STATE OF WISCONSIN
Department of Employee Trust Funds
A. John Voelker
SECRETARY

Wisconsin Department
of Employee Trust Funds
PO Box 7931
Madison WI 53707-7931
1-877-533-5020 (toll free)
Fax 608-267-4549
etf.wi.gov

Correspondence Memorandum

Date: November 18, 2021

To: Employee Trust Funds Board

From: Cindy Klimke-Armatoski, Chief Trust Finance Officer
Division of Trust Finance

Subject: Sick Leave Conversion Credit Programs Experience Study

The Department of Employee Trust Funds (ETF) requests the Employee Trust Funds Board (Board) accept the Sick Leave Conversion Credit Programs *Three-Year Experience Study January 1, 2018 – December 31, 2020*, including the updated assumptions contained in the report.

Actuarial valuations of the Sick Leave Conversion Credit (SLCC) Programs are conducted annually by the Board's consulting actuary, Gabriel, Roeder, Smith & Company (GRS), and are based on several demographic and economic assumptions. Many of these assumptions are the same as the assumptions used in the Wisconsin Retirement System (WRS) actuarial valuations, which are studied at least every three years as part of the WRS Experience Study.

There are some assumptions that are unique to the SLCC programs. These include the health care trend rate, health care premiums, participation rate of future retirees, and the accumulation and usage of sick leave credits. This study reviews these unique actuarial assumptions and methods and compares them to actual experience of the programs during the years 2018 – 2020. This is the first in-depth study of these assumptions.

GRS has made specific recommendations for the assumptions in the report. Page A-6 summarizes the changes, along with the impact the changes would have had on the December 31, 2020, Accumulated Sick Leave Conversion Credit (ASLCC) Program and the Supplemental Health Insurance Conversion Credit (SHICC) Program valuations had the changes been in place at that time. Please note: The economic assumptions of price inflation, wage inflation, and investment return shown in the summary are decided and approved by the Board as part of the WRS Experience Study (ref. ETF | 12.09.21 | 4A). While it is important to understand the impact of changing actuarial assumptions, the

Reviewed and approved by John Voelker, Secretary
Electronically Signed 11/23/21

Board	Mtg Date	Item #
ETF	12.09.21	4B

impact should not drive the decision in setting the assumptions. Assumptions adopted by the Board will be used in the December 31, 2021, actuarial valuations and will be the basis for 2023 contribution rates.

Actuaries from GRS will be at the Board meeting to present their report and answer any questions.

Attachment: Wisconsin Sick Leave Conversion Credit Programs Three-Year Experience Study January 1, 2018 – December 31, 2020

Wisconsin Sick Leave Conversion Credit Programs

Three-Year Experience Study

January 1, 2018 – December 31, 2020

Table of Contents

800.521.0498 | P: 248.799.9000 | www.grsconsulting.com

November 18, 2021

The Employee Trust Funds Board
4822 Madison Yards Way
Madison, Wisconsin 53705

Ladies and Gentlemen:

The results of the ***3-year investigation of experience*** of the Wisconsin Sick Leave Conversion Credit Programs are presented in this report. The investigation was made for the purpose of updating the actuarial assumptions used in valuing the actuarial liabilities of the Wisconsin Sick Leave Conversion Credit Programs.

The investigation was based upon the statistical data furnished for the annual actuarial valuations, supplemental information furnished by your Secretary and his staff, concerning State Participant and Health Care experience during the last 3 years and on published historical economic data.

The investigation covered the 3-year period from **January 1, 2018 to December 31, 2020**, and was carried out using generally accepted actuarial principles and techniques.

To the best of our knowledge, this report is complete and accurate and was made in accordance with generally recognized actuarial methods. Mark Buis, James D. Anderson, Brian B. Murphy and Richard C. Koch, Jr. are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

We believe that the new actuarial assumptions resulting from this investigation represent a reasonable estimate of possible future experience of the Wisconsin Sick Leave Conversion Credit Programs.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Mark Buis, FSA, EA, FCA, MAAA

James D. Anderson, FSA, EA, FCA, MAAA

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

Richard C. Koch, Jr., ASA, EA, MAAA

MB/JDA/BBM/RCK:rmn

EXECUTIVE SUMMARY

Executive Summary

In this report, we review current actuarial assumptions and methods and compare them to the actual experience of the Sick Leave Conversion Credit Programs – Accumulated Sick Leave Conversion Credit (ASLCC) Program and Supplemental Health Insurance Conversion Credit (SHICC) Program -- for the years 2018-2020. Note that economic and demographic assumptions were developed in the concurrent Wisconsin Retirement System (WRS) Experience study. The results of that study inform certain conclusions herein. Full listings of demographic assumptions pertinent to State employees covered by these programs are displayed in Section A.

The table below lists each of the primary assumptions and methods that we analyzed, including our recommendations for each item, and the overall financial impact of any recommended changes.

Assumption	2020 Recommendation	Financial Impact – Plan Liabilities and Contribution Rates
Withdrawal rates	Lower Rates	Increase
Disability rates	Higher Rates	Increase
Pay increases due to seniority	No Change	No Change
Retirement rates	Higher Rates	Increase
Pre and post-retirement mortality rates	Various	Little or no change
Investment return	Lower Rates	Increase
Wage inflation	No Change	No Change
Price inflation	Lower Rates	No direct impact
Health Care Trend	Change Rates	Increase
Health Care Premiums	Change Premiums	Decrease
Participation	No Change	No Change
Marriage	Decrease	Decrease
Sick leave credit accrual/usage	Various	Decrease
Total	**Various**	**Various**

A common practice is that the actuary recommends a set of demographic assumptions which the Board adopts. The actuary then suggests a range of reasonable alternate economic assumptions. Following

discussion involving the actuary, the plan governing body, and other professionals, the plan governing body makes a final choice from the various alternatives.

The overall impact on the contribution rate will depend on the final economic set of assumptions selected. The impact of this is shown on page A-6.

New assumptions will be first used in the December 31, 2021 actuarial valuations, at which time experience gains or losses incurred during 2021 will also be recognized. This would first impact rates in 2023. Consequently, no rate changes are recommended for 2022 based upon this study.

SECTION A

SUMMARY OF FINDINGS

Introduction

Each year, as of December 31, the liabilities of the Wisconsin Sick Leave Conversion Credit Programs ("SLCC") are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the SLCC with regard to the following risk areas:

- Rates of **withdrawal** of active participants.
- Rates of **disability** among active participants.
- Patterns of **salary increases** to active participants.
- Rates of **retirement** among active participants.
- Rates of **mortality** among active participants, retirees, and beneficiaries.
- Long-term rates of **investment return** to be generated by the assets of the Fund.
- Miscellaneous and Technical Assumptions, including a marriage assumption

The above assumptions were investigated in detail in a separate experience study for the Wisconsin Retirement System, covering the 3-year period 2018-2020. Certain results from that study are developed and incorporated herein as appropriate. Specifically, decrement rates for State employees were developed for the first time in the 2018-2020 WRS Experience study.

Assumptions/methods unique to the SLCC include:

- Health care trend
- Health care premiums
- Participation for future retirees
- Accumulation and usage of sick leave credits

Assumptions should be carefully chosen and continually monitored. A poor initial choice of assumptions or continued use of outdated assumptions can lead to:

- Understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future;
- Overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate or an unnecessarily large burden on the current generation of employers and taxpayers.

A single set of assumptions will not be suitable indefinitely. Conditions change, and our understanding of conditions also changes.

In recognition of this, assumptions used to compute the liabilities of the SLCC should be periodically studied in depth. The package of assumptions is then adjusted to reflect basic experience trends -- but not random year to year fluctuations.

Summary of Decrement Experience

The Wisconsin Retirement System experience study investigated decrement experience in detail. The following summarizes demographic assumption changes from that study that impact the SLCC – and in particular, for the first time assumptions were specifically developed for State employees for use in the Sick Leave valuation. As noted in the WRS Study, in most cases, when adjustments are indicated, the proposed assumptions give partial recognition to present assumptions as well as to results from actual experience. Complete recognition is rarely given to actual experience over a limited period. This would cause contribution rates to be unduly sensitive to short-term experience fluctuations. **Please reference the Wisconsin Retirement System 2018-2020 report for the underlying analysis in developing new decrement assumptions for State employees.**

Recommendations from the WRS Experience study follow:
Most of the decrement assumptions derived in the WRS Experience study are based on weighting of pension liability. Since both sick leave and pension liability are driven primarily by pay and service, we believe it is reasonable to use the same assumptions in the Sick Leave valuation.

Withdrawal Rates: We recommend that the withdrawal (termination) rates be modified to move closer to the liability weighted rates. This change had a small upward effect on Sick Leave liabilities.

Disability Rates: We recommend increasing the incidence of disability for most groups. This change had a small upward effect on Sick Leave liabilities.

Pay Increase Rate (Merit and Longevity Portion): Actual rates varied by group and provide a fairly reasonable match to current assumptions. No changes are being recommended to the merit and longevity portion.

Normal and Reduced Retirement Experience: We recommend modifying the normal retirement rates slightly for all groups to move closer to the observed liability weighted rates. This change had an upward effect on Sick Leave liabilities.

Mortality: We recommend the 2020 WRS Experience Tables for Employees/Healthy Retirees/Disabled Retirees, amount-weighted and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010. Further, we recommend that the mortality improvement scale remain unchanged until the next experience study. The change in mortality tables will be approximately cost neutral, but will provide a better measure of liabilities at certain ages and genders.

Marriage Assumption: We recommend decreasing this assumption so that 75% of males and 55% of females are assumed to be married. We recommend that the assumption that male spouses are three years older than female spouses be updated to two years. This change had a downward effect on Sick Leave liabilities.

State versus non-State Experience: In the WRS experience study, GRS studied decrement experience between state and non-state members. As a result, the proposed rates for many of the decrements were developed separately for both state and non-state members for the first time**.**

Complete listings of all assumptions begin on page B-1.

Summary of Sick Leave Specific Factors

Health Care Cost Trend

Trend rates are used to project results from the experience period to the rating period. While experience is often the best starting point for future costs, we do not rely on a group's experience in setting trend assumptions since trends vary significantly from year-to-year and are not credible for most groups. Therefore, professional judgment and industry benchmarks are used in conjunction with historical experience in setting the trend assumptions. Various benefit segments of the health care environment are studied including non-Medicare medical, Medicare medical, prescription drug, dental and vision.

The current health care trend assumption is based on an initial increase of 10% applied to premiums to account for secular trend, aging, etc. On a go forward basis, premiums were assumed to increase 3.0% in each future year. Based on forward-looking expectations, a more gradual decrease to the ultimate health care trend is anticipated.

The proposed health care trend assumption generally aligns with the assumptions used in the valuation of the State of Wisconsin Retiree Health Insurance Program. For the Sick Leave programs, we recommend a trend assumption beginning at 6.0% for the first year grading down to an ultimate health care trend rate of 3.50% over a 12 year period. **We propose adopting this trend assumption for valuation purposes.** This change had an upward impact on liabilities.

Health Care Premiums

Unused Sick Leave conversion credits are used to cover the cost of health insurance premiums for the employee and eligible dependents. Health insurance premiums vary among a variety of health plans and health plan designs offered under the State of Wisconsin Group Health Insurance Program.

Currently, average pre-65 and post-65 premiums are calculated based on active annuitant data each year for use in the SLCC valuations - values from the December 31, 2020 were pre-65 = $1,258.69/month, post-65 = $569.06/month. A 10% increase to the average premiums was applied to account for secular trend, aging, etc. For active annuitants, the actual premiums provided in the data are used.

We recommend updating the average premium calculation to reflect 1-person and 2-person coverage, pre-65 and post-65. The associated monthly premiums as of January 1, 2021 follow:

	Pre-65 Premium	Post-65 Premium
1-Person Coverage	$ 818.77	$379.60
2-Person Coverage	$1,718.65	$763.12
Average net premium*	$1,268.71	$571.36

** Used in the valuation of all non-active annuitants (i.e., current actives, preserved members and on-hold/escrowed retirees). For active annuitants, the actual premiums provided in the data are used. Net premium is a blend of the 1-person and 2-person average premiums based on the election percent assumption (see next page).*

Summary of Sick Leave Specific Factors

In conjunction with reflecting 1-person and 2-person coverage, an election percentage assumption of 50% will be incorporated into the valuation, based on the following data:

Election Percent Assumption				
Year	Number of 1-person Active Annuitant Contracts	Number of Multi-person Active Annuitant Contracts	Percent Electing 1-person Coverage	Percent Electing Multiple-Person Coverage
2018	8,787	8,451	50.97%	49.03%
2019	8,932	8,664	50.76%	49.24%
2020	9,219	8,918	50.83%	49.17%

The change in premiums put downward pressure on liabilities.

Participation

The valuation currently assumes that 100% of active and terminated vested members would begin using sick leave credits to cover health care costs immediately upon reaching eligibility to do so. We developed the statistic shown in the table below, based on original member data status of "Escrowed", compared to the total number of retiree records. The resulting participation rates are roughly 88% each year during the last 3 years. We know from analysis related to escrowed/on-hold usage (explored later in this report) that half of this group begins using credits in the future. We recommend continuing the 100% assumption to provide margin for adverse deviation.

Participation Assumption				
Year	Number Escrowed Originally	Total Annuitant Count (excluding Closed Accounts)	% of People Not Participating Immediately	% of People Participating Immediately
2018	2,777	22,999	12.07%	87.93%
2019	2,733	23,381	11.69%	88.31%
2020	2,728	23,911	11.41%	88.59%

Accumulation While Employed

Current approach: Start with the sick leave balance accrued to date, and add net sick leave accrual derived from sick leave hours and service provided in the data. For purposes of estimating sick leave balances at retirement, each individual was assumed to continue using sick leave at the same rate as in the past but not less than 25% nor more than 75% of the person's annual accrual rate (usually 16.25 days).

Recommended approach: Start with balance accrued to date, and add net sick leave accrual derived from sick leave hours and service provided in the data. For purposes of estimating sick leave balances at retirement, each individual was assumed to continue using sick leave at the same rate as in the past but not more than 75% of the person's annual gross accrual rate based on the person's employer. In other words, the member can accrue 100% at most (historically 75% was used) of their gross accrual rate but not less than 25% of their gross accrual rate. The assumed annual gross accrual rates used are 6.4 days for Beyond Vision, 12 days for University Hospital and Non-Staff University employees and 16.25 days for all other members based on documentation received from the Department of Employee Trust Funds.

Due to the interaction of the Base (ASLCC) and Supplemental (SHICC) programs, this change increased ASLCC liabilities and decreased SHICC liabilities.

Summary of Sick Leave Specific Factors

Assumption for On-Hold/Escrowed Retirees

Payments from the sick leave account may be escrowed indefinitely after retirement for participants who provide evidence of comparable health insurance coverage from another source.

Current approach: Assume 50% of on-hold/escrowed members will start using the benefit immediately as of the valuation date while 50% will never use the benefit. The present value of future benefits is calculated by taking the balance on deposit for on-hold/escrowed annuitants multiplied by the ratio of the present value of future benefits for active status annuitants to the balance on deposit for active status annuitants multiplied by fifty percent. The fifty percent corresponds to the portion of the population that is assumed to begin using sick leave credits to pay for health care costs.

Recommended approach: Explicitly model those on-hold/escrowed retirees reported in the data. The present value of future benefits will be calculated by drawing down each member's account balance using the same average premiums applicable to active members. We will apply a 50% factor to the present value to account for the assumption that only 50% of these on-hold/escrowed retirees will, at some point, begin using their sick leave balance to pay for health care costs. In developing the 50% assumption, we looked at the number of annuitants in the 2020 data, excluding those retired within the last three years, with an original account status of escrowed/on-hold (7,674 records). Of the 7,674 records, we identified 3,850 with a current account status of active annuitant. The data suggests that roughly 50% (3,850/7,674) of members who were escrowed or on-hold at first eligibility subsequently began using their sick leave credits.

This change increased liabilities.

Modeling survivor benefit/dependent benefits

Current approach: The current model applies loads to approximate survivor/dependent benefits.

Recommended approach: Remove load, replace with approach that removes mortality application for 2-person/family retiree coverage.

This change put upward pressure on liabilities.

Summary of Valuation Results

In developing hypothetical valuation results, the numbers below reflect recommended demographic and Sick Leave specific assumptions detailed earlier in this report. In addition, the results below are based on economic assumptions developed in Wisconsin Retirement System 2018-2020 experience study.

Brief Commentary Regarding Investment Return from WRS Experience Study:

While a 7.0% investment assumption was historically conservative by industry standards, there is considerable movement among all Public Sector Retirement Systems to reduce this assumption. To assist the board with decision making, we have illustrated results ranging from 6.2% to 7% in 20 basis point increments. Please reference the WRS 2018-2020 experience study for more information.

Summary of Economic Assumption Options

Measure	Current Assumption	Reasonable Range	Recommended Assumption
Price Inflation	2.5%	2.0%-2.5%	2.4%
Wage Inflation	3.0%	2.7%-3.2%	3.0%
Investment Return	7.0%	5.4%-7.0%	6.2%-6.8%

The table below describes hypothetical valuation results at December 31, 2021 with current and proposed actuarial assumptions. The rate changes are illustrative only since contribution rates have already been set based upon the actual December 31, 2020 valuation results.

	12/31/2020	Hypothetical results as of 12/31/2021[1]					
	Actual Results	Baseline (no changes)	Demographic Changes only[2]	Alternate Economic 1	Alternate Economic 2	Alternate Economic 3	Alternate Economic 4
Price Inflation	2.50%	2.50%	2.50%	2.40%	2.40%	2.40%	2.40%
Wage Inflation	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Investment Return	7.00%	7.00%	7.00%	6.80%	6.60%	6.40%	6.20%
ASLCC Rate	**0.7%**	**0.6%**	**0.6%**	**0.7%**	**0.8%**	**0.9%**	**1.0%**
SHICC Rate	**0.1%**	**0.0%**	**0.2%**	**0.2%**	**0.3%**	**0.4%**	**0.4%**
Total Rate	**0.8%**	**0.6%**	**0.8%**	**0.9%**	**1.1%**	**1.3%**	**1.4%**

1 *Schedule includes estimated impact of asset gains in the Market Recognition Account (MRA) for 2021, and participant data at 12/31/2020 was used for calculating System liabilities, without adjustment or roll forward.*

2 *Results include proposed demographic assumptions (changes to the withdrawal, retirement, disability and mortality rates); Sick Leave specific Health Care premiums and trend, participation, and program usage assumptions discussed earlier in this report.*

It should also be noted that there are currently unrecognized gains in the MRA for each of the next 4 years. Absent offsetting investment losses, the forecasted contribution rate will continue to decrease over the next four years. New assumptions will be first used in the December 31, 2021 actuarial valuations, at which time experience gains or losses incurred during 2021 will also be recognized. This would first impact rates in 2023. Consequently, no rate changes are recommended for 2022 based upon this study.

SECTION B

COMPLETE LISTS OF PROPOSED DECREMENT ASSUMPTIONS

Actuarial Assumptions
Based on 2018-2020 Experience Study

Select and Ultimate Withdrawal

		% of Active Participants Withdrawing					
		General State		University State		Protective	Executive
Age	Service	Male	Female	Male	Female	With SS State	& Elected State
	0-1	17.2%	19.5%	14.0%	14.1%	18.8%	19.0%
	1-2	12.9%	15.5%	13.8%	14.0%	15.5%	16.0%
	2-3	9.5%	12.5%	12.6%	12.7%	10.5%	13.0%
	3-4	7.4%	10.0%	11.0%	10.0%	6.5%	12.5%
	4-5	7.3%	8.7%	8.6%	9.3%	5.5%	12.0%
	5-6	6.1%	7.8%	8.5%	8.1%	5.0%	6.0%
	6-7	5.2%	6.9%	7.0%	7.0%	4.5%	6.0%
	7-8	5.1%	6.0%	5.6%	5.6%	4.0%	6.0%
	8-9	4.5%	5.6%	4.6%	4.9%	3.5%	6.0%
	9-10	3.6%	5.5%	4.3%	4.3%	3.3%	6.0%
Under 30	10 & Up	3.1%	4.8%	4.2%	4.0%	2.9%	4.5%
31		2.9%	4.8%	4.1%	4.0%	2.8%	4.5%
32		2.8%	4.7%	4.1%	4.0%	2.8%	4.5%
33		2.8%	4.4%	4.1%	4.0%	2.7%	4.5%
34		2.8%	4.2%	4.0%	4.0%	2.6%	4.5%
35		2.7%	3.9%	4.0%	4.0%	2.4%	4.5%
36		2.7%	3.7%	3.9%	4.0%	2.3%	4.5%
37		2.7%	3.4%	3.9%	4.0%	2.2%	4.5%
38		2.7%	3.3%	3.7%	3.9%	2.1%	4.5%
39		2.7%	3.2%	3.5%	3.8%	2.0%	4.5%
40		2.6%	3.0%	3.4%	3.7%	1.8%	4.5%
41		2.6%	2.9%	3.2%	3.6%	1.7%	4.5%
42		2.6%	2.8%	3.1%	3.5%	1.6%	4.5%
43		2.5%	2.8%	3.0%	3.4%	1.5%	4.4%
44		2.4%	2.7%	2.9%	3.3%	1.5%	4.3%
45		2.4%	2.7%	2.8%	3.2%	1.4%	4.2%
46		2.3%	2.6%	2.7%	3.1%	1.4%	4.1%
47		2.2%	2.6%	2.6%	3.0%	1.3%	4.0%
48		2.1%	2.4%	2.5%	2.9%	1.3%	3.9%
49		2.0%	2.3%	2.4%	2.8%	1.3%	3.8%
50		1.9%	2.1%	2.3%	2.7%	1.2%	3.7%
51		1.8%	2.0%	2.3%	2.6%	1.2%	3.6%
52		1.7%	1.8%	2.2%	2.5%	1.2%	3.5%
53		1.7%	1.8%	2.2%	2.5%	1.2%	3.5%
54		1.7%	1.8%	2.2%	2.5%	1.2%	3.5%

Actuarial Assumptions
Based on 2018-2020 Experience Study

Disability Rates

Age	% of Active Participants Becoming Disabled					
	General State		University State		Protective	Executive
	Male	Female	Male	Female	With SS State	& Elected State
20	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
21	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
22	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
23	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
24	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
25	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
26	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
27	0.01%	0.01%	0.00%	0.01%	0.02%	0.00%
28	0.01%	0.03%	0.00%	0.01%	0.02%	0.00%
29	0.01%	0.03%	0.00%	0.01%	0.02%	0.00%
30	0.01%	0.04%	0.00%	0.01%	0.02%	0.00%
31	0.01%	0.04%	0.00%	0.01%	0.02%	0.00%
32	0.01%	0.04%	0.00%	0.01%	0.02%	0.00%
33	0.01%	0.04%	0.00%	0.02%	0.02%	0.00%
34	0.01%	0.05%	0.00%	0.02%	0.03%	0.00%
35	0.01%	0.05%	0.00%	0.03%	0.03%	0.01%
36	0.01%	0.05%	0.00%	0.03%	0.04%	0.01%
37	0.02%	0.05%	0.00%	0.04%	0.04%	0.01%
38	0.02%	0.06%	0.00%	0.04%	0.04%	0.01%
39	0.03%	0.07%	0.00%	0.04%	0.04%	0.01%
40	0.03%	0.07%	0.01%	0.04%	0.05%	0.01%
41	0.04%	0.08%	0.01%	0.04%	0.05%	0.01%
42	0.05%	0.08%	0.01%	0.05%	0.05%	0.01%
43	0.05%	0.09%	0.01%	0.04%	0.06%	0.01%
44	0.06%	0.10%	0.01%	0.04%	0.06%	0.01%
45	0.06%	0.10%	0.02%	0.04%	0.07%	0.01%
46	0.06%	0.11%	0.02%	0.04%	0.07%	0.02%
47	0.06%	0.11%	0.02%	0.04%	0.08%	0.02%
48	0.09%	0.13%	0.02%	0.05%	0.09%	0.02%
49	0.11%	0.14%	0.02%	0.06%	0.10%	0.02%
50	0.13%	0.16%	0.03%	0.07%	0.11%	0.02%
51	0.15%	0.17%	0.03%	0.08%	0.12%	0.03%
52	0.17%	0.19%	0.04%	0.09%	0.13%	0.03%
53	0.19%	0.22%	0.05%	0.10%	0.66%	0.05%
54	0.21%	0.26%	0.07%	0.10%	1.20%	0.08%
55	0.24%	0.29%	0.08%	0.11%	1.73%	0.09%
56	0.27%	0.32%	0.10%	0.12%	2.27%	0.11%
57	0.30%	0.36%	0.12%	0.13%	2.80%	0.12%
58	0.33%	0.38%	0.12%	0.14%	2.84%	0.12%
59	0.36%	0.39%	0.11%	0.15%	2.88%	0.11%
60	0.43%	0.41%	0.11%	0.17%	2.92%	0.11%

Actuarial Assumptions
Based on 2018-2020 Experience Study

Salary Scale – Service Based Rates

Service	% Merit Increases in Salaries Next Year			
	General State (Not Including Schools)	University Teachers State	Protective With SS State	Executive & Elected State
1	3.5%	3.0%	4.8%	2.5%
2	3.5%	3.0%	4.8%	2.5%
3	3.1%	2.9%	4.1%	2.0%
4	2.8%	2.8%	3.5%	1.6%
5	2.5%	2.7%	2.8%	1.1%
6	2.2%	2.6%	2.2%	0.7%
7	1.9%	2.5%	1.5%	0.2%
8	1.8%	2.4%	1.4%	0.2%
9	1.6%	2.3%	1.3%	0.2%
10	1.5%	2.2%	1.1%	0.2%
11	1.4%	2.1%	1.0%	0.2%
12	1.3%	2.0%	0.9%	0.2%
13	1.2%	1.9%	0.9%	0.2%
14	1.2%	1.8%	0.9%	0.2%
15	1.1%	1.7%	0.8%	0.2%
16	1.1%	1.6%	0.8%	0.2%
17	1.0%	1.5%	0.8%	0.2%
18	1.0%	1.4%	0.8%	0.2%
19	0.9%	1.3%	0.8%	0.2%
20	0.9%	1.2%	0.7%	0.2%
21	0.8%	1.1%	0.7%	0.2%
22	0.8%	1.0%	0.7%	0.2%
23	0.7%	0.9%	0.7%	0.2%
24	0.7%	0.9%	0.7%	0.2%
25	0.6%	0.9%	0.6%	0.2%
26	0.6%	0.8%	0.6%	0.2%
27	0.5%	0.8%	0.6%	0.2%
28	0.5%	0.8%	0.6%	0.2%
29	0.4%	0.7%	0.6%	0.2%
30	0.4%	0.7%	0.5%	0.2%
31	0.3%	0.6%	0.5%	0.2%
32	0.3%	0.6%	0.5%	0.2%
33	0.3%	0.5%	0.5%	0.2%
34	0.3%	0.4%	0.5%	0.2%
35	0.2%	0.4%	0.4%	0.2%
36	0.2%	0.3%	0.4%	0.2%
37	0.2%	0.2%	0.4%	0.2%
38	0.2%	0.2%	0.4%	0.2%
39	0.2%	0.2%	0.3%	0.2%
40	0.1%	0.1%	0.3%	0.2%

Actuarial Assumptions
Based on 2018-2020 Experience Study

Normal Retirement Pattern

	% of Active Participants Retiring					
	General State		University State		Protective	Executive
Age	Male	Female	Male	Female	With SS State *	& Elected State
50					8%	
51					9%	
52					11%	
53					25%	
54					20%	
55					20%	
56					20%	
57	19%	19%	12%	10%	20%	12%
58	19%	19%	16%	20%	20%	12%
59	19%	19%	9%	12%	20%	12%
60	19%	21%	15%	14%	20%	12%
61	19%	25%	9%	13%	20%	12%
62	28%	29%	10%	15%	25%	18%
63	30%	28%	11%	19%	25%	18%
64	25%	31%	16%	17%	36%	18%
65	27%	31%	16%	21%	38%	18%
66	35%	36%	21%	25%	38%	18%
67	32%	33%	18%	25%	38%	18%
68	21%	25%	19%	18%	38%	18%
69	21%	27%	14%	17%	38%	18%
70	21%	29%	21%	22%	100%	18%
71	21%	34%	24%	17%	100%	15%
72	21%	33%	24%	17%	100%	15%
73	30%	24%	24%	21%	100%	15%
74	30%	18%	24%	14%	100%	15%
75	100%	100%	100%	100%	100%	100%

** Includes Reduced Retirement.*

Actuarial Assumptions
Based on 2018-2020 Experience Study

Reduced Retirement Pattern

Age	% of Active Participants Retiring				
	General State		University State		Executive & Elected State
	Male	Female	Male	Female	
55	6%	6%	3%	5%	6%
56	7%	8%	3%	5%	6%
57	6%	6%	4%	5%	6%
58	6%	9%	4%	6%	6%
59	7%	8%	4%	6%	6%
60	9%	10%	5%	8%	6%
61	13%	11%	5%	9%	6%
62	16%	18%	7%	11%	6%
63	17%	20%	8%	12%	3%
64	21%	18%	12%	15%	3%

Actuarial Assumptions
Based on 2018-2020 Experience Study

Post-Retirement
Mortality Rates* – Healthy Lives

Age	% Dying Next Year	
	Male	Female
20	0.0396%	0.0163%
21	0.0355%	0.0153%
22	0.0302%	0.0131%
23	0.0260%	0.0121%
24	0.0230%	0.0123%
25	0.0211%	0.0126%
26	0.0233%	0.0144%
27	0.0254%	0.0147%
28	0.0277%	0.0165%
29	0.0315%	0.0184%
30	0.0339%	0.0218%
31	0.0377%	0.0236%
32	0.0399%	0.0254%
33	0.0435%	0.0269%
34	0.0454%	0.0300%
35	0.0484%	0.0311%
36	0.0512%	0.0335%
37	0.0535%	0.0356%
38	0.0569%	0.0373%
39	0.0581%	0.0402%
40	0.0604%	0.0414%
41	0.0636%	0.0436%
42	0.0665%	0.0457%
43	0.0701%	0.0489%
44	0.0735%	0.0509%
45	0.0792%	0.0542%
46	0.0848%	0.0586%
47	0.0915%	0.0633%
48	0.0995%	0.0682%
49	0.1078%	0.0737%
50	0.1220%	0.0883%
51	0.1389%	0.1059%
52	0.1596%	0.1276%
53	0.1835%	0.1553%
54	0.2118%	0.1886%
55	0.2469%	0.2291%
56	0.2757%	0.2521%
57	0.3075%	0.2761%
58	0.3435%	0.3015%
59	0.3817%	0.3265%
60	0.4228%	0.3519%
61	0.4673%	0.3784%
62	0.5155%	0.4046%
63	0.5654%	0.4330%
64	0.6213%	0.4637%
65	0.6818%	0.4995%
66	0.7500%	0.5395%
67	0.8274%	0.5879%
68	0.9162%	0.6462%
69	1.0184%	0.7170%
70	1.1370%	0.8033%
71	1.2757%	0.9060%
72	1.4363%	1.0282%
73	1.6243%	1.1730%
74	1.8414%	1.3432%
75	2.0920%	1.5414%
76	2.3821%	1.7715%
77	2.7129%	2.0352%
78	3.0887%	2.3378%
79	3.5169%	2.6830%
80	4.0033%	3.0758%
81	4.5584%	3.5243%
82	5.1942%	4.0335%
83	5.9181%	4.6126%
84	6.7445%	5.2701%
85	7.6830%	6.0133%
86	8.7379%	6.8500%
87	9.9175%	7.7909%
88	11.2328%	8.8487%
89	12.6925%	10.0318%
90	14.3006%	11.3550%
91	16.0542%	12.8386%
92	17.9281%	14.4764%
93	19.9079%	16.2637%
94	21.9667%	18.1745%
95	24.0680%	20.1948%
96	26.3223%	22.3849%
97	28.6109%	24.6624%
98	30.9289%	27.0094%
99	33.2753%	29.4102%
100	35.6135%	31.8439%
101	37.9337%	34.2998%
102	40.2333%	36.7802%
103	42.5179%	39.2695%
104	44.7448%	41.7374%
105	46.9039%	44.1757%
106	48.9965%	46.5427%
107	51.0027%	48.8393%
108	52.9035%	51.0548%
109	54.7197%	53.1592%
110	56.1733%	55.1534%
111	56.3309%	57.0367%
112	56.4891%	58.0802%
113	56.6419%	58.2139%
114	56.8121%	58.3481%
115	56.9715%	58.4766%
116	56.9886%	58.4883%
117	56.9943%	58.5000%
118	57.0000%	58.5000%
119	57.0000%	58.5000%
120	100.0000%	100.0000%

* *Mortality rates for 2020. Future years will reflect improvements in mortality.*

Actuarial Assumptions
Based on 2018-2020 Experience Study

Mortality Rates* – Disabled Lives

Age	% Dying Next Year	
	Male	Female
20	0.4789%	0.2916%
21	0.4563%	0.2746%
22	0.4250%	0.2533%
23	0.3916%	0.2353%
24	0.3690%	0.2245%
25	0.3669%	0.2300%
26	0.3985%	0.2570%
27	0.4319%	0.2881%
28	0.4677%	0.3229%
29	0.5056%	0.3599%
30	0.5447%	0.3999%
31	0.5845%	0.4425%
32	0.6242%	0.4865%
33	0.6630%	0.5327%
34	0.7032%	0.5780%
35	0.7403%	0.6231%
36	0.7779%	0.6669%
37	0.8152%	0.7103%
38	0.8527%	0.7527%
39	0.8899%	0.7958%
40	0.9278%	0.8394%
41	0.9685%	0.8844%
42	1.0133%	0.9321%
43	1.0633%	0.9846%
44	1.1229%	1.0435%
45	1.1907%	1.1104%
46	1.2711%	1.1859%
47	1.3633%	1.2726%
48	1.4683%	1.3726%
49	1.5859%	1.4877%
50	1.7174%	1.6167%
51	1.8282%	1.6928%
52	1.9473%	1.7776%
53	2.0734%	1.8719%
54	2.2057%	1.9697%
55	2.3406%	2.0673%
56	2.4759%	2.1585%
57	2.6058%	2.2395%
58	2.7325%	2.3063%
59	2.8514%	2.3585%
60	2.9648%	2.3983%
61	3.0726%	2.4254%
62	3.1795%	2.4476%
63	3.2873%	2.4692%
64	3.3964%	2.4933%
65	3.5058%	2.5264%
66	3.6176%	2.5724%
67	3.7340%	2.6381%
68	3.8576%	2.7259%
69	3.9938%	2.8408%
70	4.1456%	2.9857%
71	4.3219%	3.1615%
72	4.5243%	3.3709%
73	4.7611%	3.6153%
74	5.0341%	3.8984%
75	5.3480%	4.2232%
76	5.7050%	4.5903%
77	6.1099%	5.0032%
78	6.5654%	5.4673%
79	7.0775%	5.9831%
80	7.6486%	6.5567%
81	8.2842%	7.1912%
82	8.9858%	7.8904%
83	9.7502%	8.6588%
84	10.5835%	9.4988%
85	11.4832%	10.4179%
86	12.4471%	11.3753%
87	13.4812%	12.3538%
88	14.5954%	13.3483%
89	15.9918%	14.3519%
90	17.5285%	15.3796%
91	19.1032%	16.4544%
92	20.6811%	17.5933%
93	22.2643%	18.8217%
94	23.8589%	20.1534%
95	25.4734%	21.6175%
96	27.2693%	23.3148%
97	29.1634%	25.2175%
98	31.1840%	27.2718%
99	33.3483%	29.4858%
100	35.6135%	31.8439%
101	37.9337%	34.2998%
102	40.2333%	36.7802%
103	42.5179%	39.2695%
104	44.7448%	41.7374%
105	46.9039%	44.1757%
106	48.9965%	46.5427%
107	51.0027%	48.8393%
108	52.9035%	51.0548%
109	54.7197%	53.1592%
110	56.1733%	55.1534%
111	56.3309%	57.0367%
112	56.4891%	58.0802%
113	56.6419%	58.2139%
114	56.8121%	58.3481%
115	56.9715%	58.4766%
116	56.9886%	58.4883%
117	56.9943%	58.5000%
118	57.0000%	58.5000%
119	57.0000%	58.5000%
120	100.0000%	100.0000%

* *Mortality rates for 2020. Future years will reflect improvements in mortality.*

Actuarial Assumptions
Based on 2018-2020 Experience Study

Mortality Rates* – Death-in-Service

Age	% Dying Next Year	
	Male	Female
20	0.0396%	0.0163%
21	0.0355%	0.0153%
22	0.0302%	0.0131%
23	0.0260%	0.0121%
24	0.0230%	0.0123%
25	0.0211%	0.0126%
26	0.0233%	0.0144%
27	0.0254%	0.0147%
28	0.0277%	0.0165%
29	0.0315%	0.0184%
30	0.0339%	0.0218%
31	0.0377%	0.0236%
32	0.0399%	0.0254%
33	0.0435%	0.0269%
34	0.0454%	0.0300%
35	0.0484%	0.0311%
36	0.0512%	0.0335%
37	0.0535%	0.0356%
38	0.0569%	0.0373%
39	0.0581%	0.0402%
40	0.0604%	0.0414%
41	0.0636%	0.0436%
42	0.0665%	0.0457%
43	0.0701%	0.0489%
44	0.0735%	0.0509%
45	0.0792%	0.0542%
46	0.0848%	0.0586%
47	0.0915%	0.0633%
48	0.0995%	0.0682%
49	0.1078%	0.0737%
50	0.1188%	0.0796%
51	0.1303%	0.0872%
52	0.1425%	0.0963%
53	0.1575%	0.1051%
54	0.1736%	0.1152%
55	0.1905%	0.1269%
56	0.2103%	0.1388%
57	0.2320%	0.1515%
58	0.2564%	0.1661%
59	0.2831%	0.1811%

Age	% Dying Next Year	
	Male	Female
60	0.3127%	0.1974%
61	0.3460%	0.2147%
62	0.3812%	0.2339%
63	0.4178%	0.2539%
64	0.4578%	0.2771%
65	0.5010%	0.3023%
66	0.5449%	0.3311%
67	0.5925%	0.3640%
68	0.6426%	0.4032%
69	0.6972%	0.4503%
70	0.7534%	0.5060%
71	0.8133%	0.5721%
72	0.8780%	0.6504%
73	0.9483%	0.7410%
74	1.0244%	0.8482%
75	1.1093%	0.9717%
76	1.2714%	1.1216%
77	1.4591%	1.2952%
78	1.6768%	1.4963%
79	1.9276%	1.7265%
80	2.2172%	1.9931%
81	2.7855%	2.4527%
82	3.5009%	3.0160%
83	4.3986%	3.7059%
84	5.5287%	4.5513%
85	6.9505%	5.5857%

* *Mortality rates for 2020. Future years will reflect improvements in mortality.*

.