

# Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS)

GASB Statement Nos. 67 and 68 Accounting and Financial  
Reporting for Pension Plans

June 30, 2023





September 26, 2023

Retirement Board  
Missouri Department of Transportation  
and Highway Patrol Employees' Retirement System  
1913 William Street  
Jefferson City, Missouri 65109

Dear Board Members:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 for the Missouri Department of Transportation and Highway Patrol Employees' Retirement System ("MPERS"). 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 stand-alone 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.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statement Nos. 67 and 68. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. This report may be provided to parties other than MPERS only in its entirety and only with the permission of the Retirement Board. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by Retirement System staff, 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 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.

To the best of our knowledge, this report is complete, accurate, and in accordance with generally recognized actuarial methods. Heidi G. Barry and Jamal Adora are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the Academy of Actuaries to render the actuarial opinions contained herein.

This information is presented in draft form for review by the plan's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the plan's financial statements. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,  
Gabriel, Roeder, Smith & Company



Heidi G. Barry, ASA, FCA, MAAA



Jamal Adora, ASA, EA, MAAA

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# SECTION A



## EXECUTIVE SUMMARY

# Executive Summary as of June 30, 2023

Actuarial Valuation Date	June 30, 2023
Measurement Date of the Net Pension Liability	June 30, 2023
Employer's Fiscal Year Ending Date (Employer's Reporting Date)	June 30, 2024
Plan's Fiscal Year Ending Date (Plan's Reporting Date)	June 30, 2023

## Membership

Number of		
- Retirees and Beneficiaries	9,604	
- Inactive, Nonretired Members	2,239	
- Active Members	6,621	
- Total	18,464	
Valuation Payroll	\$ 389,324,743	
Covered Payroll (Reported Fiscal Year Payroll Paid)	\$ 400,799,485	

## Net Pension Liability

Total Pension Liability	\$ 4,709,391,407
Plan Fiduciary Net Position	3,281,627,844
Net Pension Liability	\$ 1,427,763,563
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	69.68%
Net Pension Liability as a Percentage of Covered Payroll	356.23%

## 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*	3.86%
Last year ending June 30 in the 2024 to 2123 projection period for which projected benefit payments are fully funded	2123

**Total Pension Expense** \$ 176,900,799

## Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	\$ 165,911,860	\$ 7,307,821
Changes in assumptions	95,515,799	-
Net difference between projected and actual earnings on pension plan investments	78,034,510	268,156,567
<b>Total</b>	<b>\$ 339,462,169</b>	<b>\$ 275,464,388</b>

*\*Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 30, 2023. 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.*



# Discussion

## Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67 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 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.

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 or local governments 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).

The pension expense 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 liability 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.

## Discussion

Both GASB Statements No. 67 and No. 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The type 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 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; and
- 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.

### 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
- Comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

### Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the Total Pension Liability (TPL) is required to be rolled forward from the actuarial valuation date to the measurement date.





## Discussion

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2023 and a measurement date of June 30, 2023.

### 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 all actuarial assumptions are met (including the assumption of the plan earning 6.50% on the actuarial value of assets), it is expected that:

- 1) The unfunded actuarial accrued liabilities will be fully amortized after 16 years;
- 2) The funded status of the plan will increase gradually towards a 100% funded ratio and then slightly exceed 100% (due to the contribution stabilization reserve fund); and
- 3) The unfunded accrued liability will follow the pattern shown on page A-5 of the valuation report.

### Limitations of Assets as a Percent of Total Pension Liability 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. 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).

### Limitations 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.



# Discussion

## 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 3.86% (based on the daily rate closest to but not later than the measurement date of the Fidelity 20-Year Municipal GO AA Index); and the resulting single discount rate is 6.50%.

Under the Board's current funding policy, the plan is expected to exceed a 100% funded status if future experience is exactly as assumed due to the Contribution Stabilization Reserve Fund that became part of the funding policy in 2014.

**SECTION B**

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**FINANCIAL STATEMENTS**

# Statement of Pension Expense under GASB Statement No. 68

## Fiscal Year Ended June 30, 2023

### A. Expense

1. Service Cost (inc. disability expense, service purchases, and transfers in)	\$	52,759,573
2. Interest on the Total Pension Liability		279,014,877
3. Current-Period Benefit Changes		-
4. Member Contributions (inc. service purchases and transfers in)		(11,448,174)
5. Projected Earnings on Plan Investments (made negative for addition here)		(197,732,033)
6. Pension Plan Administrative Expense		5,529,258
7. Other Changes in Plan Fiduciary Net Position		-
8. Recognition of Outflow (Inflow) of Resources due to Liabilities		118,418,399
9. Recognition of Outflow (Inflow) of Resources due to Assets		(69,641,101)
<b>10. Total Pension Expense</b>	<b>\$</b>	<b>176,900,799</b>

# Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2023

## A. Outflows (Inflows) of Resources Due to Liabilities

1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	\$ 211,609,428
2. Assumption Changes (gains) or losses	\$ 44,379,018
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	3.9130
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	\$ 54,078,566
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	\$ 11,341,431
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	\$ 65,419,997
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	\$ 157,530,862
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	\$ 33,037,587
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	\$ 190,568,449

## B. Outflows (Inflows) of Resources Due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$ (67,026,350)
2. Recognition period for Assets {in years}	5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	\$ (13,405,270)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$ (53,621,080)



# Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2023

## 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 of Resources
1. Due to Liabilities	\$ 124,806,355	\$ 6,387,956	\$ 118,418,399
2. Due to Assets	51,031,912	120,673,013	(69,641,101)
<b>3. Total</b>	<b>\$ 175,838,267</b>	<b>\$ 127,060,969</b>	<b>\$ 48,777,298</b>

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

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	\$ 58,851,103	\$ 6,387,956	\$ 52,463,147
2. Assumption Changes	65,955,252	-	65,955,252
3. Net Difference between projected and actual earnings on pension plan investments	51,031,912	120,673,013	(69,641,101)
<b>4. Total</b>	<b>\$ 175,838,267</b>	<b>\$ 127,060,969</b>	<b>\$ 48,777,298</b>

## 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 of Resources
1. Differences between expected and actual experience	\$ 165,911,860	\$ 7,307,821	\$ 158,604,039
2. Assumption Changes	95,515,799	-	95,515,799
3. Net Difference between projected and actual earnings on pension plan investments	78,034,510	268,156,567	(190,122,057)
<b>4. Total</b>	<b>\$ 339,462,169</b>	<b>\$ 275,464,388</b>	<b>\$ 63,997,781</b>

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

Year Ending June 30	Net Deferred Outflows of Resources
2024	\$ 46,860,227
2025	(30,271,555)
2026	60,814,379
2027	(13,405,270)
2028	-
Thereafter	-
<b>Total</b>	<b>\$ 63,997,781</b>



## Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2023

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
<b>Deferred Outflow (Inflow) Due to Differences between Expected and Actual Experience on Liabilities</b>					
2019	\$ 203,459	4.2011	\$ 9,739	\$ -	0.0000
2020	3,494,582	4.1771	836,605	148,162	0.1771
2021	(26,471,689)	4.1440	(6,387,956)	(7,307,821)	1.1440
2022	16,085,222	4.0969	3,926,193	8,232,836	2.0969
2023	211,609,428	3.9130	54,078,566	157,530,862	2.9130
<b>Total</b>			<b>\$ 52,463,147</b>	<b>\$ 158,604,039</b>	
<b>Deferred Outflow (Inflow) Due to Assumption Changes</b>					
2019	\$ -	4.2011	\$ -	\$ -	0.0000
2020	-	4.1771	-	-	0.1771
2021	226,319,675	4.1440	54,613,821	62,478,212	1.1440
2022	-	4.0969	-	-	2.0969
2023	44,379,018	3.9130	11,341,431	33,037,587	2.9130
<b>Total</b>			<b>\$ 65,955,252</b>	<b>\$ 95,515,799</b>	
<b>Deferred Outflow (Inflow) Due to Differences between Projected and Actual Earnings on Plan Investments</b>					
2019	\$ 6,094,463	5.0000	\$ 1,218,891	\$ -	0.0000
2020	178,511,392	5.0000	35,702,278	35,702,280	1.0000
2021	(536,338,716)	5.0000	(107,267,743)	(214,535,487)	2.0000
2022	70,553,716	5.0000	14,110,743	42,332,230	3.0000
2023	(67,026,350)	5.0000	(13,405,270)	(53,621,080)	4.0000
<b>Total</b>			<b>\$ (69,641,101)</b>	<b>\$ (190,122,057)</b>	

According to paragraph 33 of GASB Statement No. 68, 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 pensions 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 72,574 years. Additionally, the average total plan membership (active employees and inactive employees) was 18,547. 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 3.9130 years.

Additionally, differences between projected and actual earnings on pension 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 Fiduciary Net Position as of June 30, 2023

<b>Assets</b>	
Cash	\$ 590,877
Receivables	
Investment Sales	\$ 19,229,893
Accrued Investment Interest and Income	13,449,780
Contributions	10,550,289
Total Receivables	<u>\$ 43,229,962</u>
Investments	
Equities	\$ 168,719,607
Fixed Income	1,104,543,056
Limited Partnerships	1,732,300,725
Hedge	29,572,393
Short Term Securities	231,790,768
Total Investments	<u>\$ 3,266,926,549</u>
Securities Lending Collateral	\$ 18,946,422
Capital Assets	
Land (not depreciated)	\$ 188,319
Equipment	3,445,854
Building	745,828
Accumulated Depreciation	(3,843,563)
Total Capital Assets	<u>\$ 536,438</u>
Deferred Outflows - OPEB Related Items	<u>\$ 398,255</u>
<b>Total Assets</b>	<u><u>\$ 3,330,628,503</u></u>
<b>Liabilities</b>	
Investment Fees Payable	\$ 741,531
OPEB Obligation	1,929,126
Security Lending Collateral	19,284,048
Deferred Inflows - OPEB Related Items	496,723
Accounts Payable - Other	26,549,231
<b>Total Liabilities</b>	<u>\$ 49,000,659</u>
<b>Net Position Restricted for Pensions</b>	<u><u>\$ 3,281,627,844</u></u>







## Schedule of Proportionate Employer Share for Year Ended June 30, 2023

		Deferred Outflows of Resources							Deferred Inflows of Resources					Pension Expense		
Contributions#	Employer	Prop. Share	Net Pension Liability	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Investment Earnings on Pension Plan	Changes of Assum.	Changes in Proportion and Differences Between Employer Cont. and Share of Cont.	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Investment Earnings on Pension Plan	Changes of Assum.	Changes in Proportion and Differences Between Employer Cont. and Share of Cont.	Total Deferred Inflows of Resources	Prop. Share of Plan Pension Expense	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and	Total Employer Pension Expense
\$ 144,460,527	MoDOT	62.45%	\$ 891,638,345	\$ 103,611,957	\$ 48,732,551	\$ 59,649,616	\$ 7,972,976	\$ 219,967,100	\$ 4,563,734	\$ 167,463,776	\$ -	\$ 3,875,566	\$ 175,903,076	\$ 110,474,549	\$ 215,334	\$ 110,689,883
86,846,812	Highway Patrol	37.55%	536,125,218	62,299,903	29,301,959	35,866,183	3,875,566	131,343,611	2,744,087	100,692,791	-	7,972,976	111,409,854	66,426,250	(215,334)	66,210,916
<b>\$ 231,307,339</b>	<b>Total for All Employers</b>	<b>100.0000%</b>	<b>\$ 1,427,763,563</b>	<b>\$165,911,860</b>	<b>\$ 78,034,510</b>	<b>\$ 95,515,799</b>	<b>\$ 11,848,542</b>	<b>\$ 351,310,711</b>	<b>\$ 7,307,821</b>	<b>\$ 268,156,567</b>	<b>\$ -</b>	<b>\$ 11,848,542</b>	<b>\$ 287,312,930</b>	<b>\$ 176,900,799</b>	<b>\$ -</b>	<b>\$ 176,900,799</b>

# Excludes \$1,506,656 in contributions for Retirement System members. Retirement System members' costs were spread proportionately to the other two employers.

		Schedule of Deferred (Inflows)/Outflows						
Employer	Employer Allocation Percentage	2024	2025	2026	2027	2028	Thereafter	Total
MoDOT	62.45%	\$ 28,760,630	\$ (16,669,667)	\$ 40,344,653	\$ (8,371,591)	\$ -	\$ -	\$ 44,064,025
Highway Patrol	37.55%	18,099,597	(13,601,888)	20,469,726	(5,033,679)	-	-	19,933,756
<b>TOTAL</b>	<b>100.00%</b>	<b>\$ 46,860,227</b>	<b>\$ (30,271,555)</b>	<b>\$ 60,814,379</b>	<b>\$ (13,405,270)</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 63,997,781</b>



## SECTION C

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### REQUIRED SUPPLEMENTARY INFORMATION

# Schedule of Changes in Net Pension Liability and Related Ratios Current Period Fiscal Year Ended June 30, 2023

## A. Total Pension Liability

1. Service Cost (inc. disab. exp., svc. purchases, and transfers in)	\$	52,759,573
2. Interest on the Total Pension Liability		279,014,877
3. Changes of Benefit Terms		-
4. Difference between Expected and Actual Experience of the Total Pension Liability		211,609,428
5. Changes of Assumptions		44,379,018
6. Benefit Payments (inc. refunds of employee contributions, disability premiums, and transfers out)		(289,056,536)
7. Other		-
8. Net change in Total Pension Liability	\$	298,706,360
9. Total Pension Liability – Beginning		4,410,685,047
10. Total Pension Liability – Ending	<u>\$</u>	<u>4,709,391,407</u>

## B. Plan Fiduciary Net Position

1. Contributions – employer	\$	232,813,995
2. Contributions – employee (inc. svc. purchases, and transfers in)		11,448,174
3. Net Investment Income		264,758,383
4. Benefit Payments (inc. refunds of employee contributions, disability premiums, and transfers out)		(289,056,536)
5. Pension Plan Administrative Expense		(5,529,258)
6. Net Change in Plan Fiduciary Net Position	\$	214,434,758
7. Plan Fiduciary Net Position – Beginning		3,067,193,086
8. Post Valuation Audit Adjustment		-
9. Plan Fiduciary Net Position – Ending	<u>\$</u>	<u>3,281,627,844</u>

## C. Net Pension Liability

\$ 1,427,763,563

## D. Plan Fiduciary Net Position as a percentage of the Total Pension Liability

69.68%

## E. Covered-Employee Payroll (Reported Fiscal Year Payroll Paid) #

\$ 400,799,485

## F. Net Pension Liability as a percentage of covered-employee payroll

356.23%

# Valuation Payroll was \$389,324,743.



# Schedules of Required Supplementary Information

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

Last 10 Fiscal Years

Fiscal year ending June 30,

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
<b>Total Pension Liability</b>										
Service Cost (starting with 2022, inc. disab. exp., svc. purchases, and transfers in)	\$ 52,759,573	\$ 55,097,433	\$ 43,726,886	\$ 44,048,083	\$ 43,971,030	\$ 46,621,377	\$ 45,713,403	\$ 45,441,305	\$ 45,358,095	\$ 44,739,603
Interest on the Total Pension Liability	279,014,877	275,067,181	278,522,994	274,791,358	271,174,089	286,457,436	283,568,441	280,432,068	275,284,910	270,525,608
Benefit Changes	-	-	-	-	-	(7,684)	-	-	-	-
Difference between Expected and Actual Experience	211,609,428	16,085,222	(26,471,689)	3,494,582	203,459	(37,173,164)	(37,286,966)	(39,810,009)	(13,324,219)	(17,614,321)
Assumption Changes	44,379,018	-	226,319,675	-	-	142,556,109	-	-	-	-
Benefit Payments (starting with 2022, inc. disability premiums and transfers out)	(288,084,295)	(278,612,715)	(266,108,191)	(262,710,812)	(255,310,406)	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)
Refunds	(972,241)	(1,024,986)	(611,132)	(796,106)	(780,538)	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)
Other (prior to 2022, disability premiums and transfers out)	-	-	(3,403,528)	(4,098,916)	(3,726,867)	(4,424,647)	(4,345,049)	(3,489,276)	(4,702,158)	(3,407,914)
<b>Net Change in Total Pension Liability</b>	<b>298,706,360</b>	<b>66,612,135</b>	<b>251,975,015</b>	<b>54,728,189</b>	<b>55,530,767</b>	<b>179,395,211</b>	<b>40,710,726</b>	<b>45,887,353</b>	<b>65,603,910</b>	<b>66,266,182</b>
<b>Total Pension Liability - Beginning</b>	<b>4,410,685,047</b>	<b>4,344,072,912</b>	<b>4,092,097,897</b>	<b>4,037,369,708</b>	<b>3,981,838,941</b>	<b>3,802,443,730</b>	<b>3,761,733,004</b>	<b>3,715,845,651</b>	<b>3,650,241,741</b>	<b>3,583,975,559</b>
<b>Total Pension Liability - Ending (a)</b>	<b>\$ 4,709,391,407</b>	<b>\$ 4,410,685,047</b>	<b>\$ 4,344,072,912</b>	<b>\$ 4,092,097,897</b>	<b>\$ 4,037,369,708</b>	<b>\$ 3,981,838,941</b>	<b>\$ 3,802,443,730</b>	<b>\$ 3,761,733,004</b>	<b>\$ 3,715,845,651</b>	<b>\$ 3,650,241,741</b>
<b>Plan Fiduciary Net Position</b>										
Contributions - Employer	\$ 232,813,995	\$ 212,711,117	\$ 208,212,848	\$ 210,871,852	\$ 210,166,927	\$ 204,955,180	\$ 206,562,924	\$ 199,609,396	\$ 200,638,571	\$ 183,353,841
Contributions - Member (starting with 2022, inc. svc. purchases, and transfers in)	11,448,174	12,655,780	7,095,963	6,547,351	5,996,344	5,001,418	4,891,932	3,482,513	3,294,162	2,260,563
Pension Plan Net Investment Income	264,758,383	122,767,680	699,644,536	(10,667,857)	154,326,818	197,619,838	220,301,741	21,432,095	92,645,571	319,445,780
Benefit Payments (starting with 2022, inc. disability premiums and transfers out)	(288,084,295)	(278,612,715)	(266,108,191)	(262,710,812)	(255,310,406)	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)
Refunds	(972,241)	(1,024,986)	(611,132)	(796,106)	(780,538)	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)
Pension Plan Administrative Expense	(5,529,258)	(5,229,018)	(4,585,473)	(4,291,028)	(4,372,966)	(4,693,492)	(4,515,458)	(4,370,860)	(4,066,944)	(3,736,355)
Other (prior to 2022, disability premiums and net transfers)	-	-	(1,323,211)	(615,342)	(1,294,497)	(2,557,202)	(2,600,942)	(759,597)	(3,587,721)	(1,623,532)
<b>Net Change in Plan Fiduciary Net Position</b>	<b>214,434,758</b>	<b>63,267,858</b>	<b>642,325,340</b>	<b>(61,661,942)</b>	<b>108,731,682</b>	<b>145,691,526</b>	<b>177,701,094</b>	<b>(17,293,188)</b>	<b>51,910,921</b>	<b>271,723,503</b>
<b>Plan Fiduciary Net Position - Beginning</b>	<b>3,067,193,086</b>	<b>3,003,925,228</b>	<b>2,361,599,888</b>	<b>2,423,261,830</b>	<b>2,314,530,148</b>	<b>2,169,775,040</b>	<b>1,992,073,946</b>	<b>2,009,367,134</b>	<b>1,957,456,213</b>	<b>1,685,732,710</b>
<b>Post Valuation Audit Adjustment</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>(936,418)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Plan Fiduciary Net Position - Ending (b)</b>	<b>\$ 3,281,627,844</b>	<b>\$ 3,067,193,086</b>	<b>\$ 3,003,925,228</b>	<b>\$ 2,361,599,888</b>	<b>\$ 2,423,261,830</b>	<b>\$ 2,314,530,148</b>	<b>\$ 2,169,775,040</b>	<b>\$ 1,992,073,946</b>	<b>\$ 2,009,367,134</b>	<b>\$ 1,957,456,213</b>
<b>Net Pension Liability - Ending (a) - (b)</b>	<b>1,427,763,563</b>	<b>1,343,491,961</b>	<b>1,340,147,684</b>	<b>1,730,498,009</b>	<b>1,614,107,878</b>	<b>1,667,308,793</b>	<b>1,632,668,690</b>	<b>1,769,659,058</b>	<b>1,706,478,517</b>	<b>1,692,785,528</b>
<b>Plan Fiduciary Net Position as a Percentage of Total Pension Liability</b>	<b>69.68 %</b>	<b>69.54 %</b>	<b>69.15 %</b>	<b>57.71 %</b>	<b>60.02 %</b>	<b>58.13 %</b>	<b>57.06 %</b>	<b>52.96 %</b>	<b>54.08 %</b>	<b>53.63 %</b>
<b>Covered-Employee Payroll</b>	<b>\$ 400,799,485</b>	<b>\$ 367,493,332</b>	<b>\$ 359,409,940</b>	<b>\$ 363,980,262</b>	<b>\$ 362,747,630</b>	<b>\$ 353,751,292</b>	<b>\$ 356,515,416</b>	<b>\$ 344,635,441</b>	<b>\$ 342,264,593</b>	<b>\$ 336,590,797</b>
<b>Net Pension Liability as a Percentage of Covered-Employee Payroll</b>	<b>356.23 %</b>	<b>365.58 %</b>	<b>372.87 %</b>	<b>475.44 %</b>	<b>444.97 %</b>	<b>471.32 %</b>	<b>457.95 %</b>	<b>513.49 %</b>	<b>498.58 %</b>	<b>502.92 %</b>
<b>Notes to Schedule:</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>



## Schedules of Required Supplementary Information

### Schedule of the Net Pension Liability (Multiyear)

#### Last 10 Fiscal Years

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2014	\$ 3,650,241,741	\$ 1,957,456,213	\$ 1,692,785,528	53.63%	\$ 336,590,797	502.92%
2015	3,715,845,651	2,009,367,134	1,706,478,517	54.08%	342,264,593	498.58%
2016	3,761,733,004	1,992,073,946	1,769,659,058	52.96%	344,635,441	513.49%
2017	3,802,443,730	2,169,775,040	1,632,668,690	57.06%	356,515,416	457.95%
2018	3,981,838,941	2,314,530,148	1,667,308,793	58.13%	353,751,292	471.32%
2019	4,037,369,708	2,423,261,830	1,614,107,878	60.02%	362,747,630	444.97%
2020	4,092,097,897	2,361,599,888	1,730,498,009	57.71%	363,980,262	475.44%
2021	4,344,072,912	3,003,925,228	1,340,147,684	69.15%	359,409,940	372.87%
2022	4,410,685,047	3,067,193,086	1,343,491,961	69.54%	367,493,332	365.58%
2023	4,709,391,407	3,281,627,844	1,427,763,563	69.68%	400,799,485	356.23%

## Schedule of Contributions (Multiyear)

### Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll *	Actual Contribution as a % of Covered Payroll
2014	\$ 183,353,841	\$ 183,353,841	-	\$ 336,799,855	54.440%
2015	200,638,571	200,638,571	-	342,211,446	58.630%
2016	199,609,396	199,609,396	-	344,154,131	58.000%
2017	206,562,924	206,562,924	-	356,142,972	58.000%
2018	204,955,180	204,955,180	-	353,371,000	58.000%
2019	210,166,927	210,166,927	-	362,356,771	58.000%
2020	210,871,852	210,871,852	-	363,572,159	58.000%
2021	208,212,848	208,212,848	-	358,987,669	58.000%
2022	212,711,117	212,711,117	-	366,743,305	58.000%
2023	232,813,995	232,813,995	-	400,285,401	58.162%

\* Values are estimated from contribution rate and actual contribution amount.



## Notes to Schedule of Contributions

**Valuation Date:** June 30, 2021  
**Notes** Actuarially determined contribution rates are calculated as of June 30, for the fiscal year ending 2 years thereafter.

### Methods and Assumptions Used to Determine FY 2023 Contribution Rates:

Actuarial Cost Method	Entry-Age
Amortization Method	Level Percentage of Payroll, Closed #
Remaining Amortization Period	Permanent Policy: The total contribution will be based on normal cost plus a 14-year amortization of UAAL. The amortization period is a closed 14-year period starting July 1, 2022. Temporary Accelerated Policy: The total contribution is based on normal cost plus a 3-year amortization period for unfunded retiree liabilities and a 18-year amortization period for other unfunded liabilities. Both amortization periods are closed periods starting July 1, 2022. This temporary accelerated policy was adopted by the Retirement Board on September 17, 2009 and will remain in effect until such time as the retiree liability becomes 100% funded or the permanent policy produces a higher contribution rate.
Asset Valuation Method	3-Year smoothed market; 20% corridor
Inflation	2.25% (price inflation)
Salary Increases	3.00% to 12.45% (including 3.00% wage inflation)
Investment Rate of Return	6.50%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2018 valuation pursuant to an experience study of the period July 1, 2013 - June 30, 2017.
Mortality	The mortality tables, for post-retirement mortality, used in evaluating allowances to be paid to non-disabled pensioners were the RP-2014 Healthy Annuitant Mortality Tables projected forward to 2022 using projection scales MP-2017. Pre-retirement mortality used was RP-2014 Employee Mortality Tables projected to 2022 using projection scales MP-2017 multiplied by a factor of 65%. Post-retirement disabled mortality used was the RP-2014 Disabled Retiree Annuitant Mortality Table projected to 2022 using projection scales MP-2017. All mortality tables include a margin for mortality improvement in the projection to 2022.

### Other Information:

**Notes** There were no benefit changes during the year.

*# A Contribution Stabilization Reserve Fund of approximately \$96.0 million was added to the unfunded for purposes of determining the FY 2023 contribution rate.*





## **SECTION D**

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### **NOTES TO FINANCIAL STATEMENTS**

## 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 the 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 plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. 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. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

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 plan’s net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

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

	1% Decrease		Current Single Discount Rate Assumption		1% Increase
	5.50%		6.50%		7.50%
<b>Total Pension Liability</b>	\$ 5,290,675,452	\$	4,709,391,407	\$	4,229,322,252
<b>Plan Fiduciary Net Position</b>	3,281,627,844		3,281,627,844		3,281,627,844
<b>Net Pension Liability</b>	\$ 2,009,047,608	\$	1,427,763,563	\$	947,694,408

The inclusion of discount rates in the schedule above is not an indication of the reasonableness of the discount rate as an assumption.

## Reconciliation of DROP Accounts

### Disclosure Regarding the Contribution Stabilization Reserve Fund

At the September 26, 2014 Board meeting, the Board adopted the use of a Contribution Stabilization Reserve Fund that would result in an MPERS employer contribution rate similar to the Fiscal Year 2015 rates. The Contribution Stabilization Reserve Fund is intended to keep the contribution relatively level over time and may be used if the market experiences a downturn in the future. The Board further adopted (in February 2015) that the employer contribution rate would not fall below 58% unless 1) the fund became fully funded, or 2) the Contribution Stabilization Reserve Fund reached \$250 million. The balance of the Contribution Stabilization Reserve Fund as of June 30, 2023 is \$250,000,000.

### Disclosure Regarding the Deferred Retirement Option Program

MPERS currently provides a BackDROP option. This is an election made at the time of actual retirement. In effect, it provides members an option to elect to receive a portion of their benefits as cash. Since the election is not made until the member actually retires, the option is not treated as a DROP provision as defined in GASB Statement No. 67.

## Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	9,604
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	2,239
Active Plan Members	<u>6,621</u>
Total Plan Members	18,464

## SECTION E

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### SUMMARY OF BENEFITS

# Missouri Department of Transportation and Highway Patrol Employees' Retirement System Summary of Benefit Provisions Evaluated as of June 30, 2023

Closed Plan	Year 2000 Plan	2011 Tier
<p><b>Participation</b></p> <p>Participants include: All MPERS active members, vested terminated members, disability recipients, retirees and survivors who first became members prior to July 1, 2000 and who do not elect to transfer to the Year 2000 Plan at retirement.</p>	<p><b>Participation</b></p> <p>Participants include:</p> <ol style="list-style-type: none"> <li>1. All active employees who first became members on or after July 1, 2000 but prior to January 1, 2011.</li> <li>2. Closed Plan active members and vested former members who elect to transfer to the Year 2000 Plan at retirement.</li> <li>3. Closed Plan retirees who elected to transfer to the Year 2000 Plan during the election window from July 1, 2000 through July 1, 2001, and their survivors.</li> <li>4. Closed Plan members who left state employment prior to becoming vested (not eligible for a future retirement benefit) and return to work in a benefit eligible position on or after July 1, 2000.</li> </ol>	<p><b>Participation</b></p> <p>Participants include:</p> <ol style="list-style-type: none"> <li>1. All employees who first become members on or after January 1, 2011.</li> </ol>



**Closed Plan****Year 2000 Plan****2011 Tier****Normal Retirement Eligibility  
(unreduced benefit)**

**Non-Uniformed Employees:** The earlier of attaining:

1. Age 65 with at least 4 years of creditable service.
2. Age 60 with at least 15 years of creditable service.
3. Age 48 with age plus creditable service equal to 80 or more.
4. Age 65 with at least 5 years of service (deferred).\*

**Uniformed Patrol Employees Only:** The earlier of attaining:

1. Age 55 with at least 4 years of creditable service.
2. Mandatory retirement at age 60.
3. Age 48 with age plus creditable service equal to 80 or more.

**Final Average Pay Used  
for Benefit Determination**

Final Average Pay is the average annual pay of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining average pay). Employees terminating after reaching retirement eligibility will receive 1/12 of a year of creditable service for every 168 hours of unused sick leave (usable only for benefit computation, not eligibility).

\*See Chapter 104.010.1(32) RSMo.

**Normal Retirement Eligibility  
(unreduced benefit)**

**Non-Uniformed Employees:** The earlier of attaining:

1. Age 62 with at least 5 years of creditable service.
2. Age 48 with age plus creditable service equal to 80 or more.

**Uniformed Patrol Employees Only:** The earlier of attaining:

1. Mandatory retirement at age 60.
2. Age 48 with age plus creditable service equal to 80 or more.

**Final Average Pay Used  
for Benefit Determination**

Final Average Pay is the average annual pay of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining average pay). All vested members will receive 1/12 of a year of creditable service for every 168 hours of unused sick leave (usable only for benefit computation, not eligibility).

**Normal Retirement Eligibility  
(unreduced benefit)**

**Non-Uniformed Employees:** The earlier of attaining:

1. Age 67 with at least 5 years of creditable service.
2. Age 55 with age plus creditable service equal to 90 or more.

**Uniformed Patrol Employees Only:** The earlier of attaining:

1. Age 55 with at least 5 years of creditable service.
2. Mandatory retirement at age 60.

**Final Average Pay Used  
for Benefit Determination**

Final Average Pay is the average annual pay of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining average pay). Employees terminating after reaching retirement eligibility will receive 1/12 of a year of creditable service for every 168 hours of unused sick leave (usable only for benefit computation, not eligibility).



**Normal Retirement Benefit Amount**

**Non-Uniformed Employees:**

Life Benefit: 1.6% of final average pay times years of creditable service.

**Uniformed Patrol Employees:**

Life Benefit: 2.1333% of final average pay times years of creditable service.

Special Benefit: \$90 per month payable until age 65. Offset by any amount earned from gainful employment. This benefit does not apply to uniformed members hired on or after January 1, 1995.

**Early Retirement (reduced benefit)**

**Eligibility: Non-Uniformed Employees**

Age 55 with at least 10 years of creditable service.

**Amount:**

Normal retirement amount reduced by 0.6% for each month that retirement precedes eligibility for normal retirement.

**Uniformed Patrol** members are not eligible for early retirement.

**Normal Retirement Benefit Amount**

**All Employees:**

Life Benefit: 1.7% of final average pay times years of creditable service.

**Temporary Benefit:**

If member retires between ages 48 and 62 with age plus creditable service equal to 80 or more, a temporary benefit is payable in the amount of 0.8% of final average pay times years of creditable service until attainment of age 62 or death, whichever occurs first. All Uniformed Patrol members are eligible for the temporary benefit until age 62.

**Early Retirement (reduced benefit)**

**Eligibility: All Employees**

Age 57 with at least 5 years of creditable service.

**Amount:**

Normal retirement amount reduced by 0.5% for each month that retirement precedes eligibility for normal retirement.

**Normal Retirement Benefit Amount**

**All Employees:**

Life Benefit: 1.7% of final average pay times years of creditable service.

**Temporary Benefit:**

If member retires between ages 55 and 62 with age plus creditable service equal to 90 or more, a temporary benefit is payable in the amount of 0.8% of final average pay times years of creditable service until attainment of age 62 or death, whichever occurs first. All Uniformed Patrol members are eligible for the temporary benefit until age 62.

**Early Retirement (reduced benefit)**

**Eligibility: All Active Non-Uniformed Employees**

Age 62 with at least 5 years of creditable service.

**Amount:**

Normal retirement amount reduced by 0.5% for each month that retirement precedes eligibility for normal retirement.

**Uniformed Patrol** members are not eligible for early retirement.



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**Closed Plan**

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**Year 2000 Plan**

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**2011 Tier**

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**Vested Deferred Benefits*****Eligibility: All Employees***

Fully vested in accrued pension with 5 years of creditable service. The benefit will commence at the age the individual is eligible for early or normal retirement, considering years of creditable service.

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**Minimum Base Benefit**

Receive a monthly base benefit of no less than \$15 for each full year of creditable service. Must be eligible to receive a normal or early retirement benefit the first of the month immediately following the date you leave state employment. Not required to immediately start drawing a benefit.

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**Death Prior to Retirement**

The spouse of the member who dies after accruing 5 years of creditable service may elect to receive an annuity as if the employee had retired on the date of death and elected a joint and 100% survivor annuity.

If no eligible spouse survives or upon the death of the spouse, 80% of the member's accrued annuity will be paid to eligible children until age 21.

If the member has 3 or more, but less than 5 years of creditable service, the surviving spouse may elect to receive an annuity equal to 25% of the accrued benefit.

If the death is duty-related, there is no service requirement and the minimum annuity is 50% of the final average pay (FAP) to the surviving spouse or eligible children.

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**Vested Deferred Benefits*****Eligibility: All Employees***

Fully vested in accrued pension with 5 years of creditable service. The benefit will commence at the age the individual is eligible for early or normal retirement considering years of creditable service. Normal retirement eligibility begins at age 62.

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**Minimum Base Benefit**

Same.

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**Death Prior to Retirement**

The spouse of the member who dies after accruing 5 years of creditable service may elect to receive an annuity as if the employee had retired on the date of death and elected a joint and 100% survivor annuity.

If no eligible spouse survives or upon the death of the spouse, 80% of the member's accrued annuity will be paid to eligible children until age 21.

If the death is duty related, there is no service requirement and the minimum annuity is 50% of the final average pay (FAP) to the surviving spouse or eligible children.

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**Vested Deferred Benefits*****Eligibility: All Employees***

Fully vested in accrued pension with 5 years of creditable service. The benefit will commence at the age the individual is eligible for normal retirement considering years of creditable service. Normal retirement eligibility begins at age 67.

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**Minimum Base Benefit**

Same.

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**Death Prior to Retirement**

**Actives:** The spouse of the member who dies after accruing 5 years of creditable service may elect to receive an annuity as if the employee had retired on the date of death and elected a joint and 100% survivor annuity. **Deferred:** The spouse of a vested former member who dies after accruing 5 years of creditable service may elect to receive an annuity on the date the member would have attained normal retirement eligibility based on a joint and 100% survivor annuity election.

If no eligible spouse survives or upon the death of the spouse, 80% of the member's accrued annuity will be paid to eligible children until age 21.

If the death is duty related, there is no service requirement and the minimum annuity is 50% of the final average pay (FAP) to the surviving spouse or eligible children.



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**Closed Plan**

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**Year 2000 Plan**

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**2011 Tier**

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**Death After Retirement**

The benefit payable is 50% of the benefit the retired member was receiving on the date of death (the normal form of payment), or the benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement.

A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary. Additionally, a member may designate a new spouse as beneficiary in the event of the death of the spouse the member was married to at the date of retirement. The election must be completed within one year of the date of marriage.

For period certain annuities, beneficiaries may be changed at any time.

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**Pop-Up Provision**

Benefits to members who choose a reduced survivor form of payment and whose spouse precedes the member in death, will “pop-up” or revert to the amount the member would have received had he/she not elected a reduced survivor option.

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**Death After Retirement**

The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement.

A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary. Additionally, a member may designate a new spouse as beneficiary in the event of the death of the spouse the member was married to at the date of retirement. The election must be completed within one year of the date of marriage.

For period certain annuities, beneficiaries may be changed at any time.

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**Pop-Up Provision**

Same.

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**Death After Retirement**

The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement.

A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary. Additionally, a member may designate a new spouse as beneficiary in the event of the death of the spouse the member was married to at the date of retirement. The election must be completed within one year of the date of marriage.

For period certain annuities, beneficiaries may be changed at any time.

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**Pop-Up Provision**

Same.

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**Closed Plan****Year 2000 Plan****2011 Tier**

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**\$5,000 Death Benefit**

MPERS provides a \$5,000 death benefit for a designated beneficiary(ies) of members who retire from service or were approved for normal or work-related disability benefits after September 28, 1985. Members who die while on terminated vested status or long-term disability status do not qualify for this benefit. Long-term disability recipients who retire on or after September 28, 1985 are eligible to receive this benefit.

**Purchase of Service**

**Military:** Prior to retirement, qualifying members may purchase up to a maximum of 4 years military service that includes active service, and/or active and inactive duty training from which they were honorably discharged. All months the member is eligible for must be purchased. This service credit **can** be used to satisfy the vesting requirement. Periods of military service cannot coincide with employment in a state agency.

**Police Service:** Prior to retirement, uniformed patrol members only, may purchase up to a maximum of 4 years police service. Members must purchase all months of service they are eligible for.

**\$5,000 Death Benefit**

MPERS provides a \$5,000 death benefit for a designated beneficiary(ies) of members who retire from service or were approved for work-related disability benefits. Members who die while on terminated vested status or long-term disability status do not qualify for this benefit. Long-term disability recipients who retire are eligible to receive this benefit.

**Purchase of Service**

**Military:** Prior to retirement, qualifying members may purchase up to a maximum of 4 years military service that includes active service from which they were honorably discharged. All months the member is eligible for must be purchased. This service credit **cannot** be used to satisfy the vesting requirement. Periods of military service cannot coincide with employment in a state agency.

**Police Service:** Not available.

**\$5,000 Death Benefit**

MPERS provides a \$5,000 death benefit for a designated beneficiary(ies) of members who retire from service or were approved for work-related disability benefits. Members who die while on terminated vested status or long-term disability status do not qualify for this benefit. Long-term disability recipients who retire are eligible to receive this benefit.

**Purchase of Service**

**Military:** Not available.

**Police Service:** Not available.

**Closed Plan****Year 2000 Plan****2011 Tier**

**Portability:** Section 105.691 allows vested members to acquire (purchase/transfer) service credit for any non-federal, full-time public sector employment within Missouri.

Service may be purchased/transferred by using the member's own money and/or using the value of the retirement benefit in the prior retirement plan if that plan has an agreement with MPERS. Any non-federal public employment **not covered** by a retirement plan must be purchased.

**Public Employment Prior Service (Subsidized Purchase)**

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Section 104.040.6 allows, prior to retirement, members may purchase up to a maximum of 4 years full-time "public employment." Public employment refers to employment with a city, county, municipality, public school, or other political subdivision. Federal and out-of-state employment is not eligible. Members must purchase all months of service they are eligible for up to 4 years.

**Disability**

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Benefits that may be payable during the period of disability (whether Normal, Work-related, or LTD) are administered through a separate program and were not considered for purposes of the valuation.

Normal retirement benefits become payable at the time a disabled member becomes eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability.

**Portability:** Same as Closed Plan Section 105.691.

**Public Employment Prior Service (Subsidized Purchase)**

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Not available.

**Disability**

---

Benefits that may be payable during the period of disability (whether Normal, Work-related, or LTD) are administered through a separate program and were not considered for purposes of the valuation.

Normal retirement benefits become payable at the time a disabled member becomes eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability increased by 80% of CPI to the retirement date.

**Portability:** Same as Closed Plan Section 105.691.

**Public Employment Prior Service (Subsidized Purchase)**

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Not available.

**Disability**

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Benefits that may be payable during the period of disability (whether Normal, Work-related, or LTD) are administered through a separate program and were not considered for purposes of the valuation.

Normal retirement benefits become payable at the time a disabled member becomes eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability increased by 80% of CPI to the retirement date.



**Closed Plan****Year 2000 Plan****2011 Tier****Post-Retirement Benefit Adjustments**

For active and inactive employees hired prior to August 28, 1997 and current retirees, the benefits of pensioners and their beneficiaries are increased annually by 80% of the increase in the Consumer Price Index (subject to a maximum increase of 5% and a minimum of 4%). These increases are made until the total of the increases reaches 65% of initial benefit at which time the increases will have the minimum removed.

For employees hired on or after August 28, 1997 the annual percentage increase is equal to the lesser of:

- i) 80% of the CPI-U increase, or
- ii) 5%.

**Member Contributions**

None.

**Post-Retirement Benefit Adjustments**

Benefits are increased to retired members (including survivors) annually in accordance with the following:

Annual benefit percentage increase equal to the lesser of:

- i) 80% of the CPI-U increase, or
- ii) 5%.

**Member Contributions**

None.

**Post-Retirement Benefit Adjustments**

Benefits are increased to retired members (including survivors) annually\* in accordance with the following:

Annual benefit percentage increase equal to the lesser of:

- i) 80% of the CPI-U increase, or
- ii) 5%.

*\* Vested former members and their survivor benefits are increased beginning on the second anniversary of retirement.*

**Member Contributions**

4% contributions with interest credited annually at a rate equal to the investment rate published by the US Department of Treasury for 52-week treasury bill, nearest the preceding July 1st. The state of Missouri employer shall pick up and pay the contributions. A deduction shall be made from each member's compensation equal to the amount of the member's contributions picked up by the employer.



## The Closed Plan & Year 2000 Plan BackDROP Option

Legislation effective January 1, 2002 provides a Deferred Retirement Option Provision (BackDROP) to members of MPERS. It is available in both the Closed Plan and the Year 2000 Plan.

To be eligible to participate in the BackDROP, a member must have been eligible to retire under normal age and/or service conditions for at least two years. A retroactive starting date is established for BackDROP purposes which is the later of: 1) the member's normal retirement date, or 2) five years prior to the annuity starting date under the retirement plan selected by the member.

The BackDROP period for the accumulation of the BackDROP amount is from the retroactive starting date to the annuity starting date. This results in a BackDROP period of one to five years depending upon the individual situation.

A theoretical BackDROP account is accumulated that includes 90% of the value of the benefit payments that would have been paid during the BackDROP period had the member retired at the retroactive starting date. These payments include applicable post-retirement benefit increases. These payments do not include any reduction for spouse options during the BackDROP period. The member may choose the BackDROP period in twelve-month increments or their maximum period, not to exceed 60 months.

The member is paid the resulting lump sum value of the BackDROP account as of the annuity starting date or as three equal annual installments beginning at the annuity starting date.

The annuity benefit payable from the actual retirement date is computed with years of service and final average pay as of the retroactive starting date for the BackDROP. Post-retirement benefit increases that occurred during the BackDROP period are applied in the calculation of the monthly annuity.

## SECTION F

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### **ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS**

# Summary of Valuation Method and Assumptions

## June 30, 2023

**The actuarial assumptions used** in the valuation are shown in this section of the report unless stated otherwise. The assumptions were established for the June 30, 2023 actuarial valuation, following a five-year actuarial investigation covering the period July 1, 2017 through June 30, 2022. Assumptions were adopted by the Board.

An actuarial valuation is based upon an actuarial cost method, an asset valuation method, and actuarial assumptions. These methods and assumptions are chosen by the Board of Trustees after consultation with the Actuary and other advisors.

The actuarial cost method is called the Entry Age Actuarial Cost Method. This method is consistent with the Board's level percent-of-payroll funding objective. With this method, the level percent-of-payroll is determined that will fund a member's retirement benefit over the member's entire working lifetime, from date of hire (Entry Age) to date of exit from the active member population. Differences in the past between assumed and actual experience become part of unfunded actuarial accrued liabilities and are amortized with level percent-of-payroll contributions. This cost method was first used in the **June 30, 1999** valuation.

The asset valuation method is a three-year smoothed market value method in which assumed investment return is recognized immediately each year and differences between actual and assumed investment return are phased-in over a closed three-year period. This asset valuation method is intended to give recognition to the long-term accuracy of market values while filtering out and dampening short term market swings. This method was first used in the **June 30, 1999** valuation.

### Economic Assumptions

**The assumed investment return rate** used in making the valuations was 6.50% per year, compounded annually (net after investment expenses). The **wage inflation rate** was assumed to be 3.00%. The real rate of return over wage growth is defined to be the portion of total investment return, which is more than the rate of wage inflation. The 6.50% investment return rate and 3.00% wage inflation rate translate to an assumed real rate of return over wage growth net of expenses of 3.50%. Based upon other assumptions, the net real rate of return over price inflation is 4.25%.

**Pay increase assumptions for merit and seniority** for individual active members are shown on page 33. Part of the total assumed pay increase at each age is for merit and/or seniority, and the other 3.00% recognizes wage inflation. **The active member payroll** for all members is assumed to increase 3.00% annually for all years.

**The price inflation rate** is assumed to be 2.25% annually. This is the inflation rate upon which the post-retirement increases are based. The difference between wage and price inflation of 0.75% is attributable to overall productivity increases and macroeconomic factors.

**The total number of active members** is assumed to continue at the present total number.





# Summary of Valuation Method and Assumptions

## June 30, 2023 (Continued)

### Non-Economic Assumptions

**Post-Retirement Healthy Mortality Rates** are used to measure the probabilities of members dying after retirement. The rates currently in use are from the Pub-2010 General, Healthy Retiree, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and Pub-2010 Public Safety Healthy Retiree, Amount-Weighted, tables for males and females for Uniformed members. Rates are decreased by 5% for non-uniform males and increased by 4% for uniform males. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on pages 34 and 35.

**Post-Retirement Disabled Mortality Rates.** The rates currently in use for disabled lives are the Pub-2010 General Disabled Retiree, Amount-Weighted tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Disabled Retiree, Amount-Weighted tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on pages 36 and 37.

**Pre-Retirement Mortality Rates.** The rates currently in use for active lives are the Pub-2010 General, Employee, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Employee, Amount-Weighted, tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on pages 38 and 39.

**The probabilities of age and service retirement** are shown on page 41. Upon retirement, members are assumed to pick the BackDROP period that when combined with the remaining annuity produces the highest liability.

**The probabilities of disability** are shown on page 42.

**The probabilities of withdrawal from service** are shown on page 43.

**Employer contributions** were assumed to be **paid in equal installments** throughout the employer fiscal year.

**Present assets (cash & investments)** were used with a market value adjustment. Assets may be used in the valuation prior to the final audit. The exact method is shown on page C-2 of the actuarial valuation report.



## Summary of Valuation Method and Assumptions June 30, 2023 (Concluded)

*The data about persons now covered and about present assets* were furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Data was furnished as of May 31 and assumed to be statistically equivalent to June 30.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA) who has experience performing public plan valuations.



## Service Based Salary Scale

% Merit Increases in Salaries Next Year		
Service Index	Uniformed Members	Non-Uniformed Members
1	6.00%	7.50%
2	4.00%	3.80%
3	3.00%	2.80%
4	2.00%	1.50%
5	2.00%	1.00%
6	1.90%	0.80%
7	1.80%	0.00%
8	1.70%	0.00%
9	1.60%	0.00%
10	1.50%	0.00%
11	1.40%	0.00%
12	1.30%	0.00%
13	1.20%	0.00%
14	1.10%	0.00%
15	1.00%	0.00%
16	0.90%	0.00%
17	0.85%	0.00%
18	0.70%	0.00%
19	0.60%	0.00%
20	0.50%	0.00%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%

# Post-Retirement Mortality

## Non-Uniform Retired Lives Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.0405%	0.0141%	60	1.0655%	0.5519%	100	29.7134%	27.0312%
21	0.0422%	0.0144%	61	1.1097%	0.5711%	101	31.6572%	29.1207%
22	0.0421%	0.0136%	62	1.1504%	0.5916%	102	33.5969%	31.2400%
23	0.0433%	0.0139%	63	1.1892%	0.6138%	103	35.5231%	33.3661%
24	0.0437%	0.0131%	64	1.2253%	0.6367%	104	37.4062%	35.4783%
25	0.0463%	0.0147%	65	1.2627%	0.6616%	105	39.2316%	37.5671%
26	0.0504%	0.0163%	66	1.3519%	0.7175%	106	41.0032%	39.5974%
27	0.0547%	0.0180%	67	1.4546%	0.7812%	107	42.7156%	41.5730%
28	0.0592%	0.0212%	68	1.5697%	0.8555%	108	44.3306%	43.4775%
29	0.0652%	0.0230%	69	1.7016%	0.9408%	109	45.8759%	45.2895%
30	0.0699%	0.0262%	70	1.8506%	1.0405%	110	47.1318%	47.0087%
31	0.0759%	0.0294%	71	2.0192%	1.1562%	111	47.2887%	48.6348%
32	0.0817%	0.0311%	72	2.2097%	1.2892%	112	47.4457%	49.5509%
33	0.0873%	0.0355%	73	2.4274%	1.4434%	113	47.6117%	49.6909%
34	0.0938%	0.0381%	74	2.6755%	1.6201%	114	47.7797%	49.8178%
35	0.0983%	0.0419%	75	2.9586%	1.8224%	115	47.9381%	49.9540%
36	0.1048%	0.0438%	76	3.2813%	2.0518%	116	47.9650%	49.9770%
37	0.1090%	0.0479%	77	3.6468%	2.3122%	117	47.9827%	49.9865%
38	0.1147%	0.0502%	78	4.0620%	2.6102%	118	47.9957%	50.0000%
39	0.1193%	0.0532%	79	4.5325%	2.9477%	119	48.0000%	50.0000%
40	0.1240%	0.0558%	80	5.0640%	3.3335%	120	100.0000%	100.0000%
41	0.1277%	0.0579%	81	5.6677%	3.7758%			
42	0.1329%	0.0598%	82	6.3453%	4.2798%			
43	0.1371%	0.0626%	83	7.0992%	4.8557%			
44	0.1429%	0.0663%	84	7.9350%	5.5128%			
45	0.1815%	0.0874%	85	8.8529%	6.2620%			
46	0.2316%	0.1164%	86	9.8491%	7.1139%			
47	0.2972%	0.1548%	87	10.9198%	8.0753%			
48	0.3837%	0.2079%	88	12.0687%	9.1491%			
49	0.4985%	0.2815%	89	13.2950%	10.3271%			
50	0.6520%	0.3833%	90	14.5853%	11.5947%			
51	0.6771%	0.3957%	91	15.9067%	12.9080%			
52	0.7076%	0.4103%	92	17.2330%	14.2328%			
53	0.7432%	0.4271%	93	18.5605%	15.5669%			
54	0.7821%	0.4453%	94	19.8974%	16.9060%			
55	0.8254%	0.4642%	95	21.2462%	18.2808%			
56	0.8722%	0.4819%	96	22.7482%	19.7956%			
57	0.9203%	0.4995%	97	24.3350%	21.4143%			
58	0.9697%	0.5162%	98	26.0215%	23.1571%			
59	1.0182%	0.5341%	99	27.8244%	25.0298%			

# Post-Retirement Mortality

## Uniform Retired Lives Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.0443%	0.0174%	60	0.5466%	0.4618%	100	32.4991%	27.0312%
21	0.0452%	0.0188%	61	0.6128%	0.5105%	101	34.6251%	29.1207%
22	0.0450%	0.0193%	62	0.6839%	0.5612%	102	36.7466%	31.2400%
23	0.0450%	0.0209%	63	0.7599%	0.6148%	103	38.8534%	33.3661%
24	0.0454%	0.0226%	64	0.8418%	0.6717%	104	40.9130%	35.4783%
25	0.0457%	0.0245%	65	0.9302%	0.7330%	105	42.9096%	37.5671%
26	0.0487%	0.0264%	66	1.0256%	0.7984%	106	44.8473%	39.5974%
27	0.0519%	0.0284%	67	1.1304%	0.8724%	107	46.7202%	41.5730%
28	0.0551%	0.0317%	68	1.2455%	0.9567%	108	48.4866%	43.4775%
29	0.0585%	0.0338%	69	1.3752%	1.0521%	109	50.1768%	45.2895%
30	0.0603%	0.0372%	70	1.5214%	1.1630%	110	51.5504%	47.0087%
31	0.0634%	0.0392%	71	1.6887%	1.2893%	111	51.7221%	48.6348%
32	0.0663%	0.0424%	72	1.8782%	1.4351%	112	51.8937%	49.5509%
33	0.0689%	0.0454%	73	2.0954%	1.6024%	113	52.0753%	49.6909%
34	0.0711%	0.0480%	74	2.3449%	1.7936%	114	52.2590%	49.8178%
35	0.0743%	0.0502%	75	2.6293%	2.0127%	115	52.4323%	49.9540%
36	0.0770%	0.0520%	76	2.9551%	2.2602%	116	52.4617%	49.9770%
37	0.0774%	0.0546%	77	3.3267%	2.5399%	117	52.4811%	49.9865%
38	0.0801%	0.0553%	78	3.7515%	2.8568%	118	52.4953%	50.0000%
39	0.0821%	0.0570%	79	4.2352%	3.2117%	119	52.5000%	50.0000%
40	0.0905%	0.0605%	80	4.7848%	3.6106%	120	100.0000%	100.0000%
41	0.0990%	0.0647%	81	5.4097%	4.0586%			
42	0.1076%	0.0685%	82	6.1156%	4.5581%			
43	0.1177%	0.0730%	83	6.9049%	5.1152%			
44	0.1279%	0.0783%	84	7.7915%	5.7373%			
45	0.1384%	0.0845%	85	8.7813%	6.4302%			
46	0.1452%	0.0918%	86	9.8807%	7.2007%			
47	0.1540%	0.1001%	87	11.0963%	8.0601%			
48	0.1642%	0.1099%	88	12.4429%	9.0189%			
49	0.1767%	0.1221%	89	13.9318%	10.0834%			
50	0.1899%	0.1360%	90	15.5670%	11.2620%			
51	0.2070%	0.1537%	91	17.2406%	12.5225%			
52	0.2261%	0.1734%	92	18.8810%	13.8338%			
53	0.2484%	0.1965%	93	20.4623%	15.1900%			
54	0.2752%	0.2236%	94	21.9876%	16.5811%			
55	0.3066%	0.2548%	95	23.4654%	18.0259%			
56	0.3427%	0.2898%	96	25.0692%	19.6166%			
57	0.3844%	0.3279%	97	26.7440%	21.3065%			
58	0.4327%	0.3696%	98	28.5283%	23.1054%			
59	0.4866%	0.4138%	99	30.4538%	25.0154%			

# Post-Retirement Mortality (Disability)

## Non-Uniform Disabled Retired Lives Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.4245%	0.2529%	60	2.5653%	2.0254%	100	30.9515%	27.0312%
21	0.4046%	0.2384%	61	2.6645%	2.0543%	101	32.9763%	29.1207%
22	0.3771%	0.2201%	62	2.7631%	2.0777%	102	34.9968%	31.2400%
23	0.3479%	0.2046%	63	2.8628%	2.0991%	103	37.0032%	33.3661%
24	0.3284%	0.1955%	64	2.9622%	2.1203%	104	38.9648%	35.4783%
25	0.3271%	0.2006%	65	3.0610%	2.1475%	105	40.8663%	37.5671%
26	0.3563%	0.2248%	66	3.1598%	2.1832%	106	42.7117%	39.5974%
27	0.3875%	0.2526%	67	3.2609%	2.2334%	107	44.4954%	41.5730%
28	0.4214%	0.2842%	68	3.3657%	2.3013%	108	46.1777%	43.4775%
29	0.4577%	0.3179%	69	3.4793%	2.3905%	109	47.7874%	45.2895%
30	0.4957%	0.3545%	70	3.6049%	2.5045%	110	49.0956%	47.0087%
31	0.5347%	0.3936%	71	3.7499%	2.6438%	111	49.2591%	48.6348%
32	0.5740%	0.4341%	72	3.9166%	2.8120%	112	49.4226%	49.5509%
33	0.6127%	0.4767%	73	4.1119%	3.0102%	113	49.5955%	49.6909%
34	0.6526%	0.5183%	74	4.3383%	3.2419%	114	49.7705%	49.8178%
35	0.6896%	0.5596%	75	4.6007%	3.5106%	115	49.9355%	49.9540%
36	0.7268%	0.5990%	76	4.9004%	3.8158%	116	49.9635%	49.9770%
37	0.7632%	0.6375%	77	5.2431%	4.1618%	117	49.9820%	49.9865%
38	0.7992%	0.6743%	78	5.6313%	4.5521%	118	49.9955%	50.0000%
39	0.8340%	0.7107%	79	6.0703%	4.9885%	119	50.0000%	50.0000%
40	0.8684%	0.7465%	80	6.5618%	5.4742%	120	100.0000%	100.0000%
41	0.9041%	0.7825%	81	7.1132%	6.0145%			
42	0.9425%	0.8198%	82	7.7222%	6.6107%			
43	0.9842%	0.8602%	83	8.3879%	7.2659%			
44	1.0331%	0.9055%	84	9.1152%	7.9839%			
45	1.0881%	0.9570%	85	9.9011%	8.7694%			
46	1.1531%	1.0151%	86	10.7453%	9.5887%			
47	1.2272%	1.0821%	87	11.6502%	10.4281%			
48	1.3114%	1.1602%	88	12.6264%	11.2813%			
49	1.4059%	1.2509%	89	13.8490%	12.1445%			
50	1.5119%	1.3535%	90	15.1930%	13.0254%			
51	1.5992%	1.4124%	91	16.5695%	13.9481%			
52	1.6941%	1.4798%	92	17.9510%	14.9229%			
53	1.7962%	1.5565%	93	19.3339%	15.9734%			
54	1.9046%	1.6378%	94	20.7265%	17.1071%			
55	2.0172%	1.7206%	95	22.1315%	18.3502%			
56	2.1317%	1.8000%	96	23.6960%	19.7966%			
57	2.2440%	1.8725%	97	25.3490%	21.4143%			
58	2.3553%	1.9346%	98	27.1057%	23.1571%			
59	2.4619%	1.9851%	99	28.9837%	25.0298%			

# Post-Retirement Mortality (Disability)

## Uniform Disabled Retired Lives Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.1247%	0.0575%	60	0.7533%	0.7238%	100	30.9515%	27.0312%
21	0.1268%	0.0621%	61	0.8342%	0.7806%	101	32.9763%	29.1207%
22	0.1264%	0.0658%	62	0.9186%	0.8368%	102	34.9968%	31.2400%
23	0.1255%	0.0697%	63	1.0074%	0.8934%	103	37.0032%	33.3661%
24	0.1261%	0.0739%	64	1.0981%	0.9501%	104	38.9648%	35.4783%
25	0.1294%	0.0795%	65	1.1926%	1.0100%	105	40.8663%	37.5671%
26	0.1379%	0.0879%	66	1.2905%	1.0730%	106	42.7117%	39.5974%
27	0.1456%	0.0954%	67	1.3946%	1.1431%	107	44.4954%	41.5730%
28	0.1536%	0.1044%	68	1.5052%	1.2210%	108	46.1777%	43.4775%
29	0.1630%	0.1136%	69	1.6260%	1.3083%	109	47.7874%	45.2895%
30	0.1708%	0.1228%	70	1.7622%	1.4089%	110	49.0956%	47.0087%
31	0.1797%	0.1331%	71	1.9174%	1.5224%	111	49.2591%	48.6348%
32	0.1879%	0.1428%	72	2.0998%	1.6512%	112	49.4226%	49.5509%
33	0.1953%	0.1518%	73	2.3157%	1.7971%	113	49.5955%	49.6909%
34	0.2015%	0.1610%	74	2.5719%	1.9601%	114	49.7705%	49.8178%
35	0.2078%	0.1689%	75	2.8719%	2.1425%	115	49.9355%	49.9540%
36	0.2139%	0.1764%	76	3.2162%	2.3467%	116	49.9635%	49.9770%
37	0.2195%	0.1823%	77	3.6058%	2.5764%	117	49.9820%	49.9865%
38	0.2246%	0.1866%	78	4.0352%	2.8568%	118	49.9955%	50.0000%
39	0.2291%	0.1919%	79	4.4998%	3.2117%	119	50.0000%	50.0000%
40	0.2343%	0.1946%	80	4.9990%	3.6106%	120	100.0000%	100.0000%
41	0.2377%	0.1987%	81	5.5433%	4.0586%			
42	0.2434%	0.2022%	82	6.1426%	4.5581%			
43	0.2478%	0.2065%	83	6.8089%	5.1152%			
44	0.2538%	0.2108%	84	7.5653%	5.7373%			
45	0.2615%	0.2167%	85	8.4345%	6.4302%			
46	0.2703%	0.2252%	86	9.4102%	7.2007%			
47	0.2814%	0.2346%	87	10.5679%	8.0601%			
48	0.2951%	0.2463%	88	11.8504%	9.0189%			
49	0.3127%	0.2606%	89	13.2684%	10.0834%			
50	0.3325%	0.2774%	90	14.8257%	11.2620%			
51	0.3484%	0.3036%	91	16.4196%	12.5225%			
52	0.3681%	0.3348%	92	17.9819%	13.8338%			
53	0.3927%	0.3701%	93	19.4879%	15.1900%			
54	0.4224%	0.4104%	94	20.9406%	16.5811%			
55	0.4580%	0.4553%	95	22.3480%	18.0259%			
56	0.5007%	0.5041%	96	23.8754%	19.6166%			
57	0.5521%	0.5557%	97	25.4705%	21.3065%			
58	0.6121%	0.6112%	98	27.1698%	23.1054%			
59	0.6794%	0.6669%	99	29.0036%	25.0154%			



# Pre-Retirement Mortality

## Non-Uniform Death-in-Service Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.0422%	0.0141%	60	0.4776%	0.2464%	100	30.9515%	27.0312%
21	0.0440%	0.0144%	61	0.5176%	0.2671%	101	32.9763%	29.1207%
22	0.0439%	0.0136%	62	0.5594%	0.2887%	102	34.9968%	31.2400%
23	0.0451%	0.0139%	63	0.6013%	0.3114%	103	37.0032%	33.3661%
24	0.0455%	0.0131%	64	0.6428%	0.3349%	104	38.9648%	35.4783%
25	0.0482%	0.0147%	65	0.6858%	0.3617%	105	40.8663%	37.5671%
26	0.0525%	0.0163%	66	0.7293%	0.3899%	106	42.7117%	39.5974%
27	0.0570%	0.0180%	67	0.7771%	0.4221%	107	44.4954%	41.5730%
28	0.0617%	0.0212%	68	0.8271%	0.4586%	108	46.1777%	43.4775%
29	0.0679%	0.0230%	69	0.8844%	0.5009%	109	47.7874%	45.2895%
30	0.0728%	0.0262%	70	0.9472%	0.5487%	110	49.0956%	47.0087%
31	0.0791%	0.0294%	71	1.0193%	0.6029%	111	49.2591%	48.6348%
32	0.0851%	0.0311%	72	1.1009%	0.6659%	112	49.4226%	49.5509%
33	0.0909%	0.0355%	73	1.1936%	0.7369%	113	49.5955%	49.6909%
34	0.0977%	0.0381%	74	1.2988%	0.8170%	114	49.7705%	49.8178%
35	0.1024%	0.0419%	75	1.4169%	0.9086%	115	49.9355%	49.9540%
36	0.1092%	0.0438%	76	1.5497%	1.0109%	116	49.9635%	49.9770%
37	0.1135%	0.0479%	77	1.6984%	1.1254%	117	49.9820%	49.9865%
38	0.1195%	0.0502%	78	1.8641%	1.2531%	118	49.9955%	50.0000%
39	0.1243%	0.0532%	79	2.0484%	1.3952%	119	50.0000%	50.0000%
40	0.1292%	0.0558%	80	2.2530%	1.5538%	120	100.0000%	100.0000%
41	0.1330%	0.0579%	81	2.8995%	2.0054%			
42	0.1384%	0.0598%	82	3.7326%	2.5869%			
43	0.1428%	0.0626%	83	4.8041%	3.3348%			
44	0.1489%	0.0663%	84	6.1857%	4.2959%			
45	0.1545%	0.0700%	85	7.9667%	5.5299%			
46	0.1622%	0.0738%	86	10.2595%	7.1139%			
47	0.1709%	0.0779%	87	11.3748%	8.0753%			
48	0.1808%	0.0833%	88	12.5716%	9.1491%			
49	0.1922%	0.0902%	89	13.8490%	10.3271%			
50	0.2053%	0.0977%	90	15.1930%	11.5947%			
51	0.2205%	0.1058%	91	16.5695%	12.9080%			
52	0.2376%	0.1156%	92	17.9510%	14.2328%			
53	0.2571%	0.1272%	93	19.3339%	15.5669%			
54	0.2800%	0.1404%	94	20.7265%	16.9060%			
55	0.3054%	0.1551%	95	22.1315%	18.2808%			
56	0.3341%	0.1710%	96	23.6960%	19.7956%			
57	0.3651%	0.1890%	97	25.3490%	21.4143%			
58	0.4000%	0.2065%	98	27.1057%	23.1571%			
59	0.4380%	0.2261%	99	28.9837%	25.0298%			



# Pre-Retirement Mortality

## Uniform Death-in-Service Mortality Rates

Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year		Age in 2023	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.0422%	0.0174%	60	0.2706%	0.1740%	100	30.9515%	27.0312%
21	0.0430%	0.0188%	61	0.2970%	0.1828%	101	32.9763%	29.1207%
22	0.0429%	0.0193%	62	0.3251%	0.1925%	102	34.9968%	31.2400%
23	0.0429%	0.0209%	63	0.3536%	0.2010%	103	37.0032%	33.3661%
24	0.0432%	0.0226%	64	0.3820%	0.2093%	104	38.9648%	35.4783%
25	0.0435%	0.0245%	65	0.4123%	0.2170%	105	40.8663%	37.5671%
26	0.0464%	0.0264%	66	0.4602%	0.2438%	106	42.7117%	39.5974%
27	0.0494%	0.0284%	67	0.5116%	0.2735%	107	44.4954%	41.5730%
28	0.0525%	0.0317%	68	0.5702%	0.3090%	108	46.1777%	43.4775%
29	0.0557%	0.0338%	69	0.6346%	0.3498%	109	47.7874%	45.2895%
30	0.0574%	0.0372%	70	0.7079%	0.3973%	110	49.0956%	47.0087%
31	0.0604%	0.0392%	71	0.7914%	0.4532%	111	49.2591%	48.6348%
32	0.0631%	0.0424%	72	0.8872%	0.5192%	112	49.4226%	49.5509%
33	0.0656%	0.0454%	73	0.9969%	0.5961%	113	49.5955%	49.6909%
34	0.0677%	0.0480%	74	1.1228%	0.6862%	114	49.7705%	49.8178%
35	0.0708%	0.0502%	75	1.2689%	0.7919%	115	49.9355%	49.9540%
36	0.0733%	0.0520%	76	1.4355%	0.9147%	116	49.9635%	49.9770%
37	0.0737%	0.0546%	77	1.6276%	1.0578%	117	49.9820%	49.9865%
38	0.0763%	0.0553%	78	1.8481%	1.2244%	118	49.9955%	50.0000%
39	0.0782%	0.0570%	79	2.1009%	1.4160%	119	50.0000%	50.0000%
40	0.0794%	0.0582%	80	2.3888%	1.6376%	120	100.0000%	100.0000%
41	0.0801%	0.0591%	81	3.0009%	2.1000%			
42	0.0828%	0.0609%	82	3.7714%	2.6905%			
43	0.0838%	0.0615%	83	4.7389%	3.4446%			
44	0.0857%	0.0632%	84	5.9563%	4.4072%			
45	0.0886%	0.0651%	85	7.4878%	5.6351%			
46	0.0915%	0.0672%	86	9.4102%	7.2007%			
47	0.0955%	0.0705%	87	10.5679%	8.0601%			
48	0.0997%	0.0733%	88	11.8504%	9.0189%			
49	0.1062%	0.0774%	89	13.2684%	10.0834%			
50	0.1130%	0.0831%	90	14.8257%	11.2620%			
51	0.1205%	0.0893%	91	16.4196%	12.5225%			
52	0.1305%	0.0960%	92	17.9819%	13.8338%			
53	0.1412%	0.1035%	93	19.4879%	15.1900%			
54	0.1527%	0.1123%	94	20.9406%	16.5811%			
55	0.1670%	0.1215%	95	22.3480%	18.0259%			
56	0.1840%	0.1318%	96	23.8754%	19.6166%			
57	0.2018%	0.1430%	97	25.4705%	21.3065%			
58	0.2230%	0.1528%	98	27.1698%	23.1054%			
59	0.2464%	0.1639%	99	29.0036%	25.0154%			

## Illustrative Annuity Values (6.50% Interest)

### Non-Uniform

Sample Attained Ages in 2023	Single Life Retirement Values					
	Present Value of \$1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Male	Female	Male	Female	Male	Female
50	\$155.47	\$164.57	0.6520%	0.3833%	32.62	37.02
55	147.73	157.98	0.8254%	0.4642%	28.27	32.35
60	138.27	149.42	1.0655%	0.5519%	24.07	27.75
65	126.50	138.16	1.2627%	0.6616%	19.98	23.19
70	111.76	123.74	1.8506%	1.0405%	16.01	18.75
75	94.90	106.60	2.9586%	1.8224%	12.37	14.60
80	76.89	87.55	5.0640%	3.3335%	9.18	10.89

### Uniform

Sample Attained Ages in 2023	Single Life Retirement Values					
	Present Value of \$1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Male	Female	Male	Female	Male	Female
50	\$163.07	\$166.54	0.1899%	0.1360%	34.92	37.38
55	154.16	158.50	0.3066%	0.2548%	29.91	32.31
60	142.95	148.56	0.5466%	0.4618%	25.08	27.44
65	129.55	136.60	0.9302%	0.7330%	20.53	22.82
70	113.85	122.18	1.5214%	1.1630%	16.30	18.45
75	95.94	105.29	2.6293%	2.0127%	12.45	14.40
80	76.77	86.87	4.7848%	3.6106%	9.09	10.82

The present values shown above are for illustrative purposes only. They are straight life amounts and do not include the value of future post-retirement increases.

## Rates of Retirement

Age	% of Active Participants Retiring								
	Closed and Year 2000 Plans					2011 Tier			
	Non-Uniformed Members				Uniformed	Non-Uniformed Members			Uniformed
	Male		Female			Normal		Early	
	Normal	Early	Normal	Early	Normal	Age & Service	Rule of 90		Normal
50	39%		25%		45%				
51	35%		19%		15%				
52	27%		23%		18%				
53	22%		21%		16%				
54	21%		23%		19%				
55	25%	3%	28%	3%	26%		30%		30%
56	27%	3%	29%	3%	30%		30%		30%
57	24%	3%	29%	4%	28%		30%		30%
58	21%	3%	26%	4%	30%		30%		30%
59	22%	3%	29%	5%	40%		30%		30%
60	21%	5%	23%	5%	100%		30%		100%
61	19%	5%	22%	5%	100%		30%		100%
62	32%	28%	33%	20%	100%		30%	10%	100%
63	32%	25%	22%	20%	100%		30%	10%	100%
64	22%	21%	16%	20%	100%		30%	10%	100%
65	30%		39%		100%		30%	10%	100%
66	40%		45%		100%		30%	10%	100%
67	40%		40%		100%	50%	30%		100%
68	30%		40%		100%	50%	30%		100%
69	30%		40%		100%	50%	30%		100%
70	40%		50%		100%	100%	100%		100%
71	50%		50%		100%	100%	100%		100%
72	50%		100%		100%	100%	100%		100%
73	50%		100%		100%	100%	100%		100%
74	100%		100%		100%	100%	100%		100%

# Rates of Disability

## All Plan Participants

Age	% of Active Participants Becoming Disabled			
	Uniformed Members		Non-Uniformed Members	
	Male	Female	Male	Female
20	0.10%	0.10%	0.06%	0.06%
21	0.10%	0.10%	0.06%	0.06%
22	0.10%	0.10%	0.07%	0.07%
23	0.10%	0.10%	0.07%	0.07%
24	0.10%	0.10%	0.07%	0.07%
25	0.10%	0.10%	0.08%	0.08%
26	0.10%	0.10%	0.08%	0.08%
27	0.10%	0.10%	0.09%	0.09%
28	0.10%	0.10%	0.09%	0.09%
29	0.10%	0.10%	0.09%	0.09%
30	0.10%	0.10%	0.09%	0.09%
31	0.10%	0.10%	0.09%	0.09%
32	0.10%	0.10%	0.10%	0.10%
33	0.10%	0.10%	0.10%	0.10%
34	0.10%	0.10%	0.11%	0.11%
35	0.10%	0.10%	0.12%	0.12%
36	0.10%	0.10%	0.12%	0.12%
37	0.10%	0.10%	0.13%	0.13%
38	0.10%	0.10%	0.14%	0.14%
39	0.10%	0.10%	0.14%	0.14%
40	0.10%	0.10%	0.16%	0.16%
41	0.10%	0.10%	0.18%	0.18%
42	0.10%	0.10%	0.20%	0.20%
43	0.10%	0.10%	0.21%	0.21%
44	0.10%	0.10%	0.23%	0.23%
45	0.10%	0.10%	0.26%	0.26%
46	0.10%	0.10%	0.28%	0.28%
47	0.10%	0.10%	0.31%	0.31%
48	0.10%	0.10%	0.34%	0.34%
49	0.10%	0.10%	0.38%	0.38%
50	0.10%	0.10%	0.43%	0.43%
51	0.10%	0.10%	0.49%	0.49%
52	0.10%	0.10%	0.56%	0.56%
53	0.10%	0.10%	0.64%	0.64%
54	0.10%	0.10%	0.72%	0.72%
55	0.10%	0.10%	0.82%	0.82%
56	0.10%	0.10%	0.92%	0.92%
57	0.10%	0.10%	1.03%	1.03%
58	0.10%	0.10%	1.15%	1.15%
59	0.10%	0.10%	1.28%	1.28%
60	0.10%	0.10%	1.41%	1.41%
61	0.10%	0.10%	1.55%	1.55%
62	0.10%	0.10%	1.70%	1.70%
63	0.10%	0.10%	1.86%	1.86%
64	0.10%	0.10%	2.03%	2.03%
65	0.10%	0.10%	0.00%	0.00%
66	0.10%	0.10%	0.00%	0.00%
67	0.10%	0.10%	0.00%	0.00%
68	0.10%	0.10%	0.00%	0.00%
69	0.10%	0.10%	0.00%	0.00%
70	0.10%	0.10%	0.00%	0.00%
71	0.10%	0.10%	0.00%	0.00%
72	0.10%	0.10%	0.00%	0.00%

# Rates of Separation from Active Employment

## All Plan Participants

Age	Service	% of Active Participants Withdrawing			
		Uniformed Members		Non-Uniformed Members	
		Male	Female	Male	Female
	0-1	10.00%	10.00%	28.00%	22.00%
	1-2	6.00%	6.00%	18.50%	15.00%
	2-3	3.25%	3.25%	12.50%	14.00%
	3-4	3.00%	3.00%	9.00%	12.00%
	4-5	2.75%	2.75%	8.00%	7.00%
25	5 & Up	3.51%	3.51%	9.04%	10.40%
26		3.51%	3.51%	9.04%	10.40%
27		3.51%	3.51%	9.04%	10.40%
28		3.51%	3.51%	8.71%	10.08%
29		3.51%	3.51%	8.38%	9.75%
30		3.51%	3.51%	8.05%	9.43%
31		3.51%	3.51%	7.73%	9.10%
32		3.39%	3.39%	7.41%	8.78%
33		3.07%	3.07%	7.10%	8.35%
34		2.77%	2.77%	6.79%	7.92%
35		2.49%	2.49%	6.48%	7.49%
36		2.22%	2.22%	6.18%	7.06%
37		1.97%	1.97%	5.89%	6.63%
38		1.76%	1.76%	5.60%	6.33%
39		1.59%	1.59%	5.31%	6.03%
40		1.47%	1.47%	5.04%	5.73%
41		1.37%	1.37%	4.77%	5.43%
42		1.28%	1.28%	4.51%	5.14%
43		1.19%	1.19%	4.26%	4.97%
44		1.11%	1.11%	4.02%	4.80%
45		1.02%	1.02%	3.78%	4.63%
46	0.94%	0.94%	3.55%	4.46%	
47	0.85%	0.85%	3.34%	4.29%	
48	0.76%	0.76%	3.14%	4.17%	
49	0.67%	0.67%	2.95%	4.06%	
50	0.59%	0.59%	2.76%	3.94%	
51	0.50%	0.50%	2.60%	3.82%	
52	0.43%	0.43%	2.43%	3.71%	
53	0.38%	0.38%	2.29%	3.71%	
54	0.36%	0.36%	2.15%	3.71%	
55	0.30%	0.30%	2.02%	3.71%	
56	0.32%	0.32%	1.93%	3.71%	
57	0.24%	0.24%	1.83%	3.71%	
58	0.24%	0.24%	1.75%	3.71%	
59	0.23%	0.23%	1.68%	3.71%	
60	0.22%	0.22%	1.64%	3.71%	

## Miscellaneous and Technical Assumptions

<b>Administrative Expenses:</b>	1.340% of payroll, based upon actual results from previous year.
<b>Disability Expenses:</b>	0.475% of payroll included in contribution. Retirement system pays premium directly to an outside insurance company or TPA.
<b>Marriage Assumption:</b>	90% of participants are assumed to be married for purposes of death-in-service benefits. Applies to disabled members entitled to future retirement benefits also. Male spouses are assumed to be 3 years older than females if beneficiary information is not available. For purposes of valuing the 50% death after retirement benefit, 100% of closed active members are assumed to be married.
<b>Pay Increase Timing:</b>	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	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.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is a 50% joint & survivor benefit for married members in the Closed plan and a straight life benefit for all other members.
<b>Optional Benefit Factors:</b>	Optional Benefit Factors are in accordance with tables adopted by the Board. We believe these factors are reasonably close to actuarial equivalence based on valuation assumptions. The reduction for the Y2K and 2011 Tier benefits was calculated in accordance with 104.1027 RSMo.
<b>Deferred Joint and Survivor:</b>	It was assumed that all deferred members eligible for the Closed plan would choose Closed plan benefits at retirement.
<b>Other:</b>	Turnover decrements do not operate during retirement eligibility.
<b>Miscellaneous Adjustments:</b>	The calculated normal and early retirement benefits were increased by 3.75% for Uniformed and 2.3% for Non-Uniformed to account for the inclusion of unused sick leave in the calculation of Average Pay. The calculated normal and early retirement benefits were further increased by 2% for the Closed and Year 2000 plan Uniform members for end of career increases in compensation. Post-disability benefit liabilities were increased by 25% for all future disabilities to account for potential survivor benefits payable by the retirement system during the period of disability. Current self-insured disability retiree liabilities are increased by 12% to account for future survivor benefits.

## Miscellaneous and Technical Assumptions

<b>Miscellaneous Adjustments:</b>	Liabilities for future deferred members were increased by 3% to account for potential survivor benefits payable if the member dies during the deferred period. We have otherwise not modeled this benefit for future deferred members.
<b>COLA:</b>	The COLA is assumed to be 80% of the price inflation assumption of 2.25%. This results in a 1.80% annual COLA assumption (Closed Plan members hired prior to August 28, 1997 receive a minimum 4% COLA. These increases are made until the total of the increases reaches 65% of initial benefit at which time the increases will have the minimum removed). All COLAs are assumed to be paid on the anniversary of retirement.
<b>Contribution Stabilization Reserve Fund:</b>	The contribution stabilization reserve fund affects the total amount of UAAL financed and is assumed to grow at the investment return rate.
<b>Death Prior to Retirement:</b>	100% of deaths in service are assumed to be non-duty.
<b>Gainful Employment Offset:</b>	30% of the \$90 per month special benefit is assumed to be offset by gainful employment.
<b>Minimum Benefit Eligibility:</b>	Death prior to retirement benefits are assumed to be eligible for the minimum base benefit along with normal and early retirement benefits.
<b>Active Plan Choice:</b>	It was assumed that active members eligible for the Closed plan would choose the Closed plan benefits at retirement.
<b>Member Contribution Interest:</b>	Member contributions are assumed to be credited with 3.0% interest.

## Data

Active and retired member data was reported as of May 31. It was brought forward to June 30 by adding one month of service for all active members and otherwise making no other adjustments. It was assumed that the population as of May 31 was statistically equivalent to the population as of June 30. Financial information is reported as of June 30.

**Active Member Data:** No Adjustments.

**Salary Adjustments:** Salary from data as provided in prior valuations was used for sixteen active members on leave. Salary for new hires was annualized.

**Disabled Member Data:** Y2K and 2011 Tier data as provided are increased by 80% of CPI from date of disability to the valuation date and projected increases from the valuation date to the retirement date at 2.0% annually. For purposes of valuing these benefits, the 2.0% projected annual increases are backed out and replaced with 1.8% (80% of the current 2.25% CPI assumption) projected annual increases.

**Deferred Member Data:** Nine Terminated Vested members were indicated to have a refund request in progress. As a result, we removed them from the Terminated Vested data file.

**Reconciliation and Review:** Reported data was reconciled to data reported for the prior year and reviewed for completeness and reasonableness. Any questions arising from this review were discussed with System staff. Upon completion of the review, control totals (see page 1 of the June 30, 2023 actuarial valuation report) were shared with the Executive Director and discussed to ensure MPERS also agreed that the data was reasonable.



## Method of Financing Future Benefits for Present Active Members

The valuation was prepared in accordance with Section 104.1066 of the Missouri Revised Statutes, which requires the use of the entry-age normal actuarial cost method for determining normal cost and level percent-of-payroll financing of unfunded actuarial accrued liabilities. Details of the application of these methods are described below.

**Normal cost** and the allocation of present 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.

The **Value of Future Benefits** was calculated using the benefits assumed to be payable in the future to current active, terminated vested and retired members. It was assumed that current active and retired Uniformed Patrol members hired prior to July 1, 2000 would elect to retain the benefits under the current plan. Computed costs were increased in accordance with the adjustments described on pages 44 and 45.

The **Present Value of Future Normal Costs** was defined as the average normal cost rate multiplied by the present value of future payroll for the group.

The **Actuarial Accrued Liabilities** were defined as the difference between the present value of future benefits and the present value of future normal costs.

The **Contribution Stabilization Reserve Fund (CSR)** is set by the Board based on deferred recognition of gains in an effort to stabilize employer contributions from year to year. The fund is capped at \$250,000,000.

Actuarial Accrued Liabilities, less pension assets as of June 30, 2023, resulted in **Unfunded Actuarial Accrued Liabilities (UAAL)**. The UAAL plus the CSR was amortized using the following funding policy.

The total contribution is based on normal cost plus a 1-year amortization period for unfunded retiree liabilities and a 16-year amortization period for other unfunded liabilities. Both amortization periods are closed periods starting July 1, 2024.

**Post-Valuation Date Activity:** No other adjustments were made to the valuation results to reflect other post-valuation date activity.





## **SECTION G**

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### **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 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 assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a “risk-free” 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 3.86%; and the resulting single discount rate is 6.50%.

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 SDR. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

The tables shown on pages 48 through 50 show the projected contributions on behalf of the current members. This contribution is based on the current funding policy. The amortization of UAL is similar to the amortization schedule shown in the June 30, 2023 valuation report and includes the effects of the \$250,000,000 Contribution Stabilization Reserve Fund. However, the schedule was adjusted for the use of market value of assets instead of actuarial value of assets and to allow the Contribution Stabilization Reserve Fund to grow until reaching \$250 million. Once the maximum Contribution Stabilization Reserve Fund was reached, contributions were reduced, but not below \$0.

The tables shown on pages 51 and 52 show that the present value of projected unfunded benefit payments using the municipal bond rate is \$0. Therefore, we used the market rate of assumed investment return for all periods in the valuation.

**The Projected Total Contributions shown are based on a closed group projection and are therefore not applicable for funding purposes of the open group.**



# Single Discount Rate Development

## Projection of Contributions Ending June 30, 2073

Year	Valuation Payroll for Current Employees	Contributions from Current Employees	Service Cost and Expense Contributions	UAL Contributions	Total Contributions
0	\$ 389,324,743				
1	384,218,743	\$ 6,805,658	\$ 44,956,750	\$ 194,948,020	\$ 246,710,428
2	359,112,846	6,490,924	41,813,940	184,027,477	232,332,342
3	336,668,460	6,263,898	38,888,474	144,990,692	190,143,064
4	316,068,346	6,076,696	36,154,323	149,340,412	191,571,430
5	296,537,626	5,910,496	33,565,292	153,820,625	193,296,413
6	277,676,089	5,753,018	31,078,030	158,435,244	195,266,292
7	259,738,265	5,604,058	28,734,779	163,188,301	197,527,138
8	243,030,386	5,468,917	26,574,519	168,083,950	200,127,386
9	227,189,217	5,340,111	24,539,008	173,126,468	203,005,587
10	212,146,260	5,215,529	22,616,288	178,320,262	206,152,080
11	197,961,944	5,096,207	20,819,548	183,669,871	209,585,625
12	184,617,941	4,978,685	19,139,885	189,179,967	213,298,537
13	172,455,490	4,867,581	17,617,800	194,855,366	217,340,747
14	161,144,545	4,760,093	16,205,459	200,701,026	221,666,578
15	150,551,066	4,655,191	14,879,245	190,119,821	209,654,258
16	140,739,276	4,550,159	13,642,358	-	18,192,517
17	131,873,093	4,438,699	12,533,672	-	16,972,372
18	123,982,851	4,319,661	11,565,831	-	15,885,492
19	116,711,491	4,189,646	10,696,685	-	14,886,331
20	109,722,184	4,036,844	9,887,984	-	13,924,827
21	102,661,010	3,851,548	9,103,194	-	12,954,742
22	95,256,307	3,629,902	8,304,619	-	11,934,520
23	87,631,251	3,381,557	7,510,265	-	10,891,821
24	79,979,740	3,116,587	6,750,785	-	9,867,372
25	71,909,920	2,823,074	5,977,411	-	8,800,484
26	63,583,873	2,509,139	5,205,161	-	7,714,300
27	55,357,253	2,191,124	4,465,393	-	6,656,517
28	47,347,247	1,878,248	3,763,169	-	5,641,417
29	39,739,371	1,579,253	3,117,642	-	4,696,894
30	32,494,081	1,293,138	2,510,817	-	3,803,955
31	25,783,165	1,027,149	1,954,411	-	2,981,560
32	19,773,915	788,367	1,462,290	-	2,250,657
33	14,595,999	582,292	1,051,328	-	1,633,620
34	10,373,764	414,074	725,237	-	1,139,311
35	7,087,945	283,045	474,824	-	757,869
36	4,663,073	186,279	294,489	-	480,768
37	2,984,909	119,279	173,659	-	292,937
38	1,928,441	77,087	103,472	-	180,558
39	1,219,956	48,778	58,826	-	107,604
40	767,378	30,688	32,663	-	63,351
41	515,631	20,624	21,580	-	42,203
42	339,094	13,564	13,894	-	27,458
43	213,660	8,546	8,412	-	16,958
44	132,718	5,309	4,961	-	10,270
45	82,662	3,306	3,086	-	6,393
46	47,205	1,888	1,596	-	3,484
47	23,623	945	707	-	1,652
48	11,115	445	352	-	797
49	5,071	203	105	-	308
50	1,603	64	45	-	109



# Single Discount Rate Development

## Projection of Plan Fiduciary Net Position Ending June 30, 2123

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 6.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
1	\$ 3,281,627,844	\$ 246,710,428	\$ 288,951,697	\$ 5,148,531	\$ 211,789,887	\$ 3,446,027,931
2	3,446,027,931	232,332,342	297,054,235	4,812,112	221,767,536	3,598,261,462
3	3,598,261,462	190,143,064	305,150,978	4,511,357	230,063,768	3,708,805,959
4	3,708,805,959	191,571,430	313,136,581	4,235,316	237,048,235	3,820,053,727
5	3,820,053,727	193,296,413	320,931,880	3,973,604	244,093,532	3,932,538,189
6	3,932,538,189	195,266,292	328,559,176	3,720,860	251,232,136	4,046,756,580
7	4,046,756,580	197,527,138	335,379,388	3,480,493	258,518,173	4,163,942,010
8	4,163,942,010	200,127,386	342,123,382	3,256,607	266,009,836	4,284,699,243
9	4,284,699,243	203,005,587	348,774,574	3,044,336	273,745,155	4,409,631,075
10	4,409,631,075	206,152,080	354,807,869	2,842,760	281,779,828	4,539,912,354
11	4,539,912,354	209,585,625	360,823,443	2,652,690	290,171,596	4,676,193,443
12	4,676,193,443	213,298,537	365,363,288	2,473,880	299,009,135	4,820,663,947
13	4,820,663,947	217,340,747	369,242,688	2,310,904	308,410,139	4,974,861,241
14	4,974,861,241	221,666,578	374,186,064	2,159,337	318,482,034	5,140,664,451
15	5,140,664,451	209,654,258	374,426,324	2,017,384	328,807,866	5,302,682,867
16	5,302,682,867	18,192,517	375,656,025	1,885,906	333,179,384	5,276,512,837
17	5,276,512,837	16,972,372	375,271,642	1,767,099	331,455,397	5,247,901,865
18	5,247,901,865	15,885,492	374,063,822	1,661,370	329,602,935	5,217,665,100
19	5,217,665,100	14,886,331	371,467,962	1,563,934	327,691,738	5,187,211,273
20	5,187,211,273	13,924,827	368,060,289	1,470,277	325,793,484	5,157,399,018
21	5,157,399,018	12,954,742	364,588,123	1,375,658	323,938,752	5,128,328,731
22	5,128,328,731	11,934,520	361,613,589	1,276,435	322,114,872	5,099,488,099
23	5,099,488,099	10,891,821	358,852,672	1,174,259	320,298,463	5,070,651,452
24	5,070,651,452	9,867,372	355,946,133	1,071,729	318,487,565	5,041,988,527
25	5,041,988,527	8,800,484	353,314,828	963,593	316,677,977	5,013,188,567
26	5,013,188,567	7,714,300	350,319,487	852,024	314,870,620	4,984,601,976
27	4,984,601,976	6,656,517	347,239,458	741,787	313,080,706	4,956,357,955
28	4,956,357,955	5,641,417	343,717,945	634,453	311,328,454	4,928,975,428
29	4,928,975,428	4,696,894	339,712,064	532,508	309,649,779	4,903,077,529
30	4,903,077,529	3,803,955	335,290,339	435,421	308,082,401	4,879,238,125
31	4,879,238,125	2,981,560	330,271,724	345,494	306,669,947	4,858,272,414
32	4,858,272,414	2,250,657	324,242,376	264,970	305,479,240	4,841,494,965
33	4,841,494,965	1,633,620	317,433,945	195,586	304,588,978	4,830,088,032
34	4,830,088,032	1,139,311	309,679,939	139,008	304,081,563	4,825,489,959
35	4,825,489,959	757,869	300,929,684	94,978	304,051,801	4,829,274,967
36	4,829,274,967	480,768	291,501,958	62,485	304,591,580	4,842,782,873
37	4,842,782,873	292,937	281,452,815	39,998	305,785,760	4,867,368,758
38	4,867,368,758	180,558	270,756,270	25,841	307,722,866	4,904,490,071
39	4,904,490,071	107,604	259,837,950	16,347	310,482,981	4,955,226,359
40	4,955,226,359	63,351	249,050,776	10,283	314,124,682	5,020,353,333
41	5,020,353,333	42,203	238,005,508	6,909	318,710,687	5,101,093,806
42	5,101,093,806	27,458	226,834,290	4,544	324,315,771	5,198,598,200
43	5,198,598,200	16,958	215,898,407	2,863	331,003,095	5,313,716,983
44	5,313,716,983	10,270	205,019,454	1,778	338,833,637	5,447,539,657
45	5,447,539,657	6,393	194,067,668	1,108	347,882,338	5,601,359,612
46	5,601,359,612	3,484	183,152,526	633	358,229,715	5,776,439,652
47	5,776,439,652	1,652	172,421,217	317	369,953,146	5,973,972,917
48	5,973,972,917	797	161,880,302	149	383,129,973	6,195,223,235
49	6,195,223,235	308	151,596,069	68	397,840,206	6,441,467,612
50	6,441,467,612	109	141,633,603	21	414,164,769	6,713,998,866



# Single Discount Rate Development

## Projection of Plan Fiduciary Net Position Ending June 30, 2123 (Concluded)

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 6.50%	Projected Ending Plan Net Position
51	\$ 6,713,998,866	\$ 21	\$ 132,027,275	\$ 5	\$ 432,186,589	\$ 7,014,158,196
52	7,014,158,196	2	122,790,333	1	451,992,420	7,343,360,284
53	7,343,360,284	-	113,925,673	-	473,674,122	7,703,108,733
54	7,703,108,733	-	105,430,352	-	497,329,522	8,095,007,903
55	8,095,007,903	-	97,297,082	-	523,063,138	8,520,773,959
56	8,520,773,959	-	89,516,072	-	550,986,834	8,982,244,721
57	8,982,244,721	-	82,076,947	-	581,220,399	9,481,388,173
58	9,481,388,173	-	74,969,954	-	613,892,064	10,020,310,284
59	10,020,310,284	-	68,187,157	-	649,138,972	10,601,262,099
60	10,601,262,099	-	61,723,109	-	687,107,615	11,226,646,605
61	11,226,646,605	-	55,574,938	-	727,954,278	11,899,025,944
62	11,899,025,944	-	49,742,862	-	771,845,493	12,621,128,575
63	12,621,128,575	-	44,230,225	-	818,958,504	13,395,856,854
64	13,395,856,854	-	39,043,542	-	869,481,756	14,226,295,068
65	14,226,295,068	-	34,191,625	-	923,615,445	15,115,718,888
66	15,115,718,888	-	29,683,953	-	981,572,186	16,067,607,122
67	16,067,607,122	-	25,529,931	-	1,043,577,802	17,085,654,993
68	17,085,654,993	-	21,737,386	-	1,109,872,231	18,173,789,838
69	18,173,789,838	-	18,310,652	-	1,180,710,612	19,336,189,798
70	19,336,189,798	-	15,249,489	-	1,256,364,531	20,577,304,839
71	20,577,304,839	-	12,548,261	-	1,337,123,416	21,901,879,994
72	21,901,879,994	-	10,195,607	-	1,423,296,059	23,314,980,446
73	23,314,980,446	-	8,174,875	-	1,515,212,228	24,822,017,799
74	24,822,017,799	-	6,464,454	-	1,613,224,370	26,428,777,714
75	26,428,777,714	-	5,038,466	-	1,717,709,379	28,141,448,627
76	28,141,448,627	-	3,868,307	-	1,829,070,420	29,966,650,740
77	29,966,650,740	-	2,923,895	-	1,947,738,767	31,911,465,613
78	31,911,465,613	-	2,174,810	-	2,074,175,696	33,983,466,499
79	33,983,466,499	-	1,591,443	-	2,208,874,415	36,190,749,472
80	36,190,749,472	-	1,145,771	-	2,352,362,064	38,541,965,765
81	38,541,965,765	-	812,004	-	2,505,201,800	41,046,355,561
82	41,046,355,561	-	567,079	-	2,667,994,972	43,713,783,453
83	43,713,783,453	-	390,983	-	2,841,383,418	46,554,775,888
84	46,554,775,888	-	266,872	-	3,026,051,896	49,580,560,912
85	49,580,560,912	-	181,035	-	3,222,730,668	52,803,110,545
86	52,803,110,545	-	122,652	-	3,432,198,262	56,235,186,155
87	56,235,186,155	-	83,484	-	3,655,284,430	59,890,387,100
88	59,890,387,100	-	57,446	-	3,892,873,324	63,783,202,978
89	63,783,202,978	-	40,166	-	4,145,906,909	67,929,069,721
90	67,929,069,721	-	28,610	-	4,415,388,617	72,344,429,727
91	72,344,429,727	-	20,752	-	4,702,387,268	77,046,796,244
92	77,046,796,244	-	15,280	-	5,008,041,267	82,054,822,231
93	82,054,822,231	-	11,360	-	5,333,563,082	87,388,373,953
94	87,388,373,953	-	8,471	-	5,680,244,036	93,068,609,519
95	93,068,609,519	-	6,296	-	6,049,459,417	99,118,062,640
96	99,118,062,640	-	4,635	-	6,442,673,923	105,560,731,928
97	105,560,731,928	-	3,364	-	6,861,447,468	112,422,176,031
98	112,422,176,031	-	2,399	-	7,307,441,365	119,729,614,998
99	119,729,614,998	-	1,676	-	7,782,424,921	127,512,038,244
100	127,512,038,244	-	2,879	-	8,288,282,394	135,800,317,758



# Single Discount Rate Development

## Present Values of Projected Benefits Ending June 30, 2123

Year	Projected Beginning Plan 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 <sup>(a)-.5</sup>	(g)=(e)*vf <sup>(a)-.5</sup>	(h)=(c)/(1+sdr) <sup>(a)-.5</sup>
1	\$ 3,281,627,844	\$ 288,951,697	\$ 288,951,697	\$ -	\$ 279,995,110	\$ -	\$ 279,995,110
2	3,446,027,931	297,054,235	297,054,235	-	270,278,399	-	270,278,399
3	3,598,261,462	305,150,978	305,150,978	-	260,699,829	-	260,699,830
4	3,708,805,959	313,136,581	313,136,581	-	251,194,530	-	251,194,530
5	3,820,053,727	320,931,880	320,931,880	-	241,735,050	-	241,735,050
6	3,932,538,189	328,559,176	328,559,176	-	232,375,725	-	232,375,725
7	4,046,756,580	335,379,388	335,379,388	-	222,722,410	-	222,722,410
8	4,163,942,010	342,123,382	342,123,382	-	213,334,305	-	213,334,305
9	4,284,699,243	348,774,574	348,774,574	-	204,208,187	-	204,208,187
10	4,409,631,075	354,807,869	354,807,869	-	195,061,684	-	195,061,684
11	4,539,912,354	360,823,443	360,823,443	-	186,261,829	-	186,261,829
12	4,676,193,443	365,363,288	365,363,288	-	177,094,232	-	177,094,232
13	4,820,663,947	369,242,688	369,242,688	-	168,051,273	-	168,051,273
14	4,974,861,241	372,186,064	372,186,064	-	159,052,464	-	159,052,465
15	5,140,664,451	374,426,324	374,426,324	-	150,243,974	-	150,243,974
16	5,302,682,867	375,656,025	375,656,025	-	141,537,473	-	141,537,473
17	5,276,512,837	375,271,642	375,271,642	-	132,763,049	-	132,763,049
18	5,247,901,865	374,063,822	374,063,822	-	124,258,919	-	124,258,919
19	5,217,665,100	371,467,962	371,467,962	-	115,865,361	-	115,865,361
20	5,187,211,273	368,060,289	368,060,289	-	107,795,743	-	107,795,743
21	5,157,399,018	364,588,123	364,588,123	-	100,261,814	-	100,261,814
22	5,128,328,731	361,613,589	361,613,589	-	93,374,476	-	93,374,476
23	5,099,488,099	358,852,672	358,852,672	-	87,006,162	-	87,006,162
24	5,070,651,452	355,946,133	355,946,133	-	81,034,228	-	81,034,228
25	5,041,988,527	353,314,828	353,314,828	-	75,525,998	-	75,525,998
26	5,013,188,567	350,319,487	350,319,487	-	70,315,213	-	70,315,213
27	4,984,601,976	347,239,458	347,239,458	-	65,443,190	-	65,443,190
28	4,956,357,955	343,717,945	343,717,945	-	60,825,823	-	60,825,823
29	4,928,975,428	339,712,064	339,712,064	-	56,447,817	-	56,447,817
30	4,903,077,529	335,290,339	335,290,339	-	52,312,757	-	52,312,757
31	4,879,238,125	330,271,724	330,271,724	-	48,384,734	-	48,384,734
32	4,858,272,414	324,242,376	324,242,376	-	44,602,287	-	44,602,287
33	4,841,494,965	317,433,945	317,433,945	-	41,000,685	-	41,000,685
34	4,830,088,032	309,679,939	309,679,939	-	37,557,892	-	37,557,892
35	4,825,489,959	300,929,684	300,929,684	-	34,269,168	-	34,269,168
36	4,829,274,967	291,501,958	291,501,958	-	31,169,540	-	31,169,541
37	4,842,782,873	281,452,815	281,452,815	-	28,258,227	-	28,258,227
38	4,867,368,758	270,756,270	270,756,270	-	25,525,146	-	25,525,146
39	4,904,490,071	259,837,950	259,837,950	-	23,000,786	-	23,000,786
40	4,955,226,359	249,050,776	249,050,776	-	20,700,384	-	20,700,384
41	5,020,353,333	238,005,508	238,005,508	-	18,574,960	-	18,574,960
42	5,101,093,806	226,834,290	226,834,290	-	16,622,639	-	16,622,639
43	5,198,598,200	215,898,407	215,898,407	-	14,855,631	-	14,855,631
44	5,313,716,983	205,019,454	205,019,454	-	13,246,073	-	13,246,073
45	5,447,539,657	194,067,668	194,067,668	-	11,773,230	-	11,773,230
46	5,601,359,612	183,152,526	183,152,526	-	10,432,917	-	10,432,917
47	5,776,439,652	172,421,217	172,421,217	-	9,222,187	-	9,222,187
48	5,973,972,917	161,880,302	161,880,302	-	8,129,946	-	8,129,946
49	6,195,223,235	151,596,069	151,596,069	-	7,148,781	-	7,148,781
50	6,441,467,612	141,633,603	141,633,603	-	6,271,345	-	6,271,345

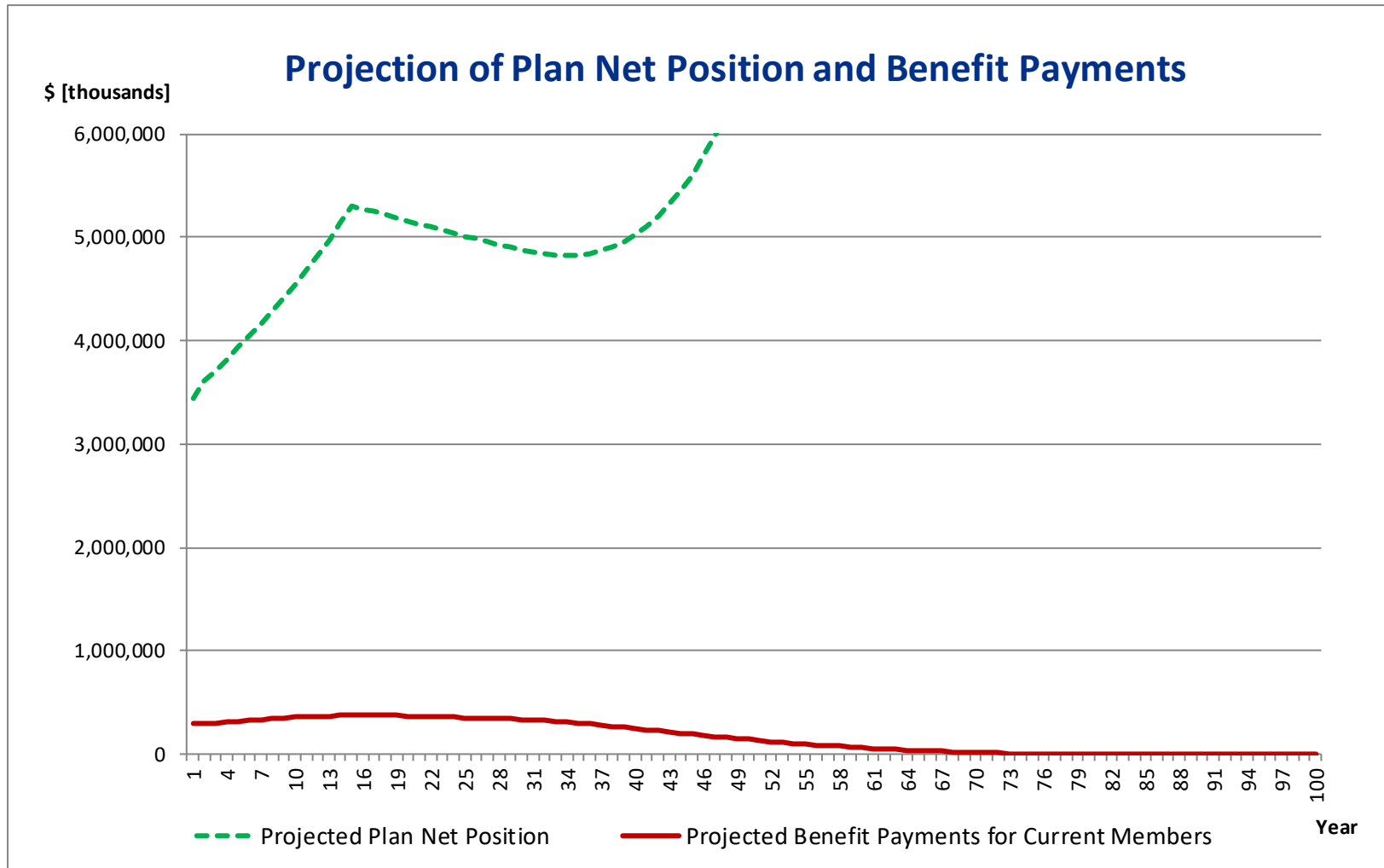


# Single Discount Rate Development

## Present Values of Projected Benefits Ending June 30, 2123 (Concluded)

Year	Projected Beginning Plan 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 <sup>(a)-5</sup>	(g)=(e)*vf <sup>(a)-5</sup>	(h)=(c)/(1+sdr) <sup>(a)-5</sup>
51	\$ 6,713,998,866	\$ 132,027,275	\$ 132,027,275	\$ -	\$ 5,489,193	\$ -	\$ 5,489,193
52	7,014,158,196	122,790,333	122,790,333	-	4,793,573	-	4,793,573
53	7,343,360,284	113,925,673	113,925,673	-	4,176,064	-	4,176,064
54	7,703,108,733	105,430,352	105,430,352	-	3,628,788	-	3,628,788
55	8,095,007,903	97,297,082	97,297,082	-	3,144,461	-	3,144,461
56	8,520,773,959	89,516,072	89,516,072	-	2,716,425	-	2,716,425
57	8,982,244,721	82,076,947	82,076,947	-	2,338,667	-	2,338,667
58	9,481,388,173	74,969,954	74,969,954	-	2,005,787	-	2,005,787
59	10,020,310,284	68,187,157	68,187,157	-	1,712,973	-	1,712,973
60	10,601,262,099	61,723,109	61,723,109	-	1,455,949	-	1,455,949
61	11,226,646,605	55,574,938	55,574,938	-	1,230,914	-	1,230,914
62	11,899,025,944	49,742,862	49,742,862	-	1,034,499	-	1,034,499
63	12,621,128,575	44,230,225	44,230,225	-	863,711	-	863,711
64	13,395,856,854	39,043,542	39,043,542	-	715,895	-	715,895
65	14,226,295,068	34,191,625	34,191,625	-	588,667	-	588,667
66	15,115,718,888	29,683,953	29,683,953	-	479,869	-	479,869
67	16,067,607,122	25,529,931	25,529,931	-	387,526	-	387,526
68	17,085,654,993	21,737,386	21,737,386	-	309,820	-	309,820
69	18,173,789,838	18,310,652	18,310,652	-	245,051	-	245,051
70	19,336,189,798	15,249,489	15,249,489	-	191,627	-	191,627
71	20,577,304,839	12,548,261	12,548,261	-	148,059	-	148,059
72	21,901,879,994	10,195,607	10,195,607	-	112,958	-	112,958
73	23,314,980,446	8,174,875	8,174,875	-	85,042	-	85,042
74	24,822,017,799	6,464,454	6,464,454	-	63,145	-	63,145
75	26,428,777,714	5,038,466	5,038,466	-	46,212	-	46,212
76	28,141,448,627	3,868,307	3,868,307	-	33,314	-	33,314
77	29,966,650,740	2,923,895	2,923,895	-	23,644	-	23,644
78	31,911,465,613	2,174,810	2,174,810	-	16,513	-	16,513
79	33,983,466,499	1,591,443	1,591,443	-	11,346	-	11,346
80	36,190,749,472	1,145,771	1,145,771	-	7,670	-	7,670
81	38,541,965,765	812,004	812,004	-	5,104	-	5,104
82	41,046,355,561	567,079	567,079	-	3,347	-	3,347
83	43,713,783,453	390,983	390,983	-	2,167	-	2,167
84	46,554,775,888	266,872	266,872	-	1,389	-	1,389
85	49,580,560,912	181,035	181,035	-	885	-	885
86	52,803,110,545	122,652	122,652	-	563	-	563
87	56,235,186,155	83,484	83,484	-	360	-	360
88	59,890,387,100	57,446	57,446	-	232	-	232
89	63,783,202,978	40,166	40,166	-	153	-	153
90	67,929,069,721	28,610	28,610	-	102	-	102
91	72,344,429,727	20,752	20,752	-	69	-	69
92	77,046,796,244	15,280	15,280	-	48	-	48
93	82,054,822,231	11,360	11,360	-	34	-	34
94	87,388,373,953	8,471	8,471	-	23	-	23
95	93,068,609,519	6,296	6,296	-	16	-	16
96	99,118,062,640	4,635	4,635	-	11	-	11
97	105,560,731,928	3,364	3,364	-	8	-	8
98	112,422,176,031	2,399	2,399	-	5	-	5
99	119,729,614,998	1,676	1,676	-	3	-	3
100	127,512,038,244	2,879	2,879	-	5	-	5
<b>Totals</b>					<b>\$ 5,065,895,473</b>	<b>\$ -</b>	<b>\$ 5,065,895,473</b>





Note the Net Plan Position is currently projected to grow since the Board has adopted a funding policy goal of more than 100% funded; therefore, even in the absence of contributions from the current active member population, the negative unfunded will continue to accrue interest.



## **SECTION H**

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### **GLOSSARY OF TERMS**

## Glossary of Terms

<b><i>Accrued Service</i></b>	Service credited under the system which was rendered before the date of the actuarial valuation.
<b><i>Actuarial Accrued Liability (AAL)</i></b>	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.
<b><i>Actuarial Assumptions</i></b>	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.
<b><i>Actuarial Equivalent</i></b>	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.
<b><i>Actuarial Cost Method</i></b>	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.
<b><i>Actuarial Gain/(Loss)</i></b>	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.
<b><i>Actuarial Present Value (APV)</i></b>	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 payments at predetermined rates of interest and probabilities of payment.
<b><i>Actuarial Valuation</i></b>	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.
<b><i>Actuarial Valuation Date</i></b>	The date as of which an actuarial valuation is performed.
<b><i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i></b>	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

<b><i>Amortization Method</i></b>	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).
<b><i>Amortization Payment</i></b>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<b><i>Cost-of-Living Adjustments</i></b>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<b><i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i></b>	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.
<b><i>Covered-Employee Payroll</i></b>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<b><i>Deferred Inflows and Outflows</i></b>	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.
<b><i>Deferred Retirement Option Program (DROP)</i></b>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<b><i>Discount Rate</i></b>	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: <ol style="list-style-type: none"><li>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</li><li>2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.</li></ol>

## Glossary of Terms

<b><i>Entry Age Actuarial Cost Method (EAN)</i></b>	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.
<b><i>Fiduciary Net Position</i></b>	The fiduciary net position is the value of the assets of the trust.
<b><i>GASB</i></b>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<b><i>Long-Term Expected Rate of Return</i></b>	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.
<b><i>Money-Weighted Rate of Return</i></b>	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.
<b><i>Multiple-Employer Defined Benefit Pension Plan</i></b>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<b><i>Municipal Bond Rate</i></b>	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.
<b><i>Net Pension Liability (NPL)</i></b>	The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.
<b><i>Non-Employer Contribution Entities</i></b>	Non-employer contribution 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 Statement, plan members are not considered non-employer contribution entities.
<b><i>Normal Cost</i></b>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

## Glossary of Terms

<b><i>Other Postemployment Benefits (OPEB)</i></b>	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.
<b><i>Real Rate of Return</i></b>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<b><i>Service Cost</i></b>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<b><i>Total Pension Expense</i></b>	The total pension expense is the sum of the following items that are recognized at the end of the employer’s fiscal year: <ol style="list-style-type: none"><li>1. Service Cost</li><li>2. Interest on the Total Pension Liability</li><li>3. Current-Period Benefit Changes</li><li>4. Employee Contributions (made negative for addition here)</li><li>5. Projected Earnings on Plan Investments (made negative for addition here)</li><li>6. Pension Plan Administrative Expense</li><li>7. Other Changes in Plan Fiduciary Net Position</li><li>8. Recognition of Outflow (Inflow) of Resources due to Liabilities</li><li>9. Recognition of Outflow (Inflow) of Resources due to Assets</li></ol>
<b><i>Total Pension Liability (TPL)</i></b>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<b><i>Unfunded Actuarial Accrued Liability (UAAL)</i></b>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<b><i>Valuation Assets</i></b>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.