | 1,145,807 | 1,145,807 | - | 863,055 | - | 863,055 |
| 2027 | 19,835,592 | 1,185,087 | 1,185,087 | - | 838,161 | - | 838,161 |
| 2028 | 20,250,227 | 1,222,535 | 1,222,535 | - | 811,874 | - | 811,874 |
| 2029 | 20,645,089 | 1,257,586 | 1,257,586 | - | 784,180 | - | 784,180 |
| 2030 | 21,022,011 | 1,290,396 | 1,290,396 | - | 755,529 | - | 755,529 |
| 2031 | 21,382,615 | 1,321,023 | 1,321,023 | - | 726,255 | - | 726,255 |
| 2032 | 21,728,504 | 1,349,615 | 1,349,615 | - | 696,689 | - | 696,689 |
| 2033 | 22,061,236 | 1,375,547 | 1,375,547 | - | 666,738 | - | 666,738 |
| 2034 | 22,383,061 | 1,399,508 | 1,399,508 | - | 636,950 | - | 636,950 |
| 2035 | 22,695,584 | 1,421,952 | 1,421,952 | - | 607,667 | - | 607,667 |
| 2036 | 23,000,003 | 1,443,435 | 1,443,435 | - | 579,199 | - | 579,199 |
| 2037 | 23,296,994 | 1,462,999 | 1,462,999 | - | 551,220 | - | 551,220 |
| 2038 | 23,588,316 | 1,479,993 | 1,479,993 | - | 523,590 | - | 523,590 |
| 2039 | 23,876,558 | 1,494,028 | 1,494,028 | - | 496,296 | - | 496,296 |
| 2040 | 24,164,810 | 1,505,977 | 1,505,977 | - | 469,732 | - | 469,732 |
| 2041 | 24,455,324 | 1,517,417 | 1,517,417 | - | 444,414 | - | 444,414 |
| 2042 | 24,748,745 | 1,527,725 | 1,527,725 | - | 420,125 | - | 420,125 |
| 2043 | 25,046,410 | 1,536,789 | 1,536,789 | - | 396,824 | - | 396,824 |
| 2044 | 25,349,962 | 1,544,371 | 1,544,371 | - | 374,443 | - | 374,443 |
| 2045 | 25,661,381 | 1,551,634 | 1,551,634 | - | 353,243 | - | 353,243 |
| 2046 | 25,981,491 | 1,559,140 | 1,559,140 | - | 333,288 | - | 333,288 |
| 2047 | 26,310,567 | 1,566,532 | 1,566,532 | - | 314,430 | - | 314,430 |
| 2048 | 26,649,363 | 1,573,034 | 1,573,034 | - | 296,465 | - | 296,465 |
| 2049 | 26,999,619 | 1,578,673 | 1,578,673 | - | 279,369 | - | 279,369 |
| 2050 | 27,363,208 | 1,583,697 | 1,583,697 | - | 263,153 | - | 263,153 |
| 2051 | 27,741,914 | 1,587,543 | 1,587,543 | - | 247,692 | - | 247,692 |
| 2052 | 28,138,305 | 1,589,945 | 1,589,945 | - | 232,927 | - | 232,927 |
| 2053 | 28,555,495 | 1,590,415 | 1,590,415 | - | 218,775 | - | 218,775 |
| 2054 | 28,997,374 | 1,588,433 | 1,588,433 | - | 205,167 | - | 205,167 |
| 2055 | 29,468,707 | 1,583,894 | 1,583,894 | - | 192,094 | - | 192,094 |
| 2056 | 29,974,705 | 1,577,270 | 1,577,270 | - | 179,616 | - | 179,616 |
| 2057 | 30,520,414 | 1,568,340 | 1,568,340 | - | 167,698 | - | 167,698 |
| 2058 | 31,111,476 | 1,556,255 | 1,556,255 | - | 156,250 | - | 156,250 |
| 2059 | 31,754,811 | 1,541,438 | 1,541,438 | - | 145,317 | - | 145,317 |
| 2060 | 32,457,347 | 1,524,064 | 1,524,064 | - | 134,910 | - | 134,910 |
| 2061 | 33,226,278 | 1,503,573 | 1,503,573 | - | 124,973 | - | 124,973 |
| 2062 | 34,069,838 | 1,479,698 | 1,479,698 | - | 115,482 | - | 115,482 |
| 2063 | 34,997,065 | 1,452,138 | 1,452,138 | - | 106,414 | - | 106,414 |
| 2064 | 36,017,902 | 1,420,796 | 1,420,796 | - | 97,763 | - | 97,763 |
| 2065 | 37,142,978 | 1,385,724 | 1,385,724 | - | 89,530 | - | 89,530 |
| 2066 | 38,383,518 | 1,347,060 | 1,347,060 | - | 81,720 | - | 81,720 |
| 2067 | 39,751,307 | 1,305,713 | 1,305,713 | - | 74,377 | - | 74,377 |
| 2068 | 41,257,880 | 1,262,354 | 1,262,354 | - | 67,519 | - | 67,519 |
| 2069 | 42,914,768 | 1,217,230 | 1,217,230 | - | 61,132 | - | 61,132 |
| 2070 | 44,733,968 | 1,170,637 | 1,170,637 | - | 55,203 | - | 55,203 |
| 2071 | 46,727,915 | 1,122,829 | 1,122,829 | - | 49,717 | - | 49,717 |

# Single Discount Rate Development
# Present Values of Projected Benefits (Dollars in Thousands, Concluded)

| Fiscal Year Ending | Projected Beginning Plan Fiduciary Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf) | Present Value of Benefit Payments using Single Discount Rate (sdr) |
|---|---|---|---|---|---|---|---|
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf ^((a)-.5) | (h)=(c)/(1+sdr)^(a-.5) |
| 2072 | $ 48,909,560 | $ 1,074,064 | $ 1,074,064 | $ - | $ 44,656 | $ - | $ 44,656 |
| 2073 | 51,292,397 | 1,024,501 | 1,024,501 | - | 39,995 | - | 39,995 |
| 2074 | 53,890,616 | 974,235 | 974,235 | - | 35,712 | - | 35,712 |
| 2075 | 56,719,233 | 923,375 | 923,375 | - | 31,781 | - | 31,781 |
| 2076 | 59,794,129 | 872,041 | 872,041 | - | 28,183 | - | 28,183 |
| 2077 | 63,132,100 | 820,373 | 820,373 | - | 24,895 | - | 24,895 |
| 2078 | 66,750,898 | 768,544 | 768,544 | - | 21,899 | - | 21,899 |
| 2079 | 70,669,260 | 716,765 | 716,765 | - | 19,177 | - | 19,177 |
| 2080 | 74,906,931 | 665,271 | 665,271 | - | 16,713 | - | 16,713 |
| 2081 | 79,484,707 | 614,320 | 614,320 | - | 14,491 | - | 14,491 |
| 2082 | 84,424,482 | 564,184 | 564,184 | - | 12,496 | - | 12,496 |
| 2083 | 89,749,298 | 515,145 | 515,145 | - | 10,713 | - | 10,713 |
| 2084 | 95,483,419 | 467,486 | 467,486 | - | 9,129 | - | 9,129 |
| 2085 | 101,652,403 | 421,484 | 421,484 | - | 7,728 | - | 7,728 |
| 2086 | 108,283,195 | 377,401 | 377,401 | - | 6,498 | - | 6,498 |
| 2087 | 115,404,231 | 335,476 | 335,476 | - | 5,423 | - | 5,423 |
| 2088 | 123,045,565 | 295,918 | 295,918 | - | 4,492 | - | 4,492 |
| 2089 | 131,238,996 | 258,900 | 258,900 | - | 3,690 | - | 3,690 |
| 2090 | 140,018,228 | 224,553 | 224,553 | - | 3,005 | - | 3,005 |
| 2091 | 149,419,032 | 192,968 | 192,968 | - | 2,425 | - | 2,425 |
| 2092 | 159,479,424 | 164,189 | 164,189 | - | 1,937 | - | 1,937 |
| 2093 | 170,239,861 | 138,220 | 138,220 | - | 1,531 | - | 1,531 |
| 2094 | 181,743,437 | 115,027 | 115,027 | - | 1,197 | - | 1,197 |
| 2095 | 194,036,099 | 94,544 | 94,544 | - | 923 | - | 923 |
| 2096 | 207,166,864 | 76,671 | 76,671 | - | 703 | - | 703 |
| 2097 | 221,188,052 | 61,284 | 61,284 | - | 528 | - | 528 |
| 2098 | 236,155,531 | 48,227 | 48,227 | - | 390 | - | 390 |
| 2099 | 252,128,977 | 37,322 | 37,322 | - | 283 | - | 283 |
| 2100 | 269,172,142 | 28,371 | 28,371 | - | 202 | - | 202 |
| 2101 | 287,353,150 | 21,159 | 21,159 | - | 142 | - | 142 |
| 2102 | 306,744,789 | 15,463 | 15,463 | - | 97 | - | 97 |
| 2103 | 327,424,829 | 11,061 | 11,061 | - | 65 | - | 65 |
| 2104 | 349,476,341 | 7,735 | 7,735 | - | 43 | - | 43 |
| 2105 | 372,988,043 | 5,283 | 5,283 | - | 27 | - | 27 |
| 2106 | 398,054,648 | 3,521 | 3,521 | - | 17 | - | 17 |
| 2107 | 424,777,235 | 2,289 | 2,289 | - | 11 | - | 11 |
| 2108 | 453,263,643 | 1,451 | 1,451 | - | 6 | - | 6 |
| 2109 | 483,628,879 | 897 | 897 | - | 4 | - | 4 |
| 2110 | 515,995,565 | 542 | 542 | - | 2 | - | 2 |
| 2111 | 550,494,404 | 321 | 321 | - | 1 | - | 1 |
| 2112 | 587,264,687 | 187 | 187 | - | 1 | - | 1 |
| 2113 | 626,454,830 | 108 | 108 | - | - | - | - |
| 2114 | 668,222,959 | 62 | 62 | - | - | - | - |
| 2115 | 712,737,523 | 36 | 36 | - | - | - | - |
| 2116 | 760,177,965 | 22 | 22 | - | - | - | - |
| 2117 | 810,735,426 | 13 | 13 | - | - | - | - |
| 2118 | 864,613,509 | 8 | 8 | - | - | - | - |
| 2119 | 922,029,082 | 5 | 5 | - | - | - | - |
| 2120 | 983,213,140 | 3 | 3 | - | - | - | - |
| 2121 | 1,048,411,730 | 2 | 2 | - | - | - | - |
| | | | | **Totals** | $ 20,324,718 | $ - | $ 20,324,718 |

# Section H

## Glossary of Terms

# Glossary of Terms

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| ***Accrued Service*** | Service credited under the system which was rendered before the date of the actuarial valuation. |
| ***Actuarial Accrued Liability (AAL)*** | The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability." |
| ***Actuarial Assumptions*** | These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation. |
| ***Actuarial Cost Method*** | A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method. |
| ***Actuarial Equivalent*** | A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions. |
| ***Actuarial Gain (Loss)*** | The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities. |
| ***Actuarial Present Value (APV)*** | The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment. |
| ***Actuarial Valuation*** | The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB. |
| ***Actuarial Valuation Date*** | The date as of which an actuarial valuation is performed. |
| ***Actuarially Determined Contribution (ADC)*** | A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment. |

# Glossary of Terms

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| ***Amortization Method*** | The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year). |
| ***Amortization Payment*** | The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal. |
| ***Cost-of-Living Adjustments*** | Postemployment benefit changes intended to adjust benefit payments for the effects of inflation. |
| ***Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)*** | A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan. |
| ***Covered-Employee Payroll*** | The payroll of covered employees, which is typically only the pensionable pay (meets the statutory salary definition) and does not include pay above any pay cap. |
| ***Deferred Inflows and Outflows of Resources*** | The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources. |
| ***Discount Rate or Single Discount Rate*** | For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:<br>1) The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period and;<br>2) The present value of the benefit payments not in (1) above, discounted using the municipal bond rate. |
| ***Entry Age Actuarial Cost Method or Entry Age Normal (EAN)*** | The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit age(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits. |

# Glossary of Terms

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| ***Fiduciary Net Position*** | The fiduciary net position is the value of the net assets of the trust restricted for pension benefits. |
| ***GASB*** | The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities. |
| ***Long-Term Expected Rate of Return*** | The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio. |
| ***Money-Weighted Rate of Return*** | The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense. |
| ***Multiple-Employer Defined Benefit Pension Plan*** | A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer. |
| ***Municipal Bond Rate*** | The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted. |
| ***Net Pension Liability (NPL)*** | The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan. |
| ***Non-Employer Contributing Entities*** | Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities. |
| ***Normal Cost*** | The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method. |
| ***Other Postemployment Benefits (OPEB)*** | All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits. |
| ***Real Rate of Return*** | The real rate of return is the rate of return on an investment after adjustment to eliminate inflation. |
| ***Service Cost*** | The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year. |

# Glossary of Terms

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| ***Total Pension Expense*** | The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:<br>1. Service Cost<br>2. Interest on the Total Pension Liability<br>3. Current-Period Changes in Benefit Terms<br>4. Employee Contributions<br>5. Projected Earnings on Plan Investments<br>6. Pension Plan Administrative Expense<br>7. Other Changes in Plan Fiduciary Net Position<br>8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual experience in measurement of the Total Pension Liability<br>9. Recognition of Outflow (Inflow) of Resources due to assumption changes<br>10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments |
| ***Total Pension Liability (TPL)*** | The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service. |
| ***Unfunded Actuarial Accrued Liability (UAAL)*** | The UAAL is the difference between actuarial accrued liability and valuation assets. |
| ***Valuation Assets*** | The valuation assets are the plan fiduciary net position used in determining the net pension liability of the fund. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets. |