

Teachers' Retirement System of the State of Kentucky



**Experience Study for the
Five-Year Period Ending
June 30, 2025**

Prepared as of September 21, 2026



September 21, 2026

Board of Trustees
Teachers' Retirement System of
The State of Kentucky
479 Versailles Road
Frankfort, KY 40601-3800

Members of the Board:

It is a pleasure to submit this report of our investigation of the economic assumptions and the mortality, service, compensation, and healthcare experience of active and retired members of the Teachers' Retirement System of the State of Kentucky (TRS) for the five-year period from July 1, 2020 to June 30, 2025. The study was based on the data submitted by TRS for the annual valuation. In preparing this report, we relied, without audit, on the data provided.

As a result of the investigation, it is recommended that revised demographic tables and healthcare assumptions be adopted by the Board for future use. If adopted, these new assumptions will be first used for the June 30, 2026 valuation. With the Board's approval of the recommendations in the report, we believe the actuarial condition of the System will be more accurately portrayed. We would like to acknowledge the help in the preparation of the data for this investigation given by TRS staff.

The purpose of the investigation was to assess the reasonability of the current TRS economic, demographic, and healthcare actuarial assumptions. Actuarial assumptions are used to measure and budget future costs. Changing assumptions will not change the actual cost of future benefits.

All rates of separation, mortality and salary increase at each age determined in this investigation are shown in the attached tables in Appendix D of this report. In the actuary's judgment, these rates are suitable for use until further experience indicates that modifications are desirable.

The impact of the COVID-19 pandemic likely influenced both economic and demographic experience during the study period. When reviewing and analyzing the data, the impact of the COVID-19 pandemic was taken into consideration in developing any recommended assumptions.

In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.



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Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that, in our opinion, the assumptions developed in this report satisfy Actuarial Standards of Practice, in particular No. 27 (Selection of Assumptions for Measuring Pension Obligations).

The experience investigation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Edward J. Koebel, EA, FCA, MAAA
Chief Executive Officer

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President



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SECTION I – EXECUTIVE SUMMARY

Introduction

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. Actuarial valuations of the Teachers' Retirement System of the State of Kentucky (TRS) are prepared annually to determine the actuarial contribution rate required to fund the system on an actuarial reserve basis (i.e., the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the system). The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as death, termination of employment, retirement, and salary changes to estimate the obligations of the system.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have adequately anticipated the actual emerging experience. This information, along with the professional judgment of system personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to recognize that actual experience is reported in the short term while assumptions are intended to be long-term estimates of experience. Therefore, actual experience is expected to vary from study period to study period, without necessarily indicating a change in assumptions is needed.

Cavanaugh Macdonald Consulting, LLC (CavMac) has performed a study of the experience of each of the Plans under the TRS' Board of Trustees purview for the five-year period ending June 30, 2025. This report presents the results, analysis, and resulting determinations of our study. It is anticipated that the changes will first be reflected in the June 30, 2026 actuarial valuations.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Actuarial Standards of Practice adopted by the Actuarial Standards Board (ASB). While the determined assumptions represent our best estimate of future experience, there are other reasonable assumption sets that could be supported by the results of this experience study. Those other sets of reasonable assumptions could produce liabilities and costs that are either higher or lower.

The impact of the COVID-19 pandemic likely influenced both economic and demographic experience during the study period. When reviewing and analyzing the data, the impact of the COVID-19 pandemic was taken into consideration in developing any recommended assumptions.





SECTION I – EXECUTIVE SUMMARY

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process, and differences between actuaries in this area are generally minor. However, the setting of assumptions differs, as it is more art than science and is typically influenced by professional judgment. In this report, we have determined that changes should be made to certain assumptions. To allow you to better understand our thought process, we offer a brief summary of our philosophy:

- **Do Not Overreact:** When we see significant changes in experience, we generally do not adjust our rates to reflect the entire difference. We will typically set rates somewhere between the old rates and the new experience. If the experience during the next study period shows similar results, we will likely recognize the trend at that point, or at least move further in the direction of the observed experience. On the other hand, if experience returns closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.
- **Anticipate Trends:** If there is an identified trend that is expected to continue, we believe that this should be recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.
- **Simplify:** In general, we attempt to identify which factors are significant and eliminate or ignore those that do not materially improve the accuracy of the liability projections.

We generally analyzed experience for each of the five years individually as well as in aggregate. If any of the experience in certain years appear to be outliers, the credibility of that experience was reduced in evaluating the current assumptions and proposing changes. A portion of this study was during the COVID-19 pandemic, and so we are aware that the behavior and experiences of the members during this period could be affected, while not necessarily representing a long-term trend. Our recommendations for change were influenced by this awareness.

Summary of Recommendations - Economic Assumptions

Economic assumptions are some of the most visible and significant assumptions used in the valuation process. The items in the broad economy modeled by these assumptions can be very volatile over short periods of time, as clearly seen in the economic recovery from the pandemic in 2021 followed by the downward trend in global markets in 2022. Our goal is to try to find the emerging long-term trends in the midst of this volatility so that we can then apply reasonable assumptions.





SECTION I – EXECUTIVE SUMMARY

Most of the economic assumptions used by actuaries are developed through a building-block approach. For example, the expected return on assets is based on the expectation for inflation plus the expected real return on assets. At the core of the economic assumptions is the inflation assumption. As we discuss later in the report, **we recommend that the price inflation assumption be maintained at 2.50%.**

We also recommend that the long-term expected return on assets assumption for the Retirement Annuity Trust, Health Insurance Trust, and the Life Insurance Trust be maintained at 7.10%, reflecting a 2.50% inflation assumption and a 4.60% real rate of return assumption. This will be discussed in detail later in this report, but a real rate of return of 4.60% is supported by the forecasting models developed using the Aon capital market assumptions, the Horizon Actuarial Services, LLC. Survey conducted in 2025 and the Board's target asset allocation.

Finally, we recommend that the general wage inflation (payroll growth) assumption used as the underlying payroll growth for active members and used in the level percent of payroll amortization method be maintained at 2.75%.

The following table summarizes the current and proposed economic assumptions:

Item	Current	Proposed
Price Inflation	2.50%	2.50%
Investment Return*		
Retirement Trust	7.10%	7.10%
Health Trust	7.10%	7.10%
Life Trust	7.10%	7.10%
Wage Inflation (Payroll Growth)	2.75%	2.75%

** Net of investment expenses only.*

Although we have determined that a change in the set of economic assumptions is not necessary, we recognize there may be other sets of economic assumptions that are also reasonable for purposes of funding TRS. For example, we have typically reflected conservatism to the degree we would classify as moderate. Actuarial Standards of Practice allow for this difference in approaches and perspective, as long as the assumptions are reasonable and consistent.

Section II of this report will provide more detail to these economic assumptions.





SECTION I – EXECUTIVE SUMMARY

Summary of Recommendations - Demographic Assumptions

In the experience study, actual demographic experience for the study period is compared to that expected based on the current actuarial assumption. Comparing the actual incidence of the event to what was expected (called the Actual-to-Expected ratio, or A/E ratio) then provides the basis for our analysis.

Mortality is perhaps the most important demographic assumption when valuing the liabilities of a pension plan. The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying in recent years. There have been significant improvements in longevity in the past, although there are different opinions about future expectations. We believe it is prudent to anticipate that this trend will continue to some degree in the future.

Plans currently reflect mortality improvements with the use of a generational mortality approach. This approach directly anticipates future improvements in mortality by using a different set of mortality rates for each year of birth, with the rates for later years of birth assuming lower mortality rates than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of tables that contain “built-in” mortality improvements, e.g., a member who turns age 65 in 2045 has a longer life expectancy than a member who turns age 65 in 2025. When using generational mortality, the A/E ratios for the observed experience are set near 100% since future mortality improvements will be taken into account directly in the actuarial valuation process.

The current mortality assumptions are based on the Pub-2010 family of mortality tables using a generational mortality approach as described above. The Society of Actuaries (SOA) published these mortality tables in 2019 which were developed exclusively from public sector retirement system experience. There was an update to these tables in 2025 called the Pub-2016 family of mortality tables. **We are recommending a change to this new family of mortality tables, and we are also recommending a change to the most recent mortality improvement scale, MP-2021. These published mortality tables will be discussed in the demographic section of this report.**





SECTION I – EXECUTIVE SUMMARY

The following is a general list of the other recommended changes to the demographic assumptions for TRS.

Assumption	Recommended Change
Retirement	Minor adjustments in the rates of retirement to better match experience of the System.
Disability	Decrease rates of disability retirement at some ages for both males and females.
Withdrawal	Minor adjustments in the rates of withdrawal to better match experience of the System.
Merit Salary Scale	Slight increases in the merit salary scale to better match experience of the System.

Section IV of this report will provide more detail to these demographic changes.

Summary of Recommendations - Actuarial Methods

The basic actuarial methodologies used in the valuation process include the:

- Actuarial Cost Method – Entry Age Normal
- Asset Valuation Method – Five-year recognition of gains and losses
- Amortization Method – Level percentage of payroll with closed, separate bases

Based on our review, discussed in full detail in Section III of this report, we recommend no changes in these actuarial methods at this time.





SECTION I – EXECUTIVE SUMMARY

Summary of Recommendations - Other Pension and OPEB Assumptions

The table below lists the other assumptions and methods that are considered in our valuations that should be reviewed during the experience study.

Assumption	Recommended Change
Administrative Expenses	Recommend minor increase to the current assumption as a percentage of payroll
Option Factors	Recommend change in current option factors to reflect change in mortality table
Percent Married	Recommend no change to current assumption
Spousal Age Difference	Recommend changing from three years to two years
Part-Timers	Recommend no change to current assumption
Sick and Annual Leave	Recommend minor change to our liability load for future service retirements and disability retirements
Aging Factors	Recommend no change to current assumption
Healthcare Participation	Recommend changes for certain tier and service combinations
Reserve for Potential Adverse Health Claims Experience	Recommend consideration of establishing and funding a reserve for potential adverse health claims experience

Sections V and VI of this report provide additional details of these recommended changes.





SECTION I – EXECUTIVE SUMMARY

Financial Impact

The following table highlights the impact of the changes on the Retirement Annuity Trust unfunded accrued liability (UAL), funding ratio and required increase rate for the actuarially determined employer contribution rate.

Pension Results – Retirement Annuity Trust (In Aggregate) (\$ in thousands)			
	Valuation Results 2025	After Demographic Changes Only	After All Changes
Unfunded Accrued Liability	\$17,498,454	\$17,533,459	\$17,598,562
Funding Ratio	61.0%	61.0%	60.9%
Required Increase Rate*	27.48%	28.54%	28.73%
Discount Rate	7.10%	7.10%	7.10%

* Other than TRS 4.

Pension Results – Retirement Annuity Trust (TRS 4 Only) (\$ in thousands)			
	Valuation Results 2025	After Demographic Changes Only	After All Changes
Unfunded Accrued Liability	\$(47,443)	\$(37,669)	\$(37,662)
Funding Ratio	133.8%	125.1%	125.1%
Discount Rate	7.10%	7.10%	7.10%





SECTION I – EXECUTIVE SUMMARY

In addition, we reviewed the financial impact of the changes on the UAL, funding ratio and employer annual required contribution rate for the Health Insurance and Life Insurance Trusts. Section V in this report lists all the changes to the health assumptions specific to only the Health Insurance Trust and the Life Insurance Trust.

OPEB Results – Health Insurance Trust (\$ in thousands)				
	Valuation Results 2025	After Demographic Changes Only	After All Changes	After All Changes and Potential Reserve
Unfunded Accrued Liability	\$460,977	\$292,566	\$455,676	\$786,663
Funding Ratio	89.1%	92.8%	89.3%	82.8%
Contribution Rate	2.99%	2.56%	3.03%	3.67%
Discount Rate	7.10%	7.10%	7.10%	7.10%

OPEB Results – Life Insurance Trust (\$ in thousands)			
	Valuation Results 2025	After Demographic Changes Only	After All Changes
Unfunded Accrued Liability	\$19,650	\$20,566	\$20,566
Funding Ratio	84.7%	84.1%	84.1%
Contribution Rate	0.08%	0.08%	0.08%
Discount Rate	7.10%	7.10%	7.10%





SECTION II – ECONOMIC ASSUMPTIONS

The economic assumptions used in the TRS valuation include price inflation, long-term investment return, and general wage inflation (the across-the-board portion of salary increases). Unlike demographic assumptions, economic assumptions do not lend themselves to analysis based heavily upon internal historical patterns, because both wage inflation and investment returns are influenced more by external forces which are difficult to accurately predict over the long term. The investment return and general wage inflation assumptions are generally selected on the basis of expectations in an inflation-free environment and then increased by the long-term expectation for price inflation, called the “building block” approach.

Sources of data considered in the analysis and selection of the economic assumptions included:

- The 2026 Social Security Trustees Report;
- Data from the Bureau of Labor Statistics;
- Bond pricing from the Department of the Treasury;
- Future expectations of TRS’ outside investment consultant;
- Future expectations of external investment experts;
- Historical observations of price and wage inflation statistics and investment returns;
- Survey information from large public retirement systems (National Association of State Retirement Administrators (NASRA)).

ACTUARIAL STANDARD OF PRACTICE NUMBER 27

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standard of Practice (ASOP) No. 27, *Selection of Assumptions for Measuring Pension Obligations*. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment.

ASOP 27 requires the actuary to select a “reasonable” assumption. For this purpose, an assumption is reasonable if it has the following characteristics:

- a. it is appropriate for the purpose of the measurement;
- b. it reflects the actuary’s professional judgment;
- c. it takes into account historical and current economic data that is relevant as of the measurement date;
- d. it reflects the actuary’s estimate of future experience, the actuary’s observation of the estimates inherent in market data, or a combination thereof; and
- e. it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic) except when provisions for adverse deviation or plan provisions that are difficult to measure are included.





SECTION II – ECONOMIC ASSUMPTIONS

With respect to relevant data, the standard recommends the actuary review appropriate recent and long-term historical economic data but advises the actuary not to give undue weight to recent experience. Furthermore, it advises the actuary to consider that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment. In addition, with respect to any particular valuation, each economic assumption should be consistent with all other economic assumptions over the measurement period.

ASOP 27 recognizes that economic data and analyses are available from a variety of sources, including investment advisors, economists, and other professionals. The actuary is permitted to incorporate the views of experts, but the selection or advice must reflect the actuary's professional judgment.

The standard also notes that "the actuary should also recognize that different actuaries will apply professional judgment and may choose different reasonable assumptions." As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice. For this study, we have selected a single set of recommended economic assumptions, but there are other sets of economic assumption that would also be reasonable.

The following table summarizes the current and proposed economic assumptions:

	Current Assumptions	Proposed Assumptions
Price Inflation	2.50%	2.50%
Long-term Investment Return	7.10%	7.10%
Real Wage Inflation (Productivity)	0.25%	0.25%
General Wage Growth (Wage Inflation)	2.75%	2.75%
Payroll Growth	2.75%	2.75%

As the table indicates, we are recommending no changes to any of the economic assumptions at this time. The remainder of this section of the report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of the TRS. In our opinion, the economic assumptions proposed in this report have been developed in accordance with ASOP No. 27.





SECTION II – ECONOMIC ASSUMPTIONS

Price Inflation

Background

Price inflation is typically measured by the annual increase in the Consumer Price Index (CPI). This assumption underlies most of the other economic assumptions, either directly or indirectly.

Future price inflation is used indirectly in the development of the assumptions for investment return and general wage increase, which also impacts individual salary increases and payroll growth. Under ASOP 27, the price inflation assumption must be consistent among all economic assumptions.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level “real return” – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates are expected to result in lower expected investment returns, at least in the long run.

The current price inflation assumption is 2.50% per year.

Past Experience

The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The table below provides historical annualized rates and annual standard deviation of the CPI-U over periods ending June 30th.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2025	99	2.96%	4.00%
1965 – 2025	60	3.95%	2.88%
1975 – 2025	50	3.65%	2.83%
1985 – 2025	40	2.78%	1.74%
1995 – 2025	30	2.53%	1.86%
2005 – 2025	20	2.56%	2.23%
2015 – 2025	10	3.06%	2.49%

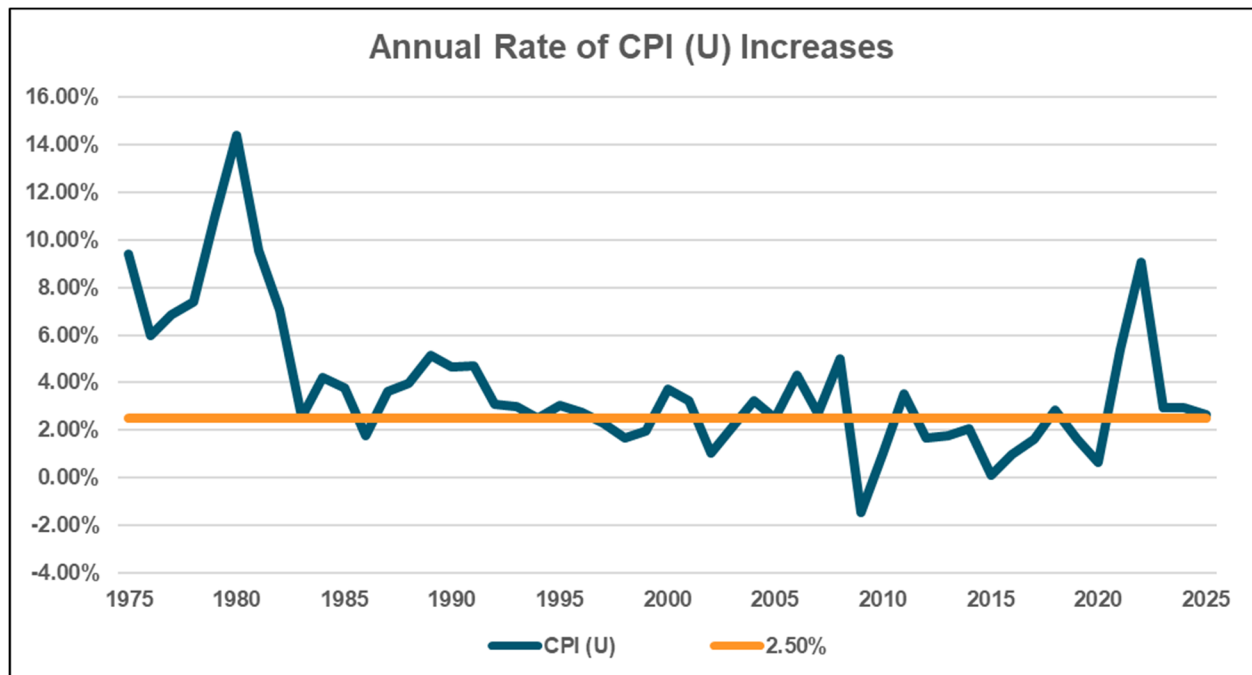




SECTION II – ECONOMIC ASSUMPTIONS

Historical averages are heavily dependent on the period selected. For example, the period of high inflation from 1973 to 1981 has a significant impact on the averages over periods which include these years. Over more recent periods (last 20 to 30 years) measured from June 30, 2025, the average annual rate of increase in the CPI-U has been closer to the current assumption of 2.50%.

The following graph illustrates the historical levels of price inflation measured as of June 30th of each of the last 50 years and compared to the current 2.50% annual rate currently assumed.



While inflation has been relatively low for most of the last 30+ years, there have been periods when higher inflation has occurred. While there has been a general downward trend since the early 1980's, the recent brief spike is a reminder that there can be unexpected changes.

Forecasts

Additional information to consider is obtained from measuring the spread on inflation protected treasury bills (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities and the inflation indexed nominal yield on TIPS of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. The table below provides the calculation of the breakeven rate of inflation as of June 30, 2025 over various periods.





SECTION II – ECONOMIC ASSUMPTIONS

Years to Maturity	Bond Yield	TIPS Yield	Breakeven Rate of Inflation
10	4.30%	2.00%	2.30%
20	4.88%	2.46%	2.42%
30	4.88%	2.69%	2.19%

As this data indicates, the bond market is anticipating inflation of 2.2% to 2.4% for both the short and long term, however, we note that measures can move fairly significantly over just a few months.

Based upon information contained in the “Survey of Professional Forecasters” for the second quarter of 2026 as published by the Philadelphia Federal Reserve Bank, the median expected annual rate of inflation for the next ten years is 2.40%. Although 10 years of future expectation is too short of a period for the basis of our inflation assumption, the information does provide some evidence that the consensus expectations of these experts are for rates of inflation very close to our current assumption of 2.50% for the near-term future.

The latest forecast from the National Association for Business Economics (NABE) released in February 2026 shows its members largely agree that the Personal Consumption Expenditures Price Index (PCE) will not hit the 2.00% target before the second half of 2027.

TRS’ investment consultant, Aon, also has an inflation forecast in their capital market assumptions. Their short-term assumption (10 years) is 2.20% and long-term assumption (30 years) is 2.30%. Horizon Actuarial Services surveys a significant portion of the major investment advisors and publishes their assumptions. For the 2025 study, the inflation assumptions for the next 10-year period and 20-year period are 2.38% and 2.40%, respectively.

Social Security Administration

Although many economists forecast lower inflation than the assumption used by most retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2026 annual report, the projected ultimate average annual increase in the CPI over the next 75 years was estimated to be 2.40%, under the intermediate (best estimate) cost assumption. The range of inflation assumptions used in the Social Security 75-year modeling, which includes a low and high-cost scenario, in addition to the intermediate cost projection, was 1.80% to 3.00%. These rates remained unchanged from their 2025 annual report.

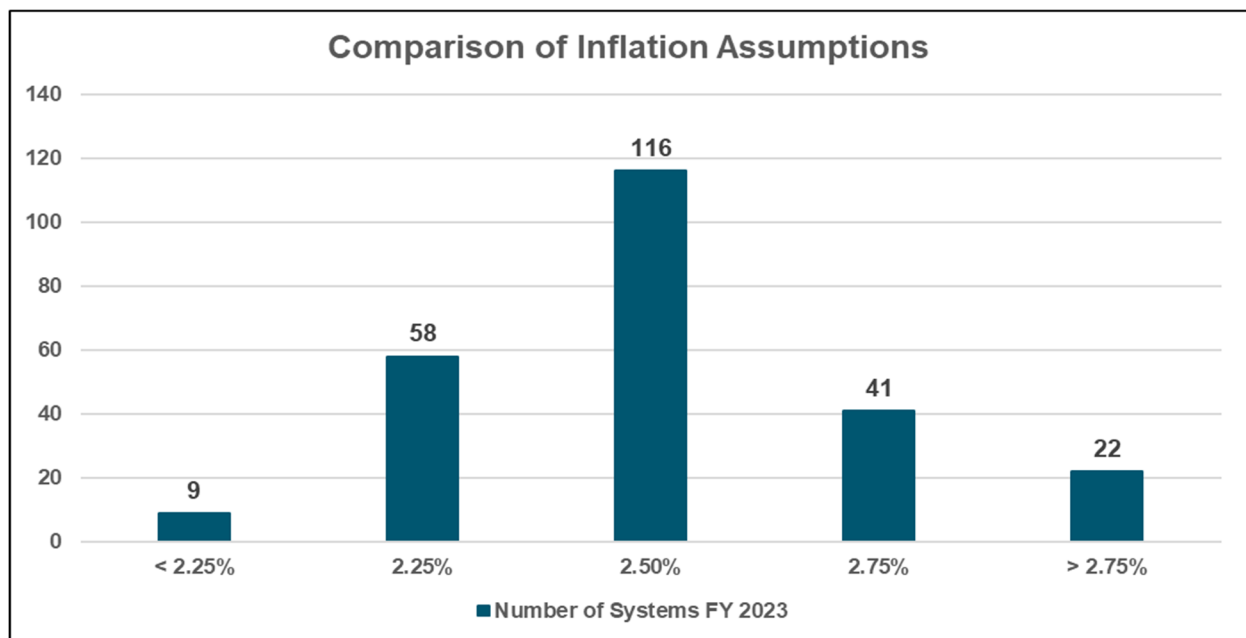




SECTION II – ECONOMIC ASSUMPTIONS

Peer Comparison

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. The following chart shows the inflation rate assumptions of 246 plans in the Public Plan Database of the Center for Retirement Research. Based on the current data, the average inflation assumption is 2.54%. The assumptions are from actuarial valuations reported in FYE 2023. Although inflation has spiked recently, we have not seen a reversal of this trend and expect most systems to take a wait-and-see approach.





SECTION II – ECONOMIC ASSUMPTIONS

Recommendation

A summary of all these sources is shown in the table below:

Source	Expected Inflation
Aon Investment Consultant (30 years)	2.30%
2025 Horizon Survey (20 years)	2.40%
Bond Market (20 years)	2.42%
2026 SSA Trustees Report (75 years)	2.40%
Survey of Professional Forecasters (10 years)	2.40%
Peer Retirement Funds	2.54%

It is difficult to predict inflation accurately. Inflation's short-term volatility is illustrated by comparing its average rate over the last 10 and 60 years. Although the 10-year average of 3.06% is closer to the TRS' assumed rate of 2.50%, the longer 60-year average of 3.95% is much higher and it includes the very high rates of inflation from the late 1970s and early 1980s.

Although we have experienced rather high inflation in 2021 and 2022 due to the recovery from the COVID-19 pandemic, current economic forecasts suggest annual inflation rates closer to 2.50% over the short-term and long-term, respectively. We concur with these forecasts and recommend maintaining the inflation assumption for TRS at 2.50%.

Price Inflation Assumption	
Current	2.50%
Determined	2.50%





SECTION II – ECONOMIC ASSUMPTIONS

Investment Return

Background

The investment return assumption reflects the anticipated returns on the current and future assets. It is one of the primary determinants in the allocation of the expected cost of the promised benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. Generally, the investment return assumption should be set with consideration of the asset allocation policy, expected long term real rates of return on the specific asset classes, the underlying inflation rate, and any investment expenses.

The current investment return assumption is 7.10% per year, net of investment-related expenses. The 7.10% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is price inflation (previously discussed). Any excess return over price inflation is referred to as the real rate of return. The real rate of return, based on the current set of assumptions, is 4.60% (7.10% nominal return less 2.50% inflation).

Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon to make prudent choices regarding how to invest the trust funds, i.e., asset allocation. For actuarial calculations, we typically consider very long periods of time as some current employees will be receiving benefit payments more than 70 years from now. It is important to remember that the retirement plan is investing assets on behalf of the member during both their working career and while they are receiving benefit payments. Often more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open plan like TRS, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in time horizon between investment consultants and actuaries is frequently a source of debate and confusion when setting economic assumptions.

Past Experience

One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the timeframe used, especially if the year-to-year results vary widely. Even though history provides a valuable perspective for setting this assumption, the economy of the past is not necessarily the economy of the future. In addition, the asset allocation can also impact the investment returns so comparing results over long periods when different asset allocations were in place may not be meaningful.





SECTION II – ECONOMIC ASSUMPTIONS

The assets for TRS are valued using a widely accepted asset-smoothing methodology that fully recognizes the expected investment income and also recognizes 20% of each year's investment gain or loss (the difference between actual and expected investment income). The experience over the last twenty years for the Retirement Annuity Trust is shown in the table below. Historical returns for the Health Insurance Trust and the Life Insurance Trust are similar, particularly in more recent years.

Year Ending 6/30	Actuarial Value	Market Value
2025	9.6%	12.0%
2024	8.1%	11.9%
2023	6.6%	10.2%
2022	7.9%	-10.9%
2021	12.9%	29.6%
2020	7.0%	5.5%
2019	7.1%	5.6%
2018	9.1%	10.5%
2017	9.3%	15.0%
2016	7.6%	-1.0%
2015	12.4%	5.1%
2014	14.0%	18.1%
2013	7.0%	14.1%
2012	2.9%	2.4%
2011	4.3%	21.6%
2010	0.5%	13.1%
2009	0.7%	-14.3%
2008	2.7%	-5.7%
2007	5.2%	14.6%
2006	4.4%	5.3%
5-year Geometric Mean	9.0%	9.8%
10-year Geometric Mean	8.5%	8.4%
15-year Geometric Mean	8.3%	9.6%
20-year Geometric Mean	6.9%	7.6%

While important to review and analyze, historical returns over such a time period are not particularly credible for the purpose of setting the long-term assumed future rate of return.





SECTION II – ECONOMIC ASSUMPTIONS

Future Expectation Analysis

ASOP 27 provides that the actuary may rely on outside experts in setting economic assumptions. TRS utilizes the services of Aon to assist them in developing investment strategies and providing capital market assumptions for the TRS portfolio. As part of their duties, Aon periodically performs asset-liability studies, along with comprehensive reviews of the expected return of the various asset classes in which the TRS portfolio is invested. We believe it is appropriate to consider the results of Aon's work as one factor in assessing expected future returns.

Our forward-looking analysis used the real rates of return in Aon's capital market assumptions for 10-year and 30-year assumptions and TRS' target asset allocation. Using statistical projections that assume investment returns approximately follow a lognormal distribution with no correlation between years, produces an expected range of real rates of return over a 50-year time perspective. Looking at one year's results produces a reasonable mean real return but also has a high standard deviation or measurement of volatility. By expanding the time perspective, the mean real return approaches the expected median of future real returns and the volatility declines significantly.

The table below provides a summary of the results of Aon's 10-year and TRS' target asset allocation for the Retirement Annuity Trust (Pension Plan).

Aon 10-year perspective Assumptions

Time Span in Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5 th	25 th	50 th	75 th	95 th
1	5.70%	13.30%	-14.67%	-3.63%	4.87%	14.13%	28.89%
5	5.04%	5.89%	-4.36%	0.98%	4.87%	8.92%	15.01%
10	4.96%	4.16%	-1.75%	2.11%	4.87%	7.72%	11.94%
20	4.92%	2.94%	0.15%	2.91%	4.87%	6.88%	9.82%
30	4.90%	2.40%	1.00%	3.27%	4.87%	6.51%	8.90%
40	4.89%	2.08%	1.51%	3.48%	4.87%	6.29%	8.35%
50	4.89%	1.86%	1.86%	3.63%	4.87%	6.14%	7.98%





SECTION II – ECONOMIC ASSUMPTIONS

The percentile results are the percentages of random returns over the time span shown that are expected to be less than the amount indicated. For example, using the Aon 10-year perspective assumptions, for the 10-year time span, 5% of the resulting real rates of return will be below -1.75% and 95% will be above that. As the time span increases, the results begin to converge. Over a 50-year time span, the results indicate there will be a 25% chance that real returns will be below 3.63% and a 25% chance they will be above 6.14%. In other words, there is a 50% chance the real returns will be between 3.63% and 6.14%.

The results of our real return forward looking analysis are very similar to the real rate of return analysis developed by Aon in their first quarter of 2025 analysis, where they developed a real return expectation of 5.0% over a 10-year perspective and 4.9% over a 30-year perspective.

We also recognize that there can be differences of opinion among investment professionals regarding future return expectations. For a broader view of expected returns, we also reviewed the 2025 Survey of Capital Market Assumptions produced by Horizon Actuarial Services, LLC to see what other investment professionals are currently using for capital market assumptions.

The Horizon survey includes both 10-year perspective and 20-year perspective capital market assumptions. We applied the same statistical analysis to these survey results as we did the capital market assumption of TRS investment advisor with the following real return results for the 10-year perspective and 20-year perspective. This information provides an additional perspective on what a broad group of investment experts anticipate for future investment returns.

Retirement Annuity Trust Horizon Survey 10-year perspective

Time Span in Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5 th	25 th	50 th	75 th	95 th
1	5.23%	12.71%	-14.29%	-3.67%	4.47%	13.31%	27.35%
5	4.63%	5.64%	-4.38%	0.75%	4.47%	8.34%	14.15%
10	4.55%	3.98%	-1.87%	1.83%	4.47%	7.19%	11.22%
20	4.51%	2.81%	-0.05%	2.60%	4.47%	6.39%	9.20%
30	4.50%	2.30%	0.77%	2.94%	4.47%	6.03%	8.32%
40	4.49%	1.99%	1.25%	3.14%	4.47%	5.82%	7.80%
50	4.49%	1.78%	1.59%	3.28%	4.47%	5.68%	7.44%





SECTION II – ECONOMIC ASSUMPTIONS

Retirement Annuity Trust Horizon Survey 20-year perspective

Time Span in Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5 th	25 th	50 th	75 th	95 th
1	5.61%	12.71%	-13.91%	-3.29%	4.86%	13.69%	27.72%
5	5.01%	5.64%	-4.00%	1.13%	4.86%	8.72%	14.53%
10	4.93%	3.98%	-1.48%	2.21%	4.86%	7.57%	11.61%
20	4.90%	2.81%	0.33%	2.98%	4.86%	6.77%	9.59%
30	4.88%	2.30%	1.15%	3.32%	4.86%	6.42%	8.70%
40	4.88%	1.99%	1.64%	3.53%	4.86%	6.21%	8.18%
50	4.87%	1.78%	1.97%	3.67%	4.86%	6.06%	7.82%

As can be seen in Appendix B, the Retirement Annuity Trust, the Healthcare Insurance Trust, and the Life Insurance Trust all have different asset allocations, so they each have slightly different real return expectations. The table below summarizes the 50th percentile returns for each of the three retirement plans under the TRS Board's purview for each of the four capital market assumptions provided by Aon and the Horizon survey, respectively.

	Retirement Annuity Trust	Healthcare Insurance Trust	Life Insurance Trust
Aon – 10 year	4.87%	4.96%	4.82%
Aon – 30 year	4.83%	4.95%	4.78%
Horizon – 10 year	4.47%	4.57%	4.32%
Horizon – 20 year	4.86%	4.98%	4.70%

While TRS is a long-term vehicle expected to pay benefits to its retirees for many years in the future, a high percentage of the present value of the benefits is determined within the next fifteen to twenty years, so the real return assumption should fall within the bands shown above.



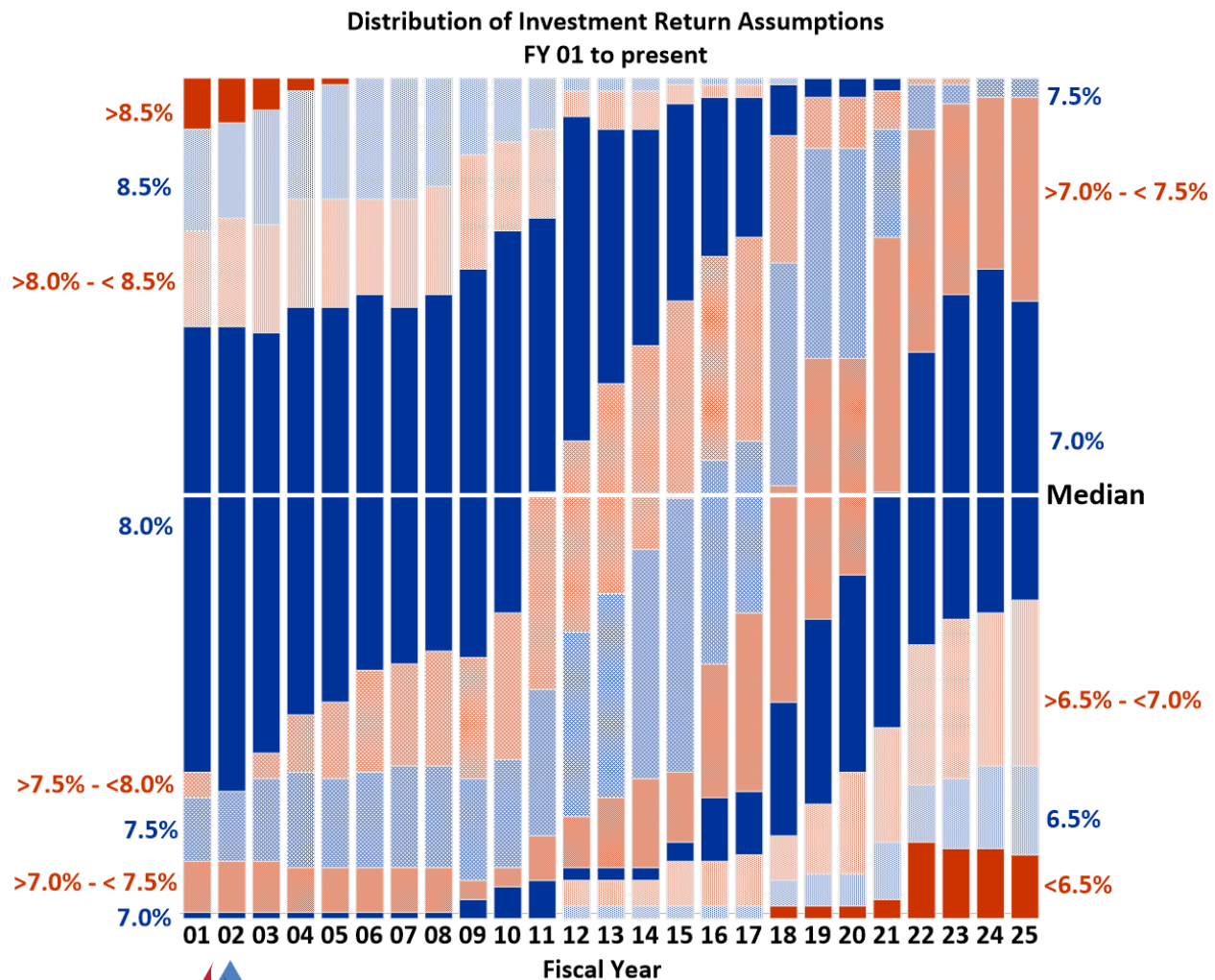


SECTION II – ECONOMIC ASSUMPTIONS

Peer Comparison

In general, we have observed a marked reduction in the capital market assumptions by both actuarial firms and investment consultants over the last decade. The impact of this trend on public pension funds is evident in the Public Fund Survey (published by the National Association of State Retirement Administrators). The median investment return assumption, which was 8.0% from 2001 to 2011, is now 7.0%.

While we do not recommend the selection of an investment return assumption be based on the assumptions used by other public retirement systems, this information does provide another set of relevant data to consider if we recognize that asset allocation varies from system to system, as does the risk profile of Boards. The following graph shows the change in the distribution of the investment return assumption from fiscal year 2001 through 2026 for the 130+ large public retirement systems included in the NASRA Public Fund Survey.

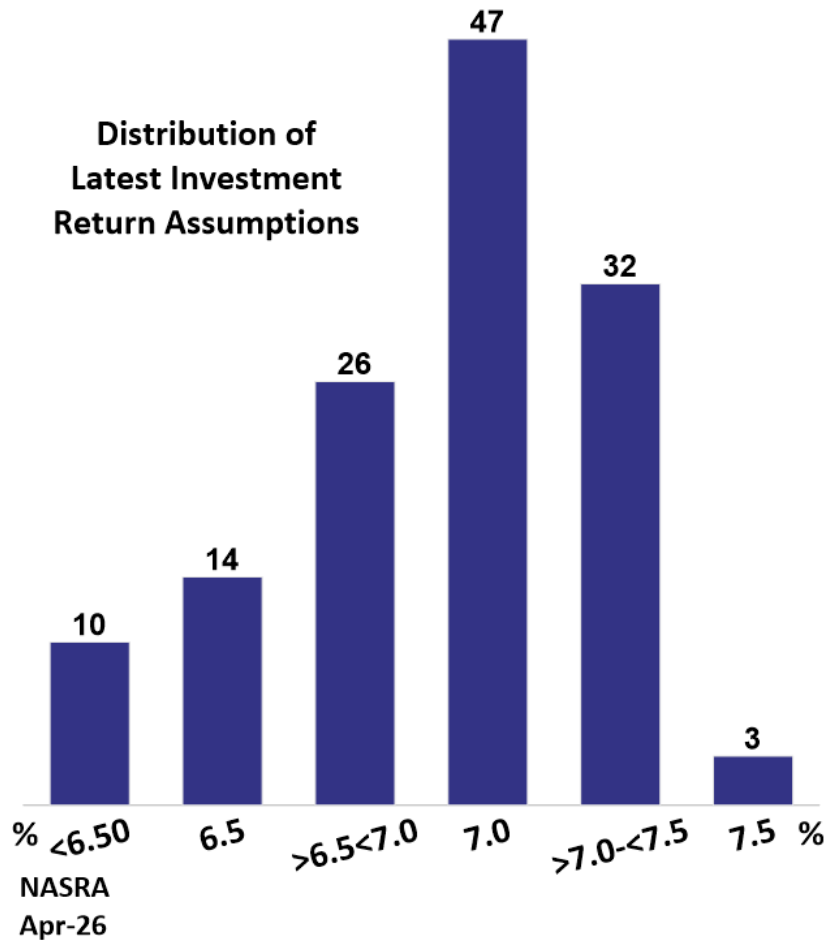




SECTION II – ECONOMIC ASSUMPTIONS

As the graph indicates, the investment return assumptions used by public plans have decreased significantly over the last decade, likely impacted by a corresponding decrease in the underlying inflation assumption over the same period.

The distribution of current investment return assumptions is shown below:





SECTION II – ECONOMIC ASSUMPTIONS

Recommendation

Because investment earnings account for the majority of revenue for most public plans, the choice of an investment return assumption has a major impact on a plan's financing and actuarial funded status. An investment return assumption that is too low will overstate liabilities and costs, causing current members/taxpayers to be overcharged and future members/taxpayers to be undercharged. An investment return assumption that is too high will understate liabilities and undercharge current members/taxpayers at the expense of future members/taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and inequitable distribution of costs among generations of members/taxpayers. Because of this, setting the investment return assumption requires a balancing act with an attempt to not be overly conservative nor aggressive, although some margin for adverse deviation is acceptable under actuarial standards.

Actuarial standards require us to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe we must be careful not to let recent experience or short-term expectations impact our judgement regarding an appropriate investment return assumption over the long term.

Based on our analysis of the Board's target asset allocation and the analysis of Aon and Horizon Survey forward looking capital market assumptions, we have determined that a real return assumption of 4.60% is still a very reasonable assumption and below the 50th percentile in most of our analysis. Based on an inflation assumption of 2.50% and real return assumption of 4.60%, **we recommend maintaining a 7.10% expected long term nominal rate of return assumption.**

Investment Return Assumption		
	Current	Proposed
Real Rate of Return*	4.60%	4.60%
Inflation	<u>2.50</u>	<u>2.50</u>
Net Investment Return	7.10%	7.10%

* Net of investment expenses.

As the Health Insurance Trust and Life Insurance Trust show similar long-term projections to the Retirement Annuity Trust and because the asset allocation strategy for the Health Insurance Trust could be impacted by the lower incoming cash flows once the plan reaches a 100% funded ratio, we believe the TRS Board should use the same investment return assumption for all three plans.





SECTION II – ECONOMIC ASSUMPTIONS

Wage Inflation

Background

The wage inflation assumption is composed of the price inflation assumption and an assumption for the real rate of wage increases. The salary increase assumption combines the wage inflation assumption with an assumption for promotion and longevity, often called merit increases. Merit assumptions are generally age and or service related and will be discussed in the demographic assumption section of the report. The excess of wage growth over price inflation is also considered the increase in productivity that labor provides.

The current wage inflation assumption is 2.75% and is composed of a 2.50% rate of inflation assumption and a 0.25% real rate of wage inflation.

Past Experience

The Social Security Administration publishes data on wage growth in the United States (see Appendix C). While this is the most comprehensive data available, it is based on all wage earners in the country so it can be influenced by the mix of jobs as well as by changes in certain sectors of the workforce that may not be seen by all segments.

As with our analysis of inflation, we provide wage inflation and a comparison with price inflation over various time periods in the table below. Currently, this wage data is only available through calendar year 2024. We remove the rate of price inflation for each year from the data to result in the historical real rate of wage inflation.

Period	Wage Inflation	Price Inflation	Real Wage Growth
2014-2024	4.16%	2.85%	1.31%
2004-2024	3.42%	2.57%	0.85%
1994-2024	3.66%	2.53%	1.13%
1984-2024	3.73%	2.80%	0.93%
1974-2024	4.42%	3.77%	0.65%

Thus, over the last 50 years, annual real wage growth has averaged 0.65%.





SECTION II – ECONOMIC ASSUMPTIONS

Social Security Administration

The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In June of 2026, the annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.60%, 1.20% higher than the Social Security intermediate inflation assumption of 2.40% per year. The range of the assumed real wage inflation in the 2026 Trustees report was 0.53% to 1.74% per year.

Public Sector Compensation and Wages

The Bureau of Labor Statistics publishes the Employment Cost Index, including detail for real (net of inflation) total compensation and wages and salaries. Further, this index is also broken down for state and local government workers. From December 2005 through June 2025, total compensation grew at an annualized rate of 2.88%, while wages and salaries grew at a rate of 2.50% (inflation was 2.56% over the same period). This difference is a reflection that state and local government workers have had much of their compensation increase delivered through benefits rather than wages. While it is reasonable to anticipate that total compensation will continue to increase faster than wages, it is also reasonable to anticipate that the difference between the two will moderate over time.

Recommendation

The data the Social Security Administration collects is nationwide and predominantly from the private sector which includes many collectively bargained employees. It is questionable whether public sector employees can match the productivity rates of the private sector. As mentioned above, the wage growth assumption is used in combination with the merit increase assumption to create the salary increase assumption which is applied to individual pay increase. Although there has been pressure to increase salaries in recent years, the wage increase assumption in isolation is primarily used for the level percent of payroll amortization method rather than projecting future retirement benefits for individuals. **Therefore, we recommend maintaining the real wage growth inflation assumption of 0.25% as a more conservative assumption and we will review again in the next study.**

Wage Inflation Assumption		
	Current	Proposed
Price Inflation	2.50%	2.50%
Real Wage Growth	<u>0.25%</u>	<u>0.25%</u>
Wage Inflation	2.75%	2.75%





SECTION II – ECONOMIC ASSUMPTIONS

Payroll Growth

Background

The assumed future rate of payroll increase in the total payroll of TRS' active members is an assumption used in the level percentage of payroll amortization method that affects the calculation of the amortization period required to fully amortize the unfunded actuarial accrued liability and the actuarially determined employer contribution. The total payroll growth is impacted by individual member's increases and population growth. The current assumption is 2.75% per year which is equal to the current wage inflation assumption.

Past Experience

The following table shows the actual TRS' annual payroll growth experienced over different time periods.

Period	Number of Years	Annual Payroll Growth
1995 – 2025	30	3.04%
2005 – 2025	20	2.55%
2010 – 2025	15	1.62%
2015 – 2025	10	2.44%
2020 – 2025	5	3.74%

Recommendation

The table above shows that since 1995 annual payroll growth has been higher than assumed levels. When looking at periods from 10 to 20 years, annual payroll growth had been much lower than assumed. This is a direct result of the financial crisis of 2008/2009. However, annual payroll growth over the past 5 years has increased significantly. The need for attracting and retaining teachers to any state is tied to the population growth and the ability to pay teachers more. **Taking all of this information into account, we recommend that the payroll growth assumption be maintained at 2.75%.**





SECTION III – ACTUARIAL METHODS

Actuarial Cost Method

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. However, Governmental Accounting Standard Board (GASB) Statement Numbers 67 and 68 require that the Entry Age Normal cost method be used for financial reporting. Most systems do not want to use a different actuarial cost method for funding and financial reporting. In addition, the Entry Age Normal method has been the most common funding method for public systems for many years. This is the cost method currently used by TRS.

The rationale of the Entry Age Normal (EAN) cost method is that the cost of each member's benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit that is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The Entry Age Normal actuarial accrued liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial accrued liability, the value of plan assets is subtracted from the Entry Age Normal actuarial accrued liability. The current year's cost to amortize the unfunded actuarial accrued liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as anticipated by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial accrued liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

Considering that the Entry Age Normal cost method is the most commonly used cost method by public plans, that it develops a normal cost rate that tends to be stable and less volatile and is the required cost method under calculations required by GASB Numbers 67 and 68, **we recommend use of the Entry Age Normal actuarial cost method be continued.**





SECTION III – ACTUARIAL METHODS

Actuarial Value of Assets

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value is often used to smooth out the volatility that is reflected in the market value of assets. This is because most employers would rather have annual costs remain relatively smooth, as a percentage of payroll or in actual dollars, as opposed to a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. The Actuarial Standards Board also has basic principles regarding the calculation of a smoothed asset value, Actuarial Standard of Practice No. 44 (ASOP 44), *Selection and Use of Asset Valuation Methods for Pension Valuations*.

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value, AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value, OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to manipulate annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

Currently, the actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value. **We recommend no change in this methodology.**





SECTION III – ACTUARIAL METHODS

Amortization of the Unfunded Actuarial Accrued Liability

The actuarial accrued liability is the portion of the actuarial present value of future benefits that is not included in future normal costs. Thus, it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded actuarial accrued liability (UAAL) exists when the actuarial accrued liability exceeds the actuarial value of plan assets. These deficiencies can result from:

- (i) plan improvements that have not been completely paid for,
- (ii) experience that is less favorable than expected,
- (iii) assumption changes that increase liabilities, or
- (iv) contributions that are less than the actuarial contribution rate.

There are a variety of different methods that can be used to amortize the UAAL. Each method results in a different payment stream and, therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAAL is amortized,
- The rate at which the amortization payment increases, and
- The number of components of UAAL (separate amortization bases).

Amortization Period

The amortization period can be either closed or open. If it is a closed amortization period, the number of years remaining in the amortization period declines by one in each future valuation. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but is reset to the same number each year. This approach essentially “refinances” the System’s debt (UAAL) every year.

Amortization Payment

The level dollar amortization method is similar to the method in which a homeowner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on the amortization period until the liability is extinguished. This results in the liability steadily decreasing while the payments, though remaining level in dollar terms, in all probability decrease as a percentage of payroll. Even if a plan sponsor’s population is not growing, inflationary salary increases will usually be sufficient to increase the aggregate covered payroll.

The rationale behind the level percentage of payroll amortization method is that since normal costs are calculated to be a constant percentage of pay, the unfunded actuarial accrued liability should be paid off in the same manner. When this method of amortizing the unfunded actuarial accrued liability is adopted, the initial amortization payments are lower than they would be under





SECTION III – ACTUARIAL METHODS

a level dollar amortization payment method but the payments increase at a fixed rate each year so that ultimately the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase at the same rate so that the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial accrued liability meaning that even if there are no experience losses, the dollar amount of the unfunded actuarial accrued liability will grow (called negative amortization). This is particularly true if the plan sponsor is paying off the unfunded actuarial accrued liability over a long period, such as 20 or more years.

Amortization Bases

The UAAL can be amortized either as one single amount or as components or “layers,” each with a separate amortization base, payment and period. If the UAAL is amortized as one amount, the UAAL is recalculated each year in the valuation and experience gains/losses or other changes in the UAAL are folded into the single UAAL amortization base. The amortization payment is then the total UAAL divided by an amortization factor for the applicable amortization period.

If separate amortization bases are maintained, the UAAL is composed of multiple amortization bases, each with its own payment schedule and remaining amortization period. In each valuation, the unexpected change in the UAAL is established as a new amortization base over the appropriate amortization period beginning on that valuation date. The UAAL is then the sum of all the outstanding amortization bases on the valuation date and the UAAL payment is the sum of all of the amortization payments on the existing amortization bases. This approach provides transparency in that the current UAAL is paid off over a fixed period of time and the remaining components of the UAAL are clearly identified. Adjustments to the UAAL in future years are also separately identified in each future year. One downside of this approach is that it can create some discontinuities in contribution rates when UAAL layers/components are fully paid off. If this occurs, it likely would be far in the future, with adequate time to address any adjustments needed.

Recommendation

The methodology in calculating the Actuarially Determined Contribution is as follows:

- Amortization Period – Closed period with maximum period of 20 years for new bases
- Amortization Payment – Level Percentage of Payroll
- Amortization Bases – Separate bases for all experience gains and losses, assumption changes or benefit changes

We recommend that no changes be made to these methods.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 27 provides guidance to actuaries regarding the selection of assumptions for measuring pension obligations. Each individual demographic assumption should satisfy the criteria of ASOP 27. In selecting demographic assumptions, the actuary should also consider: the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date, the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 27.

Overview of Analysis

The purpose of a study of demographic experience is to compare what actually happened to the individual members of the System during the study period (July 1, 2020 through June 30, 2025) with what was expected to happen, based on the actuarial assumptions. A single five-year period is a relatively short observation period. In addition, the current study period includes a few years where the COVID-19 pandemic significantly influenced demographic trends which limits the credibility of the experience. Therefore, we have considered the results of the prior Experience Study when deemed appropriate.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the study is tabulated by age, duration, gender, group, and membership class (active, retired, etc.).
- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposures, by the expected rates of decrement.
- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio) and is expressed as a percentage or decimal.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Judgement is required to anticipate future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

In our analysis, we use a methodology to analyze the experience that we call a liability-weighted approach. The liability is approximated by using the member's compensation and years of service to estimate the member's benefit level. The exposure and actual occurrences are then multiplied by the benefit level to provide the liability-weighted experience. For retiree mortality, the weight is simply the benefit amount. This approach is particularly insightful when analyzing experience in a non-homogenous group. While we reviewed experience on both a count and liability-weighted basis, we have generally found the liability-weighted experience to be a better basis to use to set assumptions. Therefore, we assign more credibility to the liability-weighted results in evaluating experience and developing new assumptions, if necessary.

Revised rates of decrement are tested by using them to recalculate the expected number of decrements during the study period, and the results are shown as revised A/E Ratios.

The table below is a comparison of TRS retirement experience on a count and liability-weighted basis. This shows that the number (count-weighted) of actual retirements that occurred in this 5-year period was slightly less than expected but the liability-weighted basis, in aggregate, met expectations.

Retirement Experience					
Group	Exposures	Actual	Expected	A/E Ratio	
				Count	Liability
Males					
TRS 1	7,487	1,746	1,685	104%	106%
TRS 2	2,777	368	472	78%	83%
TRS 3	2,675	447	549	82%	67%
Subtotal	12,939	2,561	2,706	95%	99%
Females					
TRS 1	22,541	5,529	5,389	103%	105%
TRS 2	8,165	1,145	1,361	84%	89%
TRS 3	5,942	960	1,245	77%	71%
Subtotal	36,648	7,634	7,995	95%	100%
Total	49,587	10,195	10,701	95%	100%





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

ASOP 27 states that the actuary should use professional judgement to estimate possible future outcomes, based on past experience and future expectations, and select assumptions based upon application of that professional judgement. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Pursuant to ASOP 27 the actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.
2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.
3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age or service. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.
4. Select the specific assumptions. In selecting an assumption, the actuary should consider the potential impact of future plan design as well as the factors listed above.
5. Evaluate the reasonableness of the selected assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant cumulative actuarial gains or losses over the measurement period.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Withdrawal

It is not anticipated that all members will become eligible for a retirement benefit. Some members will terminate due to resignation or dismissal prior to becoming eligible for retirement. The rates of withdrawal adopted by the Board are used to determine the expected number of separations from active service that will occur as a result of resignation or dismissal. The current set of assumptions includes one set of rates for members with less than 5 years of service, another set of rates for members with 5 to 9 years of service, and a third set of rates for members with 10 or more years of service.

The table on the following page shows the actual to expected analysis of withdrawal experience for the five-year study period ending June 30, 2025. As discussed earlier in this section, we have used a liability-weighted methodology to study this assumption. The exposures and withdrawals have been weighted by annual salary amounts.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

COMPARISON OF ACTUAL AND EXPECTED RATES OF WITHDRAWAL FROM ACTIVE SERVICE

RATES OF WITHDRAWAL						
Central Age of Group	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
Withdrawals with less than 5 years of service						
20	0.1837	0.2000	0.918	0.1472	0.1300	1.132
25	0.1102	0.1100	1.002	0.0894	0.0900	0.994
30	0.1005	0.1000	1.005	0.0935	0.1100	0.850
35	0.1045	0.1100	0.950	0.1034	0.1100	0.940
40	0.1129	0.1250	0.903	0.0943	0.1250	0.754
45	0.0965	0.1150	0.839	0.1083	0.1350	0.803
50	0.0973	0.1425	0.683	0.1061	0.1500	0.707
53 & over	0.1544	0.1665	0.927	0.1467	0.1953	0.752
TOTAL	0.1141	0.1241	0.919	0.1030	0.1196	0.861
Withdrawals with at least 5 but less than 10 years of service						
25	0.0449	0.0325	1.381	0.0447	0.0450	0.993
30	0.0430	0.0360	1.193	0.0495	0.0425	1.164
35	0.0406	0.0360	1.127	0.0381	0.0350	1.088
40	0.0369	0.0400	0.922	0.0433	0.0400	1.081
45	0.0405	0.0400	1.013	0.0362	0.0400	0.906
50	0.0493	0.0450	1.095	0.0464	0.0450	1.032
53 & over	0.0514	0.0599	0.858	0.0515	0.0552	0.932
TOTAL	0.0424	0.0395	1.072	0.0444	0.0411	1.080
Withdrawals with 10 or more years of service						
30	0.0226	0.0280	0.807	0.0297	0.0100	2.967
35	0.0191	0.0155	1.234	0.0213	0.0160	1.331
40	0.0150	0.0125	1.198	0.0137	0.0120	1.144
45	0.0100	0.0110	0.907	0.0088	0.0100	0.882
50	0.0087	0.0110	0.795	0.0101	0.0125	0.806
53 & over	0.0163	0.0125	1.302	0.0168	0.0160	1.050
TOTAL	0.0123	0.0120	1.025	0.0127	0.0123	1.029

The preceding results indicate that for male and female members with less than 5 years of service, the actual weighted withdrawal rates were less than expected. In addition, the results show that for male and female members with greater than 5 years of service and less than 10 years of service, the actual weighted withdrawals were greater than expected rates overall, and for male and female members with greater than 10 years of service, the actual weighted withdrawal rates were just slightly greater than expected in total. **We recommend adjusting the rates of withdrawal at this time to better reflect the experience of the System.**



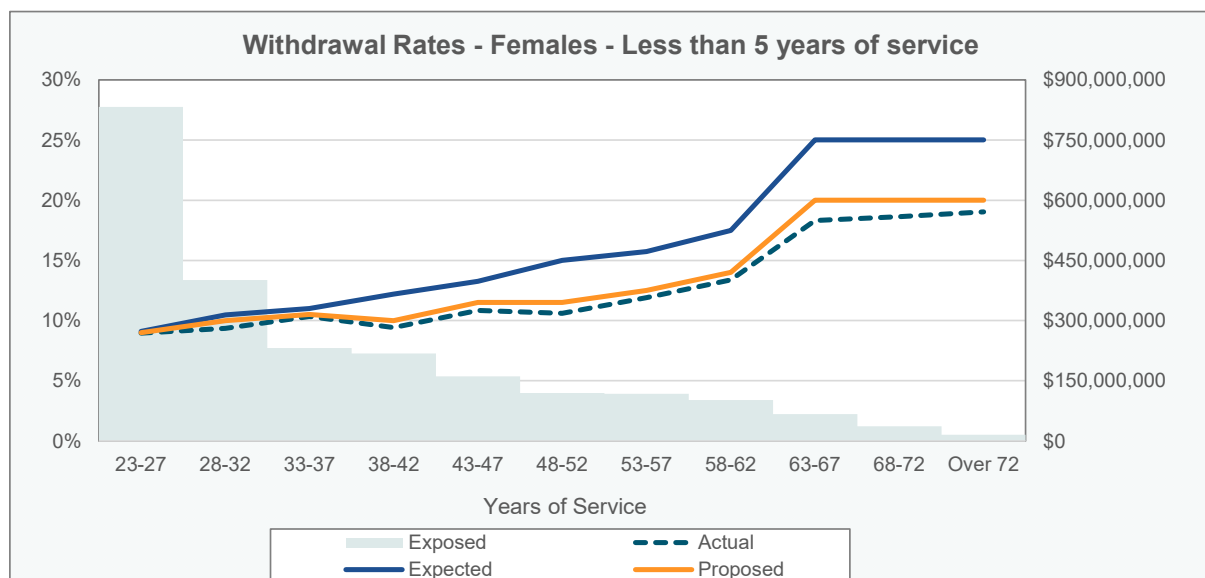
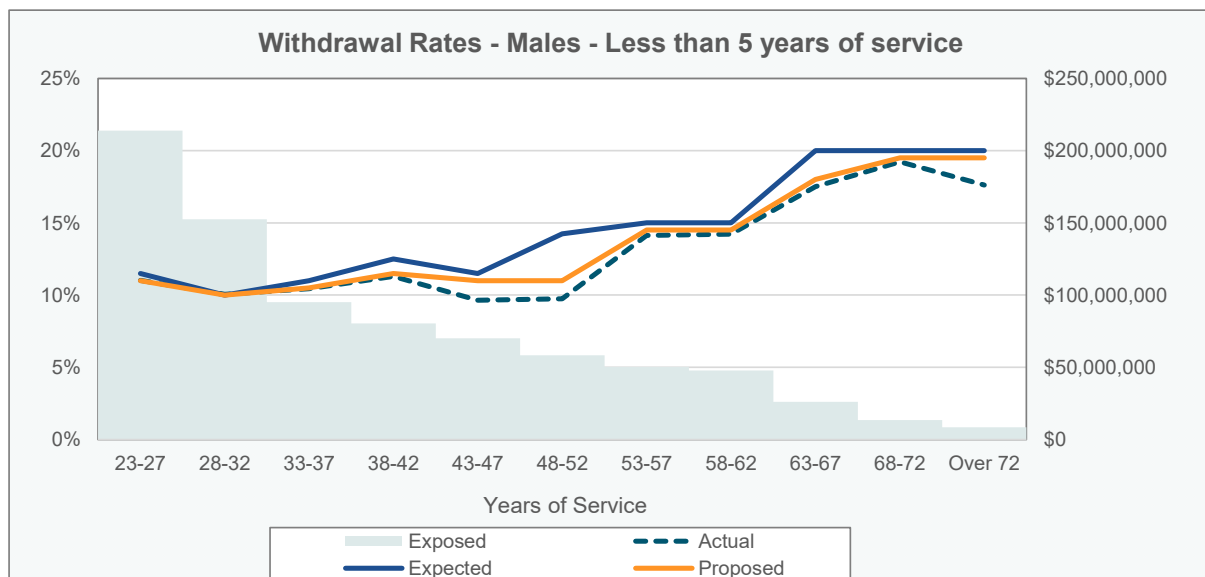


SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following graphs show a comparison of the current, actual, and proposed rates of withdrawal for each of the service categories. The left axis of the charts below shows (i) the actual withdrawal rates of employment by age groups, (ii) the current assumed withdrawal rates and (iii) the proposed assumed withdrawal rates.

The right axis of the charts below represents the liability weighted (by annual salary) exposures. The exposed liabilities are the total liabilities subject to withdrawal rates based on the benefit recipient's age during the experience period. When recommending assumption changes, it is important to recognize actual experience in areas of higher exposures versus areas of lower exposures.

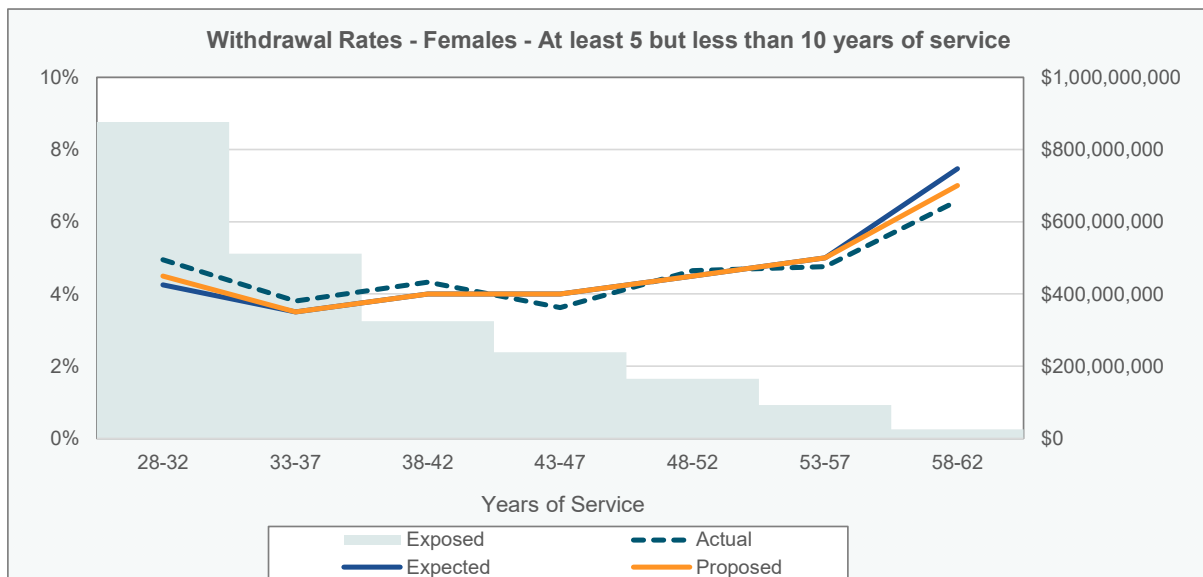
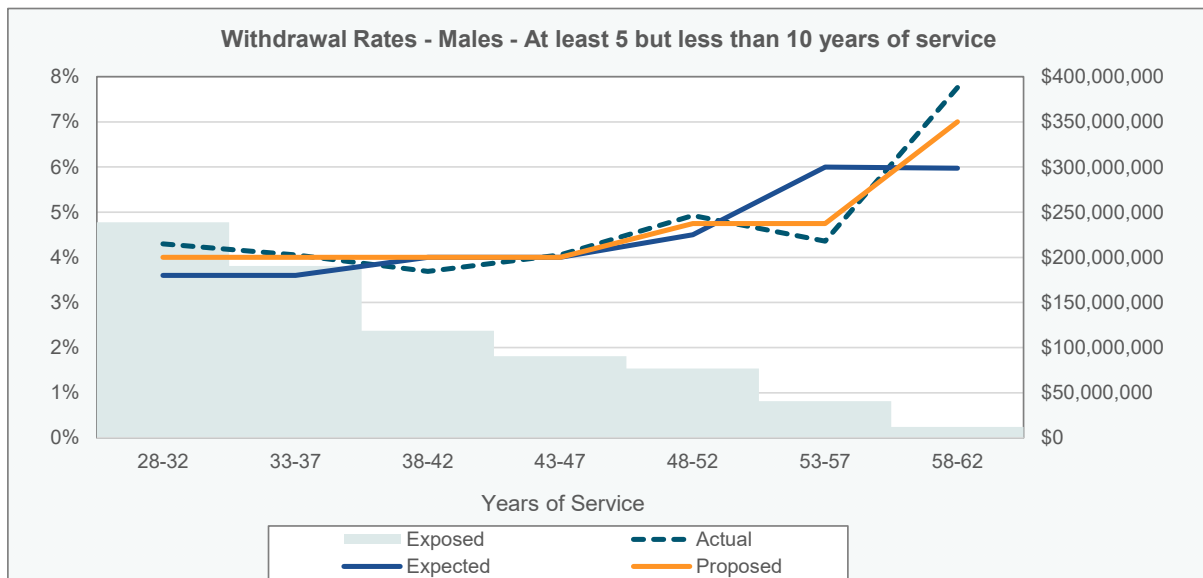
RATES OF WITHDRAWAL FOR ACTIVE MEMBERS





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

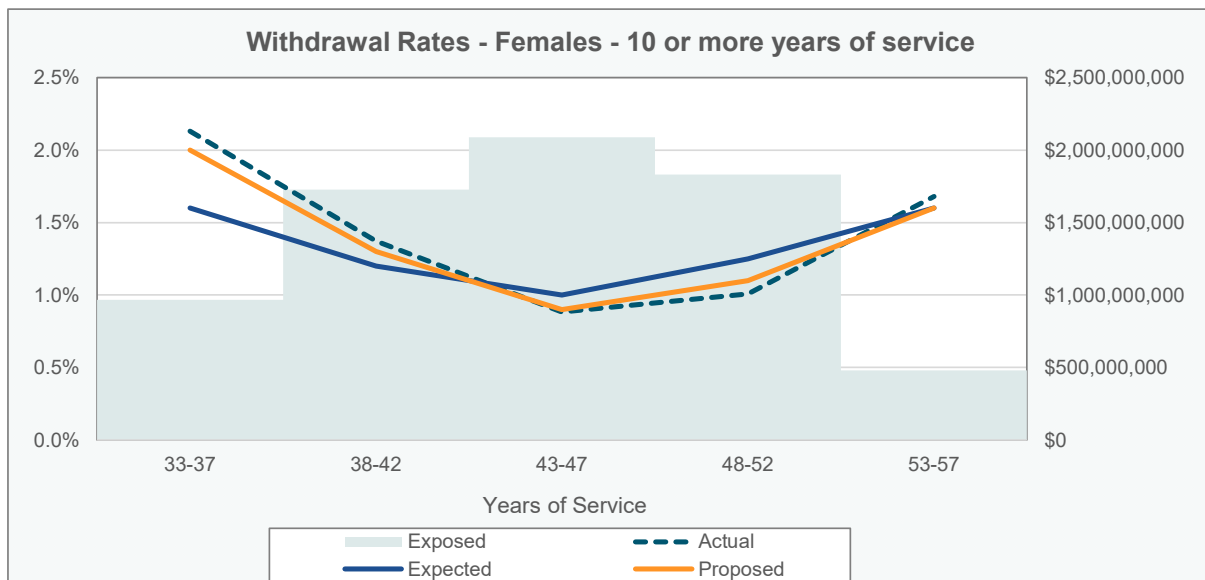
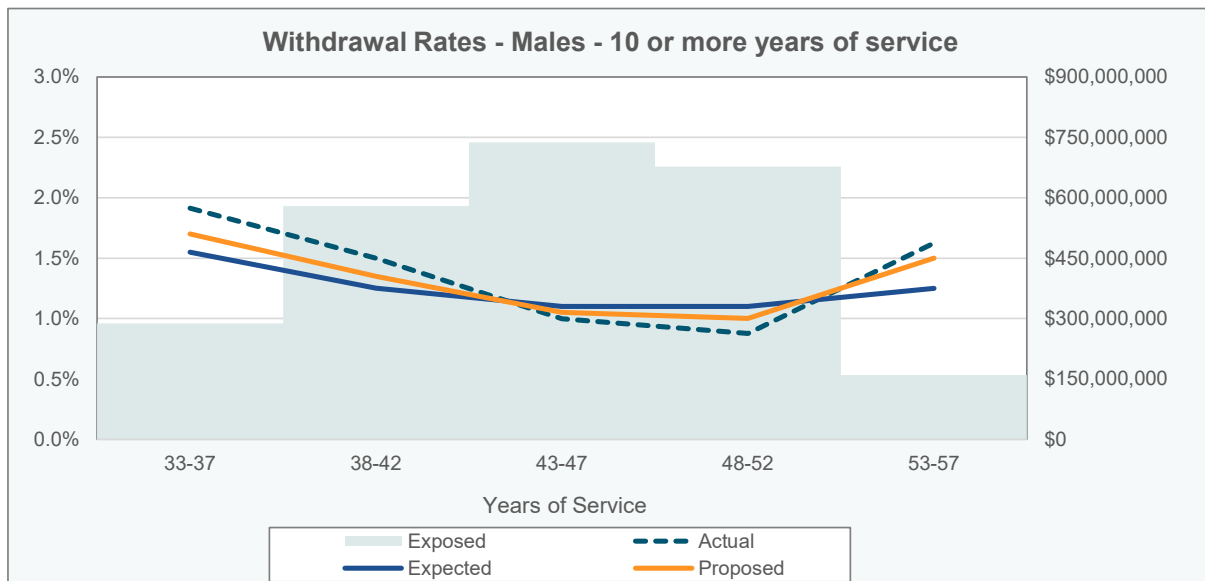
RATES OF WITHDRAWAL FOR ACTIVE MEMBERS





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

RATES OF WITHDRAWAL FOR ACTIVE MEMBERS





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison between the current and proposed withdrawal rates.

COMPARATIVE RATES OF WITHDRAWAL						
AGE	Years of Service					
	CURRENT			PROPOSED		
	0 - 4	5 - 9	10+	0 - 4	5 - 9	10+
Males						
20	20.00%			19.00%		
25	11.00%	3.25%		11.00%	4.00%	
30	10.00%	3.60%	2.80%	10.00%	4.00%	2.50%
35	11.00%	3.60%	1.55%	10.50%	4.00%	1.70%
40	12.50%	4.00%	1.25%	11.50%	4.00%	1.35%
45	11.50%	4.00%	1.10%	11.00%	4.00%	1.05%
50	14.25%	4.50%	1.10%	11.00%	4.75%	1.00%
55	15.00%	6.00%		14.50%	4.75%	
Females						
20	13.00%			14.00%		
25	9.00%	4.50%		9.00%	4.50%	
30	11.00%	4.25%	1.00%	10.00%	4.50%	2.00%
35	11.00%	3.50%	1.60%	10.50%	3.50%	2.00%
40	12.50%	4.00%	1.20%	10.00%	4.00%	1.30%
45	13.50%	4.00%	1.00%	11.50%	4.00%	0.90%
50	15.00%	4.50%	1.25%	11.50%	4.50%	1.10%
55	15.00%	5.00%		12.50%	5.00%	





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison of the actual and expected withdrawals from active service based on the new proposed rates of withdrawal.

COMPARISON OF ACTUAL AND EXPECTED RATE OF WITHDRAWALS FROM ACTIVE SERVICE BASED ON PROPOSED RATES OF WITHDRAWAL

RATES OF WITHDRAWAL						
Central Age of Group	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
Withdrawals with less than 5 years of service						
20	0.1837	0.1900	0.967	0.1472	0.1400	1.051
25	0.1102	0.1100	1.002	0.0894	0.0900	0.994
30	0.1005	0.1000	1.005	0.0935	0.1000	0.935
35	0.1045	0.1050	0.995	0.1034	0.1050	0.985
40	0.1129	0.1150	0.982	0.0943	0.1000	0.943
45	0.0965	0.1100	0.877	0.1083	0.1150	0.942
50	0.0973	0.1100	0.885	0.1061	0.1150	0.922
53 & over	0.1544	0.1588	0.972	0.1467	0.1559	0.941
TOTAL	0.1141	0.1171	0.974	0.1030	0.1072	0.961
Withdrawals with at least 5 but less than 10 years of service						
25	0.0449	0.0400	1.122	0.0447	0.0450	0.993
30	0.0430	0.0400	1.074	0.0495	0.0450	1.100
35	0.0406	0.0400	1.014	0.0381	0.0350	1.088
40	0.0369	0.0400	0.922	0.0433	0.0400	1.081
45	0.0405	0.0400	1.013	0.0362	0.0400	0.906
50	0.0493	0.0475	1.037	0.0464	0.0450	1.032
53 & over	0.0514	0.0527	0.976	0.0515	0.0542	0.949
TOTAL	0.0424	0.0416	1.019	0.0444	0.0420	1.057
Withdrawals with 10 or more years of service						
30	0.0226	0.0250	0.903	0.0297	0.0200	1.483
35	0.0191	0.0170	1.125	0.0213	0.0200	1.065
40	0.0150	0.0135	1.109	0.0137	0.0130	1.056
45	0.0100	0.0105	0.950	0.0088	0.0090	0.981
50	0.0087	0.0100	0.875	0.0101	0.0110	0.915
53 & over	0.0163	0.0150	1.084	0.0168	0.0160	1.050
TOTAL	0.0123	0.0122	1.014	0.0127	0.0125	1.015





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Disability Retirement

The analysis of the actual disability experience over the five-year experience period yields an actual/expected ratio of 46.5% for males and 48.5% for females. A ratio that is less than 100% indicates that there were fewer disability retirements during the experience period than were anticipated by the assumption.

In our analysis of rates, we considered only the count basis in developing the A/E ratios. Based on our work with other public plans, the use of liability-weighted results can often be distorted by lower salaries in the year leading up to a disability.

The table below details the actual/expected ratio by age group and in total.

COMPARISON OF ACTUAL AND EXPECTED DISABILITY RETIREMENTS

NUMBER OF DISABILITY RETIREMENTS						
Central Age of Group	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
25	0	1	0.000	0	3	0.000
30	1	1	1.000	3	7	0.429
35	2	3	0.667	5	21	0.238
40	4	10	0.400	20	46	0.435
45	16	24	0.667	67	98	0.684
50	26	37	0.703	93	148	0.628
55	14	36	0.389	83	140	0.593
60	8	28	0.286	47	101	0.465
63 & over	9	33	0.273	12	116	0.103
TOTAL	80	172	0.465	330	680	0.485

The preceding results indicate that the actual number of disability retirements for both males and females was less than expected at all ages and in aggregate. **We recommend decreasing the rates of disability retirement to reflect more closely the actual experience of the membership.**

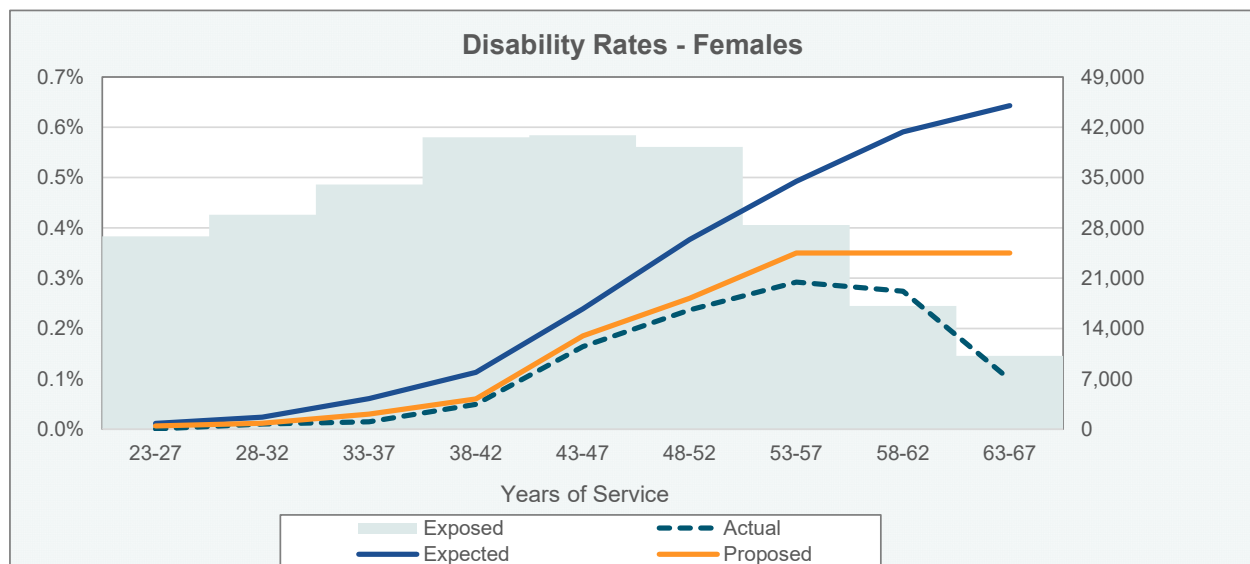
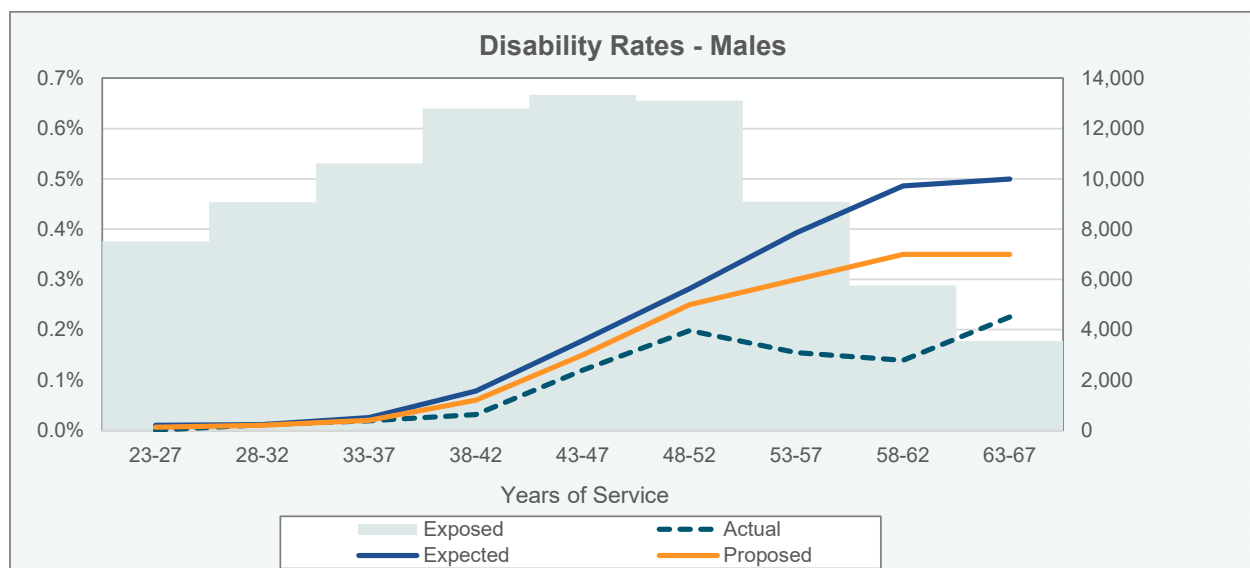




SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following graphs show a comparison of the current, actual, and proposed rates of disability retirement. The left axis of the graphs below shows (i) the actual disability rates of employment by age during the past five years, (ii) the current assumed disability rates and (iii) the proposed assumed disability rates.

The right axis of the graphs below represents the number of exposed lives. The exposed lives are the total number of individuals who were subject to disability rates based upon the benefit recipient's age during the experience period. When recommending assumption changes, it is important to recognize actual experience in areas of higher exposures versus areas of lower exposures.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison between the current and proposed rates of disability retirements.

COMPARATIVE RATES OF DISABILITY RETIREMENT				
AGE	MALES		FEMALES	
	Current	Proposed	Current	Proposed
20	0.010%	0.005%	0.010%	0.005%
25	0.010%	0.006%	0.010%	0.006%
30	0.010%	0.010%	0.020%	0.012%
35	0.020%	0.020%	0.060%	0.030%
40	0.070%	0.060%	0.100%	0.060%
45	0.180%	0.150%	0.240%	0.185%
50	0.280%	0.250%	0.380%	0.260%
55	0.400%	0.300%	0.500%	0.350%
60	0.500%	0.350%	0.600%	0.350%

The following table shows a comparison of the actual and expected disability retirements based on new proposed rates of disability.

COMPARISON OF ACTUAL AND EXPECTED DISABILITY RETIREMENTS BASED ON PROPOSED RATES OF DISABILITY

NUMBER OF DISABILITY RETIREMENTS						
Central Age of Group	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
25	0	0	0.000	0	2	0.000
30	1	1	1.000	3	4	0.750
35	2	2	1.000	5	10	0.500
40	4	8	0.500	20	24	0.833
45	16	20	0.800	67	76	0.882
50	26	33	0.788	93	102	0.912
55	14	27	0.519	83	99	0.838
60	8	20	0.400	47	60	0.783
63 & over	9	24	0.375	12	65	0.185
TOTAL	80	136	0.588	330	442	0.747





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Service Retirement

The rates of retirement used in the actuarial valuation project the percentage of employees who are expected to retire during the upcoming year. Higher paid members typically have a greater liability compared to members who are lower paid. As a result, retirement rates for members with higher compensation levels and higher service will have a greater influence on the liabilities of the System. In this study, we have analyzed recent retirement experience on a liability-weighted basis where the exposures and retirements are weighted by annual salary amounts.

The rates of retirement were studied separately for TRS 1 and 2, TRS 3, and TRS 4 and for members with more than, less than and exactly 27 years of service for TRS 1, 2, and 3. The following tables show the actual to expected analysis of retirement experience for TRS 1 and 2.

COMPARISON OF ACTUAL AND EXPECTED RATES OF SERVICE RETIREMENT

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with less than 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
55	0.0587	0.0525	1.119	0.0669	0.0500	1.338
56	0.0430	0.0525	0.818	0.0562	0.0700	0.803
57	0.0522	0.0625	0.835	0.0574	0.0700	0.820
58	0.0311	0.0625	0.497	0.0665	0.0700	0.951
59	0.0837	0.0625	1.340	0.1082	0.0700	1.546
60	0.1577	0.1350	1.168	0.2109	0.1500	1.406
61	0.1369	0.1500	0.913	0.1698	0.1500	1.132
62	0.1757	0.1500	1.172	0.1832	0.1500	1.221
63	0.1775	0.1500	1.184	0.1891	0.1800	1.050
64	0.1461	0.1500	0.974	0.1851	0.1800	1.028
65	0.1772	0.2000	0.886	0.2975	0.2500	1.190
66	0.2567	0.2200	1.167	0.2662	0.2500	1.065
67	0.2876	0.2500	1.151	0.2591	0.2500	1.037
68	0.2011	0.2500	0.804	0.2264	0.2500	0.905
69	0.4157	0.2500	1.663	0.2093	0.2500	0.837
70	0.2139	0.2500	0.856	0.2026	0.3000	0.675
71	0.2719	0.2500	1.088	0.2681	0.3000	0.894
72	0.2477	0.2500	0.991	0.3109	0.3000	1.036
73	0.1868	0.2500	0.747	0.0949	0.3000	0.316
74	0.2663	0.2500	1.065	0.1985	0.3000	0.662
75+	0.2618	1.0000	0.262	0.2342	1.0000	0.234
TOTAL	0.1150	0.1201	0.958	0.1232	0.1171	1.051





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

COMPARISON OF ACTUAL AND EXPECTED RATES OF SERVICE RETIREMENT

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with exactly 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
45	0.0000	0.2550	0.000	0.0000	0.2700	0.000
46	0.0000	0.2550	0.000	0.5119	0.2700	1.896
47	0.0000	0.2550	0.000	0.4699	0.2700	1.740
48	0.4293	0.2550	1.683	0.5168	0.2700	1.914
49	0.3751	0.2550	1.471	0.3165	0.2700	1.172
50	0.3485	0.3350	1.040	0.3478	0.3000	1.159
51	0.3511	0.3050	1.151	0.3465	0.3000	1.155
52	0.3392	0.2850	1.190	0.3554	0.3000	1.185
53	0.3234	0.2350	1.376	0.3367	0.3000	1.122
54	0.2906	0.2250	1.292	0.3761	0.2500	1.504
55	0.5759	0.4850	1.187	0.6291	0.6000	1.048
56	0.5119	0.4850	1.055	0.5555	0.6000	0.926
57	0.5676	0.4250	1.336	0.6276	0.5000	1.255
58	0.5349	0.3550	1.507	0.5970	0.5000	1.194
59	0.5823	0.3650	1.595	0.6709	0.5000	1.342
60	0.3754	0.4150	0.905	0.6459	0.5000	1.292
61	0.4696	0.3850	1.220	0.5247	0.5000	1.049
62	0.5508	0.3850	1.431	0.5543	0.5000	1.109
63	0.5705	0.3850	1.482	0.5748	0.5000	1.150
64	0.5218	0.3850	1.355	0.5147	0.5000	1.029
65	0.4037	0.3850	1.049	0.4900	0.5000	0.980
66	0.5330	0.3850	1.384	0.6094	0.5000	1.219
67	0.5652	0.3350	1.687	0.6449	0.5000	1.290
68	0.0869	0.3350	0.259	0.5859	0.4500	1.302
69	0.4369	0.3350	1.304	0.2406	0.4500	0.535
70	0.6601	0.3850	1.715	0.3802	0.4500	0.845
71	0.5376	0.3850	1.396	0.4930	0.4500	1.096
72	0.9727	0.3850	2.527	0.4234	0.4500	0.941
73	0.1648	0.3850	0.428	0.1794	0.4500	0.399
74	0.0000	0.3850	0.000	0.6465	0.4500	1.437
75+	0.0000	1.0000	0.000	0.3744	1.0000	0.374
TOTAL	0.3981	0.3293	1.209	0.4253	0.3679	1.156





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

COMPARISON OF ACTUAL AND EXPECTED RATES OF SERVICE RETIREMENT

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with more than 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
45	0.0000	0.1700	0.000	0.0000	0.1700	0.000
46	0.0000	0.1700	0.000	0.5885	0.1700	3.462
47	0.6905	0.1700	4.062	0.0000	0.1700	0.000
48	0.0000	0.1700	0.000	0.1701	0.1700	1.001
49	0.2077	0.1700	1.222	0.1323	0.1700	0.778
50	0.1289	0.2500	0.516	0.1675	0.2000	0.838
51	0.2363	0.2200	1.074	0.1665	0.2000	0.832
52	0.1502	0.2000	0.751	0.1859	0.2000	0.929
53	0.1652	0.1500	1.102	0.1485	0.2000	0.743
54	0.1479	0.1400	1.056	0.1952	0.1500	1.301
55	0.5103	0.4000	1.276	0.5333	0.5000	1.067
56	0.4540	0.4000	1.135	0.4690	0.5000	0.938
57	0.3482	0.3400	1.024	0.3866	0.4000	0.966
58	0.3685	0.2700	1.365	0.3511	0.4000	0.878
59	0.2775	0.2800	0.991	0.2870	0.4000	0.718
60	0.3138	0.3300	0.951	0.3599	0.4000	0.900
61	0.2703	0.3000	0.901	0.3322	0.4000	0.830
62	0.2357	0.3000	0.786	0.3483	0.4000	0.871
63	0.2292	0.3000	0.764	0.3587	0.4000	0.897
64	0.0838	0.3000	0.279	0.3863	0.4000	0.966
65	0.2499	0.3000	0.833	0.3657	0.4000	0.914
66	0.3304	0.3000	1.101	0.2894	0.4000	0.724
67	0.2207	0.2500	0.883	0.5045	0.4000	1.261
68	0.3950	0.2500	1.580	0.3847	0.3500	1.099
69	0.0770	0.2500	0.308	0.1234	0.3500	0.353
70	0.1696	0.3000	0.565	0.3700	0.3500	1.057
71	0.1436	0.3000	0.479	0.2796	0.3500	0.799
72	0.1111	0.3000	0.370	0.2621	0.3500	0.749
73	0.2492	0.3000	0.831	0.2929	0.3500	0.837
74	0.1473	0.3000	0.491	0.3088	0.3500	0.882
75+	0.1366	1.0000	0.137	0.1560	1.0000	0.156
TOTAL	0.2628	0.2725	0.964	0.2862	0.3069	0.933



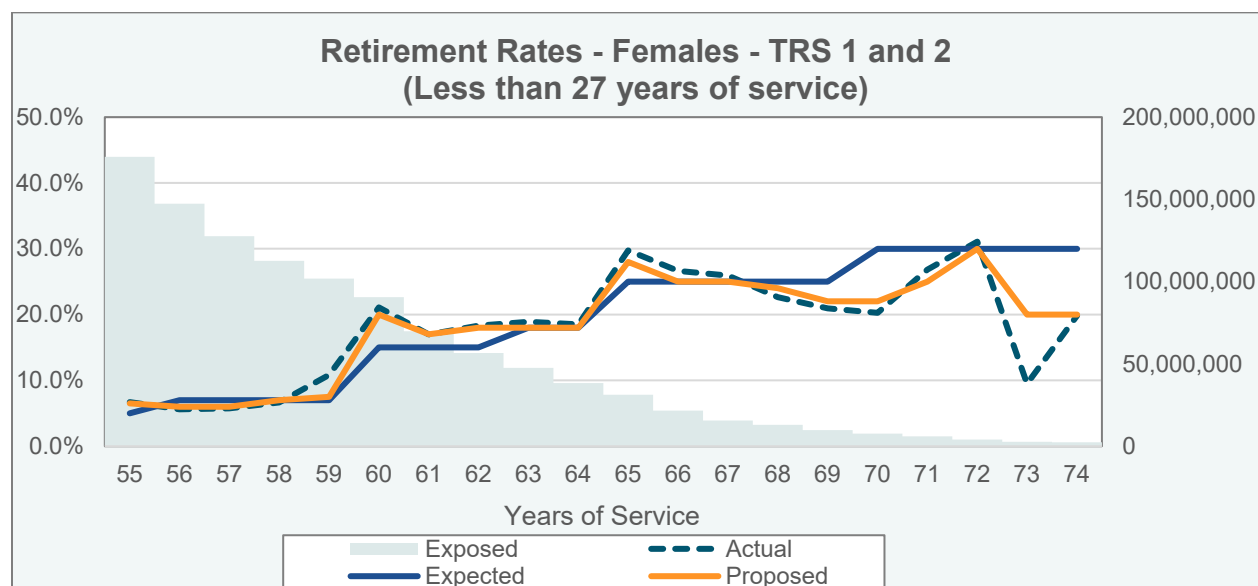
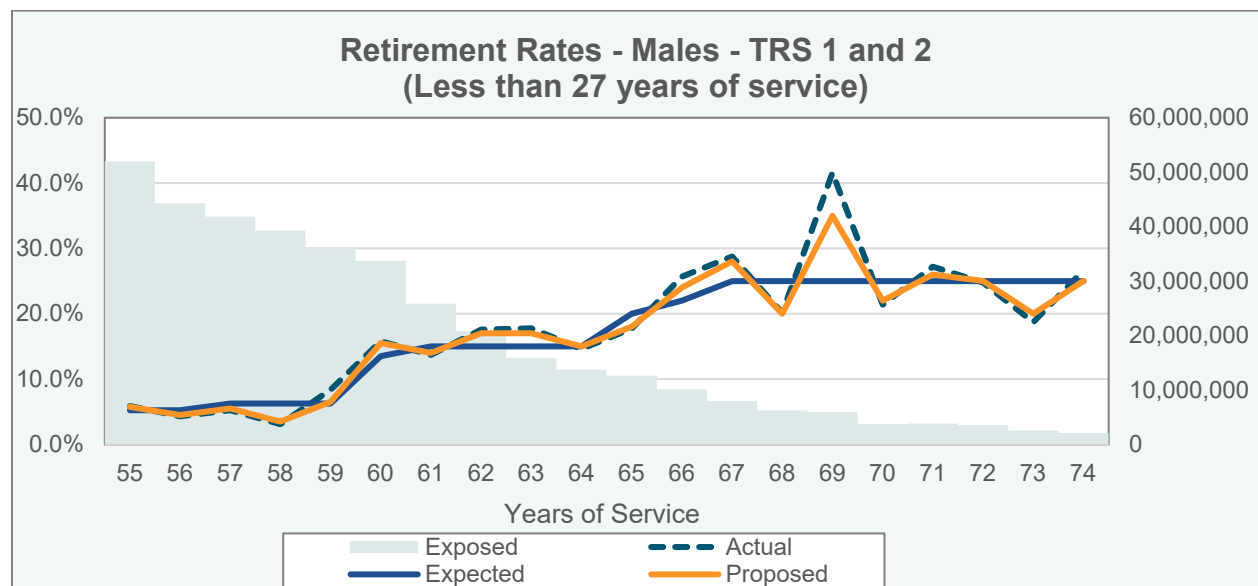


SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The preceding results indicate that, overall, the actual rates of retirement for members with less than 27 years of service was less than expected for males and greater than expected for females but with varying results at different ages. For members with exactly 27 years of service at retirement, the actual rates of retirement were greater than expected overall and for those with more than 27 years of service, the actual rates were less than expected overall. On the basis of this experience, **we recommend revising the rates of retirement in order to reflect actual experience more closely.**

The following graphs show a comparison of the current, actual, and proposed rates of service retirement.

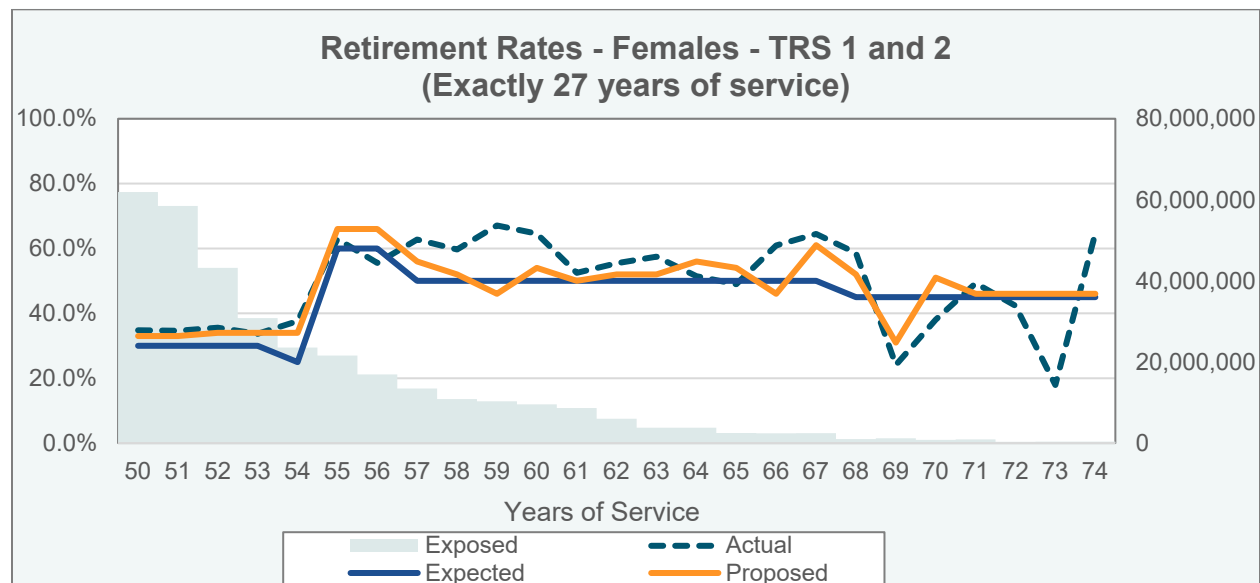
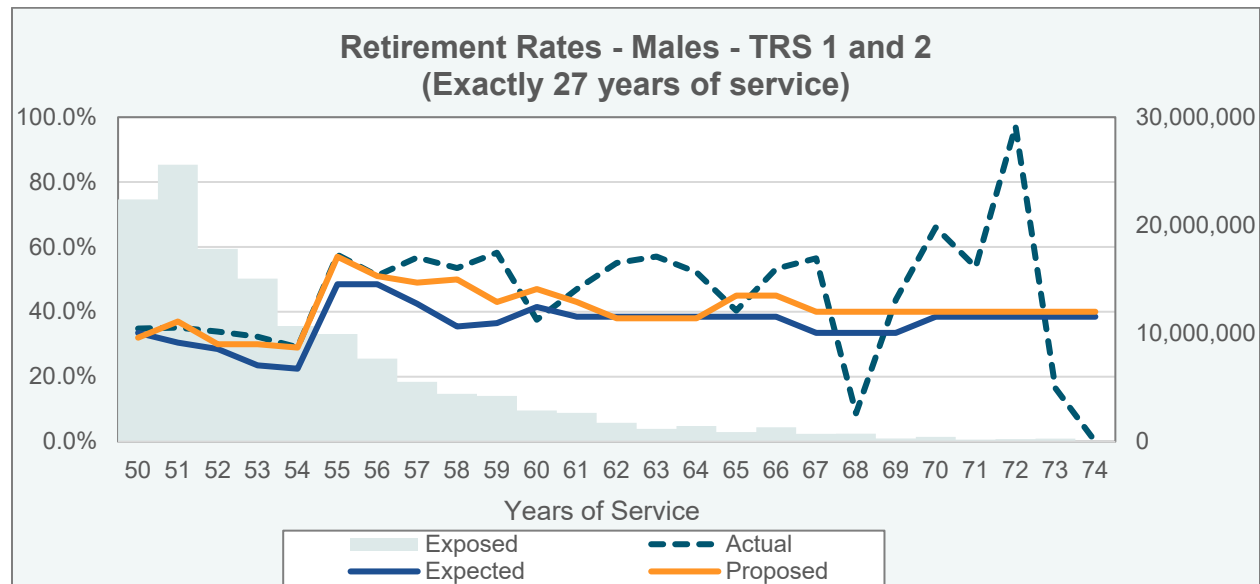
RATES OF SERVICE RETIREMENT





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

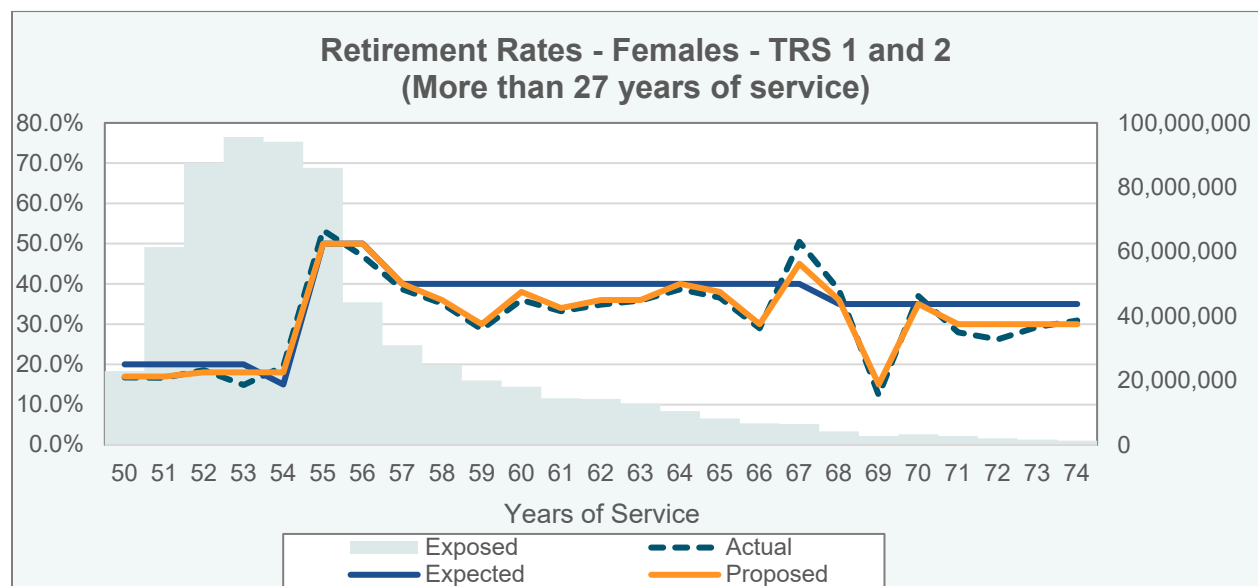
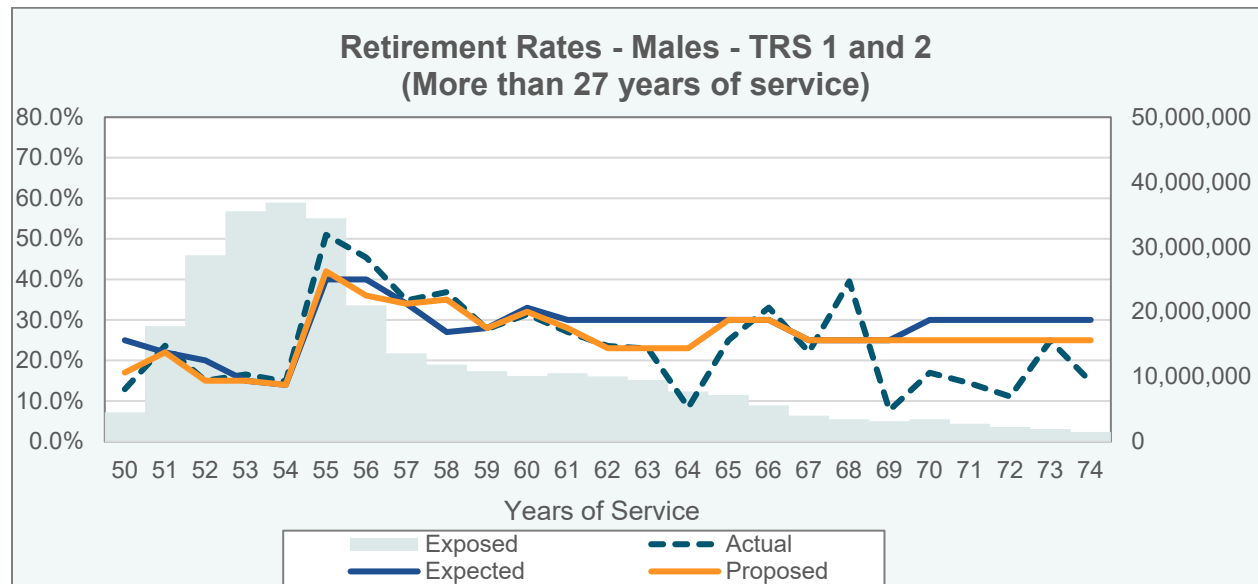
RATES OF SERVICE RETIREMENT





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

RATES OF SERVICE RETIREMENT





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison of the current and proposed rates of retirement.

COMPARATIVE RATES OF SERVICE RETIREMENT								
TRS 1 and 2								
Age	Males				Females			
	Less than 27 years of service		27 or more years of service		Less than 27 years of service		27 or more years of service	
	Current	Proposed	Current*	Proposed**	Current	Proposed	Current***	Proposed****
45	0.00%	0.00%	17.00%	17.00%	0.00%	0.00%	17.00%	17.00%
46	0.00%	0.00%	17.00%	17.00%	0.00%	0.00%	17.00%	17.00%
47	0.00%	0.00%	17.00%	17.00%	0.00%	0.00%	17.00%	17.00%
48	0.00%	0.00%	17.00%	17.00%	0.00%	0.00%	17.00%	17.00%
49	0.00%	0.00%	17.00%	17.00%	0.00%	0.00%	17.00%	17.00%
50	0.00%	0.00%	25.00%	17.00%	0.00%	0.00%	20.00%	17.00%
51	0.00%	0.00%	22.00%	22.00%	0.00%	0.00%	20.00%	17.00%
52	0.00%	0.00%	20.00%	15.00%	0.00%	0.00%	20.00%	18.00%
53	0.00%	0.00%	15.00%	15.00%	0.00%	0.00%	20.00%	18.00%
54	0.00%	0.00%	14.00%	14.00%	0.00%	0.00%	15.00%	18.00%
55	5.25%	5.75%	40.00%	42.00%	5.00%	6.50%	50.00%	50.00%
56	5.25%	4.50%	40.00%	36.00%	7.00%	6.00%	50.00%	50.00%
57	6.25%	5.50%	34.00%	34.00%	7.00%	6.00%	40.00%	40.00%
58	6.25%	3.50%	27.00%	35.00%	7.00%	7.00%	40.00%	36.00%
59	6.25%	6.50%	28.00%	28.00%	7.00%	7.50%	40.00%	30.00%
60	13.50%	15.50%	33.00%	32.00%	15.00%	20.00%	40.00%	38.00%
61	15.00%	14.00%	30.00%	28.00%	15.00%	17.00%	40.00%	34.00%
62	15.00%	17.00%	30.00%	23.00%	15.00%	18.00%	40.00%	36.00%
63	15.00%	17.00%	30.00%	23.00%	18.00%	18.00%	40.00%	36.00%
64	15.00%	15.00%	30.00%	23.00%	18.00%	18.00%	40.00%	40.00%
65	20.00%	18.00%	30.00%	30.00%	25.00%	28.00%	40.00%	38.00%
66	22.00%	24.00%	30.00%	30.00%	25.00%	25.00%	40.00%	30.00%
67	25.00%	28.00%	25.00%	25.00%	25.00%	25.00%	40.00%	45.00%
68	25.00%	20.00%	25.00%	25.00%	25.00%	24.00%	35.00%	36.00%
69	25.00%	35.00%	25.00%	25.00%	25.00%	22.00%	35.00%	15.00%
70	25.00%	22.00%	30.00%	25.00%	30.00%	22.00%	35.00%	35.00%
71	25.00%	26.00%	30.00%	25.00%	30.00%	25.00%	35.00%	30.00%
72	25.00%	25.00%	30.00%	25.00%	30.00%	30.00%	35.00%	30.00%
73	25.00%	20.00%	30.00%	25.00%	30.00%	20.00%	35.00%	30.00%
74	25.00%	25.00%	30.00%	25.00%	30.00%	20.00%	35.00%	30.00%
75+	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

* Plus 8.5% when first eligible for unreduced retirement with 27 years of service.

** Plus 15.0% when first eligible for unreduced retirement with 27 years of service.

*** Plus 10.0% when first eligible for unreduced retirement with 27 years of service.

**** Plus 16.0% when first eligible for unreduced retirement with 27 years of service.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison of actual and expected retirements based on new proposed rates of retirement.

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS BASED ON PROPOSED SERVICE RETIREMENT RATES

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with less than 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
55	0.0587	0.0575	1.021	0.0669	0.0650	1.029
56	0.0430	0.0450	0.955	0.0562	0.0600	0.937
57	0.0522	0.0550	0.949	0.0574	0.0600	0.956
58	0.0311	0.0350	0.888	0.0665	0.0700	0.951
59	0.0837	0.0650	1.288	0.1082	0.0750	1.443
60	0.1577	0.1550	1.018	0.2109	0.2000	1.055
61	0.1369	0.1400	0.978	0.1698	0.1700	0.999
62	0.1757	0.1700	1.034	0.1832	0.1800	1.018
63	0.1775	0.1700	1.044	0.1891	0.1800	1.050
64	0.1461	0.1500	0.974	0.1851	0.1800	1.028
65	0.1772	0.1800	0.984	0.2975	0.2800	1.062
66	0.2567	0.2400	1.069	0.2662	0.2500	1.065
67	0.2876	0.2800	1.027	0.2591	0.2500	1.037
68	0.2011	0.2000	1.006	0.2264	0.2400	0.943
69	0.4157	0.3500	1.188	0.2093	0.2200	0.951
70	0.2139	0.2200	0.972	0.2026	0.2200	0.921
71	0.2719	0.2600	1.046	0.2681	0.2500	1.072
72	0.2477	0.2500	0.991	0.3109	0.3000	1.036
73	0.1868	0.2000	0.934	0.0949	0.2000	0.475
74	0.2663	0.2500	1.065	0.1985	0.2000	0.993
75+	0.2618	1.0000	0.262	0.2342	1.0000	0.234
TOTAL	0.1150	0.1202	0.957	0.1232	0.1237	0.996





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS BASED ON PROPOSED SERVICE RETIREMENT RATES

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with exactly 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
45	0.0000	0.3200	0.000	0.0000	0.3300	0.000
46	0.0000	0.3200	0.000	0.5119	0.3300	1.551
47	0.0000	0.3200	0.000	0.4699	0.3300	1.424
48	0.4293	0.3200	1.341	0.5168	0.3300	1.566
49	0.3751	0.3200	1.172	0.3165	0.3300	0.959
50	0.3485	0.3200	1.089	0.3478	0.3300	1.054
51	0.3511	0.3700	0.949	0.3465	0.3300	1.050
52	0.3392	0.3000	1.131	0.3554	0.3400	1.045
53	0.3234	0.3000	1.078	0.3367	0.3400	0.990
54	0.2906	0.2900	1.002	0.3761	0.3400	1.106
55	0.5759	0.5700	1.010	0.6291	0.6600	0.953
56	0.5119	0.5100	1.004	0.5555	0.6600	0.842
57	0.5676	0.4900	1.158	0.6276	0.5600	1.121
58	0.5349	0.5000	1.070	0.5970	0.5200	1.148
59	0.5823	0.4300	1.354	0.6709	0.4600	1.458
60	0.3754	0.4700	0.799	0.6459	0.5400	1.196
61	0.4696	0.4300	1.092	0.5247	0.5000	1.049
62	0.5508	0.3800	1.449	0.5543	0.5200	1.066
63	0.5705	0.3800	1.501	0.5748	0.5200	1.105
64	0.5218	0.3800	1.373	0.5147	0.5600	0.919
65	0.4037	0.4500	0.897	0.4900	0.5400	0.907
66	0.5330	0.4500	1.184	0.6094	0.4600	1.325
67	0.5652	0.4000	1.413	0.6449	0.6100	1.057
68	0.0869	0.4000	0.217	0.5859	0.5200	1.127
69	0.4369	0.4000	1.092	0.2406	0.3100	0.776
70	0.6601	0.4000	1.650	0.3802	0.5100	0.746
71	0.5376	0.4000	1.344	0.4930	0.4600	1.072
72	0.9727	0.4000	2.432	0.4234	0.4600	0.920
73	0.1648	0.4000	0.412	0.1794	0.4600	0.390
74	0.0000	0.4000	0.000	0.6465	0.4600	1.405
75+	0.0000	1.0000	0.000	0.3744	1.0000	0.374
TOTAL	0.3981	0.3745	1.063	0.4253	0.4076	1.043





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS BASED ON PROPOSED SERVICE RETIREMENT RATES

ANNUAL RATES OF SERVICE RETIREMENT						
TRS 1 and 2						
Members with more than 27 years of service						
Age	Males			Females		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
45	0.0000	0.1700	0.000	0.0000	0.1700	0.000
46	0.0000	0.1700	0.000	0.5885	0.1700	3.462
47	0.6905	0.1700	4.062	0.0000	0.1700	0.000
48	0.0000	0.1700	0.000	0.1701	0.1700	1.001
49	0.2077	0.1700	1.222	0.1323	0.1700	0.778
50	0.1289	0.1700	0.758	0.1675	0.1700	0.985
51	0.2363	0.2200	1.074	0.1665	0.1700	0.979
52	0.1502	0.1500	1.002	0.1859	0.1800	1.033
53	0.1652	0.1500	1.102	0.1485	0.1800	0.825
54	0.1479	0.1400	1.056	0.1952	0.1800	1.085
55	0.5103	0.4200	1.215	0.5333	0.5000	1.067
56	0.4540	0.3600	1.261	0.4690	0.5000	0.938
57	0.3482	0.3400	1.024	0.3866	0.4000	0.966
58	0.3685	0.3500	1.053	0.3511	0.3600	0.975
59	0.2775	0.2800	0.991	0.2870	0.3000	0.957
60	0.3138	0.3200	0.981	0.3599	0.3800	0.947
61	0.2703	0.2800	0.966	0.3322	0.3400	0.977
62	0.2357	0.2300	1.025	0.3483	0.3600	0.968
63	0.2292	0.2300	0.996	0.3587	0.3600	0.996
64	0.0838	0.2300	0.364	0.3863	0.4000	0.966
65	0.2499	0.3000	0.833	0.3657	0.3800	0.962
66	0.3304	0.3000	1.101	0.2894	0.3000	0.965
67	0.2207	0.2500	0.883	0.5045	0.4500	1.121
68	0.3950	0.2500	1.580	0.3847	0.3600	1.068
69	0.0770	0.2500	0.308	0.1234	0.1500	0.823
70	0.1696	0.2500	0.679	0.3700	0.3500	1.057
71	0.1436	0.2500	0.574	0.2796	0.3000	0.932
72	0.1111	0.2500	0.444	0.2621	0.3000	0.874
73	0.2492	0.2500	0.997	0.2929	0.3000	0.976
74	0.1473	0.2500	0.589	0.3088	0.3000	1.029
75+	0.1366	1.0000	0.137	0.1560	1.0000	0.156
TOTAL	0.2628	0.2599	1.011	0.2862	0.2921	0.980





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Mortality

One of the most important demographic assumptions in the valuation is mortality because it defines the expectation for how long benefit payments will be made. The longer members live, the greater the true cost of future benefit obligations will be.

For many years, rates of mortality have been declining, meaning people, in general, are living longer. Consequently, we anticipate that mortality tables will need to be updated periodically. Because of potential differences in mortality, we break down our study by gender (males and females) and by status (healthy retirees, beneficiaries, disabled retirees, and active members).

Because of the substantial amount of data required to construct a mortality table, actuaries usually rely on standard tables published by the Society of Actuaries (SOA). Actuaries often use various adjustments to these published mortality tables to better match the observed mortality rates of a specific group. The first of these adjustments can be an age adjustment that is either a “set back” or a “set forward.” A one-year age set back treats all members as if they were one year younger than they truly are when applying the rates in the mortality table. So, a one-year age set back would treat a 61-year-old retiree as if she will exhibit the mortality of a 60-year-old in the standard mortality table. The second adjustment that can be used is to “scale” a mortality table by multiplying the probabilities of death by factors less than 100% (to reflect better mortality) or factors greater than 100% (to reflect poorer mortality). Scaling factors can be applied to an entire table or a portion of the table. Of course, if needed, actuaries may use both methods to develop an appropriate table to model the mortality of the specific plan population.

In 2019, the SOA released a family of mortality tables named the Pub-2010 tables. While prior pension mortality tables had been based solely on private corporate and union retirement plans, these new tables were based entirely on public sector plan data. These tables were split by three membership types: Public Safety, Teachers, and General Employees to reflect the observed differences in mortality patterns related to the three groups. Tables were further split for healthy retirees, disabled retirees, contingent beneficiaries, and employees. There were also versions of these tables for above and below median annuity values. In May of 2025, the SOA released an updated set of mortality tables named the Pub-2016 tables which are organized in a similar fashion as the Pub-2010 tables. We anticipate that this new family of tables will be a good starting point in developing a recommendation for mortality assumptions.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying and monitoring. This has resulted in changes to the relevant Actuarial Standard of Practice, ASOP 27, *Selection of Assumptions for Measuring Pension Obligations*. This ASOP requires the pension actuary to make and disclose a specific recommendation with respect to future improvements in mortality after the valuation date, although it does not require that an actuary assume there will be future improvements. There have been significant improvements in longevity in the past, although there are different opinions about future expectations, and thus there is a subjective component in the estimation of future mortality improvement. We believe it is prudent to anticipate that the trend will continue to some degree in the future and that it is appropriate to reflect some future mortality improvement as part of the mortality assumption.

The most direct approach of including future mortality improvements, referred to as generational mortality, directly anticipates future improvements in mortality by using a different set of mortality rates for each year of birth, with the rates for later years of birth assuming lower mortality than the rates for earlier years of birth. TRS' current methodology uses the generational approach, which is the most commonly used method and is our preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with what we believe is more likely to occur. The varying mortality rates by year of birth create a series of tables that contain “built-in” mortality improvements, e.g., a member who turns age 65 in 2046 has a longer life expectancy than a member who turns age 65 in 2026. When using generational mortality, the target for the A/E ratios for the observed experience is set near 100% as future mortality improvements will be reflected directly in the actuarial valuation process.

The post-retirement mortality rates used in the actuarial valuation project the percentage of retirees who are expected to die in a given future year. This assumption is a very material assumption and has the most significant impact of all demographic assumptions on liability projections. An important note in the examination of mortality is that it is an observed correlation that life expectancy is greater for retirees with higher benefits than retirees with lower benefits. Because the goal of an actuarial valuation is to model the expected benefit payments to be provided by a system and the liability associated with these payments, actuaries increasingly analyze mortality experience on a liability-weighted basis rather than simply considering headcounts (number of members dying), which is how we performed this analysis.

The number of deaths among active members is not large enough to provide enough statistically credible data to develop a unique table. Therefore, the same family of tables are used for pre-retirement mortality that were used for healthy post-retirement mortality.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Retiree Mortality

The analysis of the actual post-retirement mortality experience over the five-year experience study period yields actual/expected ratios of 102.2% and 98.9% respectively for males and females. The table below details the actual/expected ratios by individual age group and total.

EXPERIENCE UNDER CURRENT ASSUMPTIONS

POST-RETIREMENT MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	50,579	43,971	1.150	108,446	107,880	1.005
60	106,332	119,868	0.887	208,170	275,554	0.755
65	333,960	273,545	1.221	518,151	585,001	0.886
70	689,612	735,620	0.937	1,307,473	1,326,549	0.986
75	1,547,392	1,485,863	1.041	2,009,912	2,122,973	0.947
80	1,707,033	1,766,240	0.966	2,122,578	2,127,866	0.998
85	1,654,148	1,621,304	1.020	1,965,779	1,918,004	1.025
90	1,239,594	1,156,064	1.072	1,609,383	1,594,837	1.009
95	415,062	388,206	1.069	1,026,731	954,591	1.076
98 & over	84,373	69,258	1.218	283,301	274,602	1.032
TOTAL	7,828,086	7,659,939	1.022	11,159,924	11,287,857	0.989

Experience indicates that the current assumption predicted more liability to be released than actually occurred, in aggregate, for females and less liability than actually occurred for males during the study period. The table currently in use is the PUB-2010 Teacher Amount Weighted Healthy Retiree Mortality Table projected generationally using 75% of MP-2020 adjusted 102% for males and 98% for females and set forward 2 years for males and females.

We recommend updating the mortality assumption to the most recent public sector tables published by the SOA. **We recommend updating the mortality assumption to the PUB-2016 Teacher Amount Weighted Retiree Mortality Table projected generationally using 80% of MP-2021 adjusted 101% for males and 96% for females and set forward 2 years for males and females.**





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

EXPERIENCE UNDER PROPOSED ASSUMPTIONS

The actual/expected ratios under the proposed assumptions are 98.9% and 98.0% for males and females, respectively. The table below details the actual/expected ratios by individual age group and total.

POST-RETIREMENT MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	50,579	45,351	1.115	108,446	94,941	1.142
60	106,332	120,515	0.882	208,170	231,727	0.898
65	333,960	272,805	1.224	518,151	526,206	0.985
70	689,612	730,537	0.944	1,307,473	1,283,364	1.019
75	1,547,392	1,482,600	1.044	2,009,912	2,089,537	0.962
80	1,707,033	1,813,780	0.941	2,122,578	2,191,193	0.969
85	1,654,148	1,713,443	0.965	1,965,779	2,036,070	0.965
90	1,239,594	1,234,567	1.004	1,609,383	1,673,158	0.962
95	415,062	424,504	0.978	1,026,731	986,288	1.041
98 & over	84,373	76,285	1.106	283,301	280,707	1.009
TOTAL	7,828,086	7,914,385	0.989	11,159,924	11,393,190	0.980

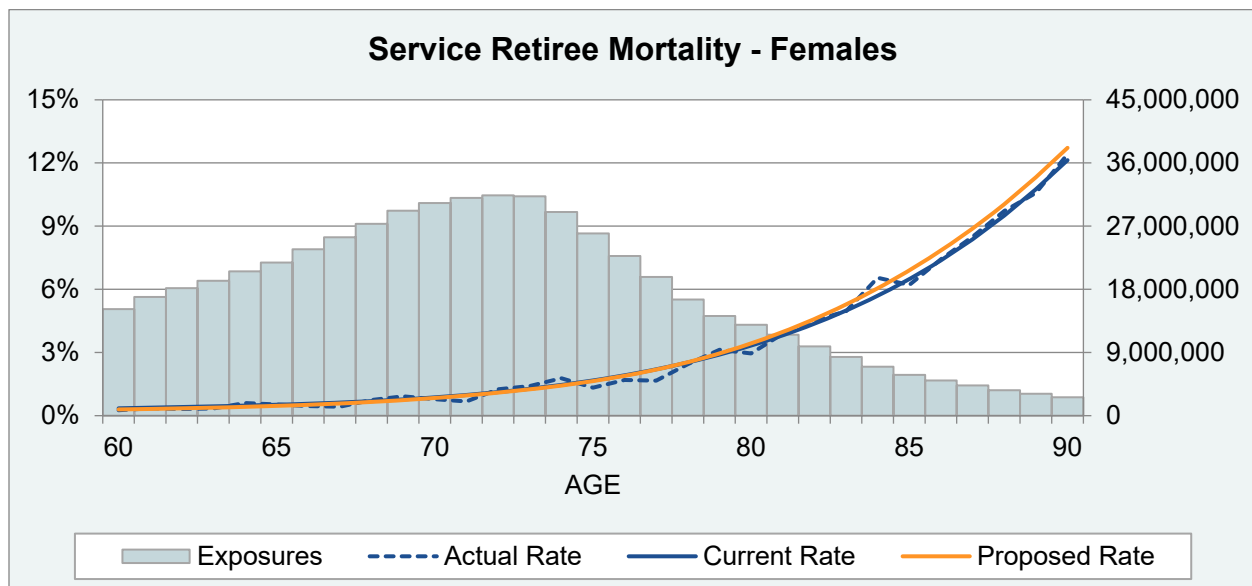
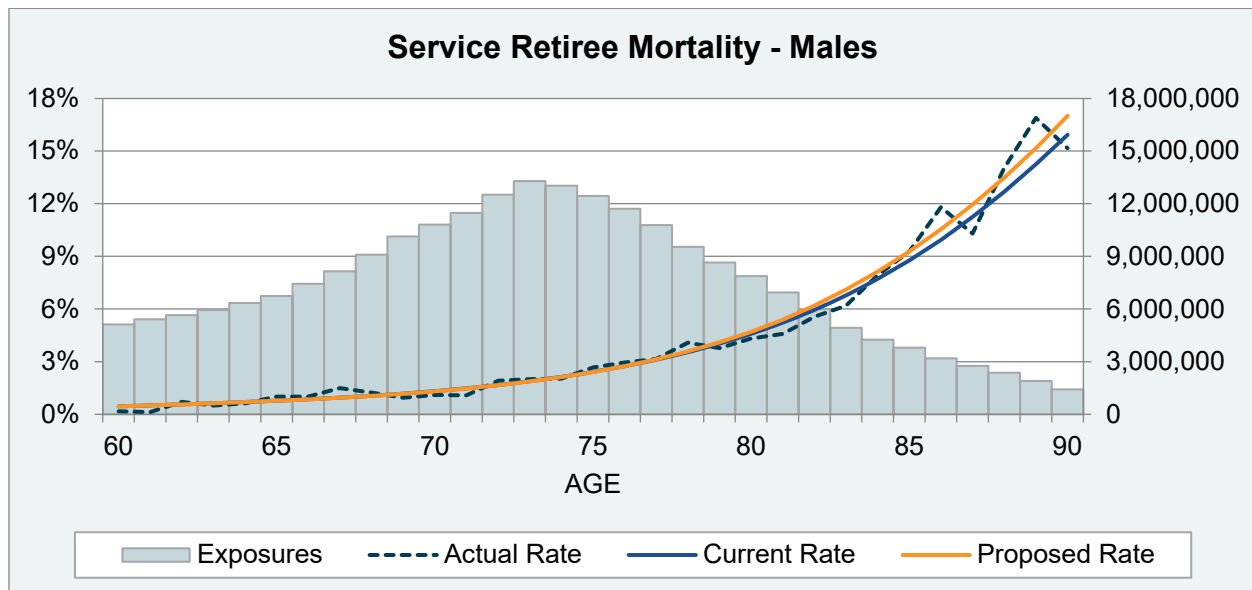




SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The right axis of the charts below represents the liability weighted exposures. The exposed liabilities are the total liability subject to mortality rates based upon the benefit recipient's age during the experience period. When recommending assumptions changes, it is important to recognize actual experience in areas of higher exposures versus areas of lower exposures.

The left axis of the charts below shows (i) the actual rates of mortality for retirees by age during the past five years, (ii) the current assumed rates of mortality and (iii) the recommended rates of mortality.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Contingent Survivor Mortality

The analysis of the actual post-retirement mortality experience for beneficiaries over the five-year experience study period yields actual/expected ratios of 110.8% and 111.31% respectively for males and females. The table below details the actual/expected ratios by individual age group and total.

EXPERIENCE UNDER CURRENT ASSUMPTIONS

CONTINGENT SURVIVOR MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	8,314	6,270	1.326	12,333	5,023	2.455
60	5,598	9,546	0.586	6,651	8,192	0.812
65	17,131	27,159	0.631	22,813	21,388	1.067
70	64,411	58,286	1.105	49,752	57,420	0.866
75	109,388	122,051	0.896	137,690	149,978	0.918
80	176,053	149,987	1.174	290,699	263,998	1.101
85	181,366	130,906	1.385	423,072	397,846	1.063
90	116,072	119,576	0.971	432,093	363,319	1.189
95	81,693	58,025	1.408	226,769	169,659	1.337
98 & over	11,116	14,441	0.770	43,820	41,970	1.044
TOTAL	771,143	696,247	1.108	1,645,692	1,478,792	1.113

Experience indicates that the current assumption predicted less liability than actually occurred for males and females, in aggregate, during the study period. The table currently in use is the PUB-2010 Teachers Amount Weighted Contingent Survivor Mortality Table projected generationally using 75% of MP-2020 adjusted 101% for males and set forward 2 years for males.

We would note that there is very little data for survivors, so these results have limited credibility. We recommend updating the mortality assumption to the most recent public sector tables published by the SOA. **We recommend updating the mortality assumption to the PUB-2016 Amount Weighted Contingent Survivor Mortality Table projected generationally using 80% of MP-2021 adjusted 106% for females and set forward 2 years for males.**





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

EXPERIENCE UNDER PROPOSED ASSUMPTIONS

The actual/expected ratios under the proposed assumptions are 101.4% and 101.1% for males and females respectively. The table below details the actual/expected ratios by individual age group and total.

CONTINGENT SURVIVOR MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	8,314	6,592	1.261	12,333	4,670	2.641
60	5,598	9,135	0.613	6,651	7,691	0.865
65	17,131	24,486	0.700	22,813	21,999	1.037
70	64,411	53,864	1.196	49,752	62,056	0.802
75	109,388	124,158	0.881	137,690	162,285	0.848
80	176,053	166,902	1.055	290,699	289,555	1.004
85	181,366	152,641	1.188	423,072	440,827	0.960
90	116,072	141,223	0.822	432,093	402,284	1.074
95	81,693	65,403	1.249	226,769	189,796	1.195
98 & over	11,116	15,906	0.699	43,820	46,476	0.943
TOTAL	771,143	760,312	1.014	1,645,692	1,627,639	1.011

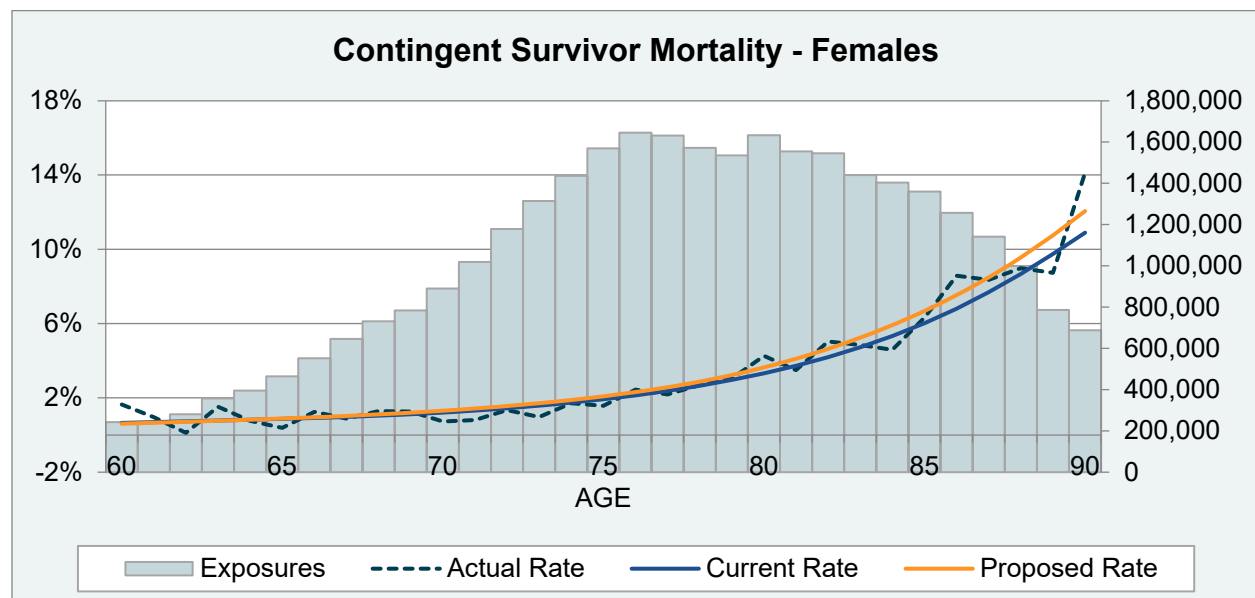
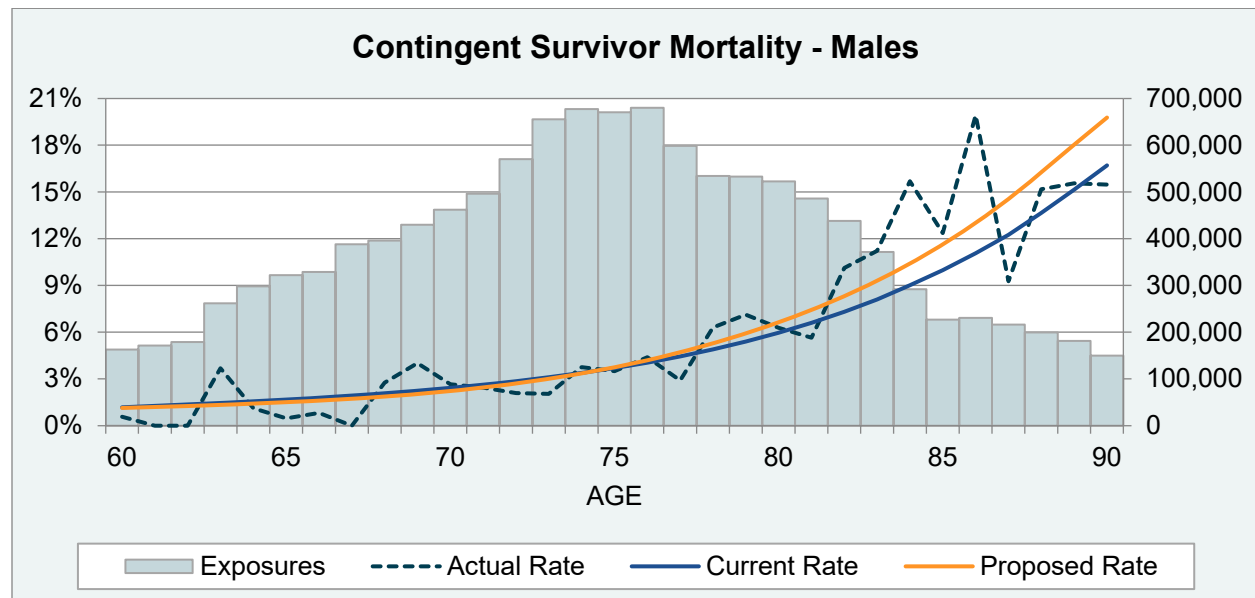




SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The right axis of the charts on the following page represents the liability weighted exposures. The exposed liabilities are the total liability subject to mortality rates based upon the benefit recipient's age during the experience period. When recommending assumptions changes, it is important to recognize actual experience in areas of higher exposures versus areas of lower exposures.

The left axis of the charts below shows (i) the actual rates of mortality for beneficiaries by age during the past five years, (ii) the current assumed rates of mortality and (iii) the recommended rates of mortality.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Disabled Post-Retirement Mortality

The disability mortality rates used in the actuarial valuations project the percentage of disabled retirees who are expected to die in the upcoming year for male and female disabled retirees. Mortality for disabled retirees is expected to be higher than mortality for non-disabled retirees.

The analysis of the actual disabled mortality over the five-year experience study period yields actual/expected ratio of 131.5% and 134.8% respectively for disabled male and female retirees respectively. The table below shows the actual/expected ratios by age groups and in total.

EXPERIENCE UNDER CURRENT ASSUMPTIONS

DISABLED MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	6,827	2,111	3.235	20,416	7,407	2.756
60	8,257	8,127	1.016	45,512	25,992	1.751
65	26,089	16,748	1.558	57,510	58,166	0.989
70	25,058	21,621	1.159	84,581	80,319	1.053
75	45,807	38,461	1.191	150,138	97,616	1.538
80	57,491	60,337	0.953	137,052	131,726	1.040
85	108,109	61,845	1.748	202,884	124,737	1.626
90	66,984	47,002	1.425	125,779	75,501	1.666
95	43,914	35,219	1.247	72,502	49,919	1.452
98 & over	18,185	17,861	1.018	28,910	35,078	0.824
TOTAL	406,723	309,332	1.315	925,282	686,462	1.348

Experience indicates that overall, more disabled retired liabilities have been released than expected during the study period. The table currently in use is the PUB-2010 Teacher Amount Weighted Disabled Retiree Mortality Table projected generationally using 75% of MP-2020 adjusted 96% for males and 94% for females and set forward 1 year for males and set back 2 years for females.

Due to the limited data to analyze and in order to maintain consistency with the healthy mortality assumption **we recommend updating the post-retirement disabled mortality table to the PUB-2016 Amount Weighted Non-Safety Disabled Retiree Mortality Table, without projection, adjusted 105% for males and set forward 4 years for males 3 years for females.**





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

EXPERIENCE UNDER PROPOSED ASSUMPTIONS

DISABLED MORTALITY EXPERIENCE (Liability Weighted)						
Central Age	Males			Females		
	Actual	Expected	Ratio of Actual/Expected	Actual	Expected	Ratio of Actual/Expected
57 & under	6,827	1,575	4.335	20,416	5,776	3.535
60	8,257	6,769	1.220	45,512	21,730	2.094
65	26,089	15,892	1.642	57,510	53,546	1.074
70	25,058	20,621	1.215	84,581	78,301	1.080
75	45,807	35,551	1.289	150,138	105,483	1.423
80	57,491	65,004	0.884	137,052	174,199	0.787
85	108,109	78,933	1.370	202,884	199,019	1.019
90	66,984	64,257	1.042	125,779	125,821	1.000
95	43,914	52,435	0.837	72,502	80,237	0.904
98 & over	18,185	27,190	0.669	28,910	55,314	0.523
TOTAL	406,723	368,226	1.105	925,282	899,425	1.029





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

Rates of Salary Increase

Estimates of future salaries for each member are based on assumptions for two types of increases:

- Increases in each individual's salary due to promotion or longevity (often called merit scale), and
- Increases in the general wage increase of the membership, which is directly related to price and wage inflation.

Earlier in this report, we determined that the wage inflation assumption be set at 2.75% (2.50% price inflation and 0.25% real wage growth). Therefore, the merit scale will be added to the applicable wage inflation assumption to develop the total individual salary increase assumption.

Analysis of the merit salary scale is complicated by the fact that only total salary is reported to TRS, which includes both the general wage inflation component of salary increases and the merit salary scale. Furthermore, there is often a delay in actual price inflation compared to when it has an impact on salary increases. As a result, it is difficult to isolate the merit scale for purposes of measuring the actual salary experience.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The analysis of salary increases yielded an actual/expected ratio of 101.1%. A ratio more than 100% indicates that salary increases in general were more than anticipated by the current assumption.

EXPERIENCE UNDER CURRENT ASSUMPTIONS

Years of Service	Actual	Expected	Ratio of Actual to Expected
1	765,438	775,407	0.987
2	718,167	717,808	1.001
3	683,033	671,842	1.017
4	667,212	663,111	1.006
5	661,500	659,671	1.003
6	644,923	642,262	1.004
7	635,428	631,121	1.007
8	639,195	635,003	1.007
9	656,600	641,863	1.023
10	657,831	648,836	1.014
11	666,593	661,339	1.008
12	685,901	679,894	1.009
13	699,138	692,908	1.009
14	729,484	717,802	1.016
15	741,545	732,147	1.013
16	748,148	740,524	1.010
17	744,927	737,262	1.010
18	730,045	722,472	1.010
19	696,623	686,020	1.015
20+	4,783,481	4,697,271	1.018
Total	17,955,212	17,754,563	1.011





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

As seen in the table on the previous page, actual salary increases for the five-year period was higher than the expected at just about every service level. This may be explained by the higher inflation experienced during the five-year study period following the COVID-19 pandemic.

While it may seem reasonable to increase the total salary increases significantly at this time for teachers to match this experience, **we recommend revising the assumed rates of salary increases to partially reflect recent experience.**

The following graph below shows (i) actual salary increases by years of service, (ii) the currently assumed salary increases and (iii) the proposed salary increase rates. The proposed assumptions result in an expected salary increase of 4.61%.





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following table shows a comparison between the current and proposed salary increase rates.

COMPARATIVE SALARY INCREASE		
Years of Service	Current	Proposed
1	7.50%	6.00%
2	5.50%	6.00%
3	5.00%	6.00%
4	5.00%	5.50%
5	5.00%	5.00%
6	4.75%	5.00%
7	4.50%	5.00%
8	4.25%	5.00%
9	4.00%	5.00%
10	4.00%	4.75%
11	4.00%	4.50%
12	3.75%	4.25%
13	3.50%	4.00%
14	3.50%	4.00%
15	3.25%	4.00%
16	3.25%	4.00%
17	3.00%	4.00%
18	3.00%	4.00%
19	3.00%	4.00%
20+	3.00%	4.00%





SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The table below shows the experience under the proposed assumptions. The actual/expected ratio under the proposed assumptions is 100.5%.

EXPERIENCE UNDER PROPOSED ASSUMPTIONS

Years of Service	Actual	Expected	Ratio of Actual to Expected
1	765,438	764,588	1.001
2	718,167	721,210	0.996
3	683,033	678,241	1.007
4	667,212	666,269	1.001
5	661,500	659,671	1.003
6	644,923	643,795	1.002
7	635,428	634,140	1.002
8	639,195	639,572	0.999
9	656,600	648,035	1.013
10	657,831	653,515	1.007
11	666,593	664,519	1.003
12	685,901	683,170	1.004
13	699,138	696,256	1.004
14	729,484	721,270	1.011
15	741,545	737,465	1.006
16	748,148	745,903	1.003
17	744,927	744,420	1.001
18	730,045	729,486	1.001
19	696,623	692,681	1.006
20+	4,783,481	4,742,874	1.009
Total	17,955,212	17,867,079	1.005





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Health Care Cost Trend Rates

Background: In addition to the economic assumptions used in all of the actuarial valuations performed for the Teachers' Retirement System of the State of Kentucky (System), the health care cost trend rates reflect the change in per capita health claims rates over time due to the following factors:

- medical inflation
- utilization
- plan design
- technology improvements

For the Health Insurance Trust (Health Trust), health care cost trend rates are needed to project the future cost of providing benefits of the Health Trust, including Kentucky Employees' Health Plan (KEHP) premiums, Medicare Eligible Health Plan (MEHP) costs, and Shared Responsibility contributions based upon Medicare Part B premiums.

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, *"Measuring Retiree Group Benefit Obligations,"* which provides guidance to actuaries in selecting economic assumptions for measuring obligations of post-retirement plans other than pensions. The actuary should not consider aging of the covered population when selecting the trend assumption for projecting future costs, but should consider the following key components in setting the health care cost trend rate as noted in ASOP No. 6:

- inflation
- medical inflation
- definition of covered charges
- frequency of services
- leveraging caused by plan design features not explicitly modeled
- plan participation

When setting assumptions for projecting medical and prescription drug costs, CavMac assumes the health benefit plan cost trend rates will decrease from an initial rate to an ultimate level. CavMac's methodology for setting the initial trend rate includes the use of published annual health care inflation surveys in conjunction with actual plan experience, where credible. The initial trend rate assumption is subject to continued update and review with each valuation performed given the volatile nature of medical and prescription drug costs. There are various approaches used to determine the timing and level of decreases to the ultimate trend rate.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

The assumed decrease in medical and prescription drug trend rates reflects the belief that health care inflation cannot indefinitely outstrip the growth rate of employer budgets and the overall economy. As a standard of practice, CavMac typically assumes a grading period of five to ten years, depending on the level of change (i.e., larger differences between the initial trend rate and the ultimate trend rate are assumed to require a longer reduction period). For the ultimate trend assumption, CavMac looks to the “Long-Term Projection Assumptions for Medicare and Aggregate National Health Expenditures” published by Center for Medicare and Medicaid Services on April 22, 2020, which states that:

“One way of analyzing health spending trends is to compare the growth rate of the U.S. health sector with that of the overall economy. Using a definition of “excess cost growth” as the difference between (i) the U.S. per capita growth rate in health-care costs adjusted for demographic factors and (ii) the per capita growth rate in GDP (both in constant dollars), Table 1 shows average excess cost growth rates for selected time periods since 1975. Average excess cost growth rates for national health expenditures (NHE) exhibit some volatility depending on which time periods are used for defining averages, but over the long run this differential has for extended periods been above 2 percent per year or just slightly below this level.”

As a standard of practice, CavMac believes the use of a “GDP+1.5%” to “GDP+2.5%” assumption is reasonable and CavMac typically assumes an ultimate trend rate of price inflation +2.0%. As with any standard of practice, the specifics of each plan are reviewed to ensure there is nothing unusual that would necessitate a long-term trend rate that is either higher or lower than what is typical. It appears to be reasonable to use an ultimate rate of 4.50%, as there appears to be nothing unusual about the Kentucky Employees’ Health Plan and Medicare Eligible Health Plan that would necessitate a long-term trend that is either higher or lower than what is typically used for this type of calculation.

In projecting the offsets associated with the Federal Supplementary Medical Insurance Trust Fund (Medicare Part B Premiums), projected trends from the CMS actuary in the most recent annual report to the trustees appear to provide a reasonable basis for the projection of these costs. As a standard of practice, CavMac typically develops the trend assumptions for these benefits based upon the CMS actuary’s most recent estimates.

In our opinion, the economic assumptions determined in this report have been developed in accordance with ASOP No. 6. Currently, the short-term health care trend rates are set on an annual basis based on the information and data as previously described, with an ultimate trend rate of price inflation plus excess cost growth that is reached after an appropriate grading period.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Recommendation: In our opinion, the health care cost trend rates determined in each year's valuation report are developed in accordance with ASOP No. 6. We will continue to update and review the initial rates with each year's valuation and use an ultimate trend rate of price inflation + 2.0%, or 4.50%.

We are not making any specific assumption changes attributable to the COVID-19 pandemic at this time due to the level of uncertainty regarding the impact on plan costs going forward. Given the uncertainty regarding COVID-19 (e.g., the impact of routine care being deferred, direct COVID-19 treatment and prevention costs, changes in contribution and budget projections), continued monitoring of the impact on the Plan's liability will be required and changes, if necessary, will be made annually at the time that experience develops.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Morbidity

Background: The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, “Measuring Retiree Group Benefit Obligations”, which provides guidance to actuaries when developing benefit cost projection assumptions for measuring obligations of postretirement plans other than pensions. As noted in ASOP No. 6, the actuary should consider the variation in rates by age for the benefits being modeled and use appropriate age bands if the rates vary significantly. The age bands should not be overly broad, based on the expected rate variations within the bands. If rates vary significantly by age, it is inappropriate to assume a single per capita rate that does not vary by age. The relationship between the rates at various ages is an actuarial assumption that may be based on normative databases.

Determination: CavMac assumes the projected medical and prescription drug costs of MEHP vary significantly by age from the average cost at the central age of the applicable group based upon the paper “Aging Curves for Health Care Costs in Retirements”, The North American Actuarial Journal, July 2005, Jeffrey P. Petertil. Here, the paper’s “Representative Curve for General Use” is used for ages 50 and older, and factors developed from a national average claims and utilization database are used for ages below 50. CavMac continuously monitors all available data, publications, and research projects undertaken by actuarial organizations regarding age-related morbidity (e.g., “Health Care Costs—From Birth to Death”, Health Care Cost Institute’s Independent Report Series – Report 2013-1, June 2013, Dale H. Yamamoto) and see no indication of the factors no longer being appropriate.

For the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees’ Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption (i.e., no implicit rate subsidy is calculated or recognized). Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation’s results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not the System, as the System has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB funding valuation process of the Health Trust. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, KEHP implicit rate subsidies are included in the GASB Total OPEB Liability (TOL).





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Coverage Assumptions

In addition to covering eligible retirees, many plans cover the spouse and dependents of retirees. In addition, plans may offer some or all participants a choice of coverage such as HMOs, PPOs, and POS plans. The magnitude of the retiree group benefit obligation can vary significantly as a result of the coverage assumptions. The actuary should therefore consider historical participation rates and trends in coverage rates when selecting the coverage assumptions.

Member Participation

Background: For plans that require some form of contribution to maintain coverage, some eligible inactive members may not elect to be covered, particularly if they have other coverage available from their most recent employer. Empirical data on plan participation, where available and credible, should be considered when selecting the participation assumption for future covered retirees that retire from an eligible inactive status. When developing the participation rates, how plan eligibility rules, plan choices, or retiree contribution rates have changed over time should be considered.

Furthermore, plan participation may be different in the future due to participants' response to changes in retiree contribution levels and plan choices. For plans that anticipate changes in retiree contributions, the appropriateness of participation rates that vary over the projection period for both current and future retirees should be considered. In addition, plan eligibility rules governing dropping coverage and subsequent re-enrollment when selecting participation rates should be considered.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Determination: Historical Health Trust participation levels suggest an adjustment to the current assumption. The use of the historical average is proposed, with adjustments to reflect an increase in participation as the System's contribution Benefits increases.

PARTICIPATION EXPERIENCE: PRE-MEDICARE				
Service Years	Membership Tier			
	TRS 1	TRS 2	TRS 3	TRS 4
Number of Retirees Electing Medical Insurance Coverage				
5 - 9.99	124	46		
10 - 14.99	506	371		
15 - 19.99	1,838	608	10	N/A
20 - 24.99	5,924	159	N/A	N/A
25 - 25.99	1,339	N/A	N/A	N/A
26 - 26.99	2,275	N/A	N/A	N/A
27 or More	38,975	N/A	N/A	N/A
Number of Retirees Eligible for Medical Insurance Coverage				
5 - 9.99	1,153	726		
10 - 14.99	1,863	1,737		
15 - 19.99	3,748	1,785	48	N/A
20 - 24.99	8,920	417	N/A	N/A
25 - 25.99	2,086	N/A	N/A	N/A
26 - 26.99	3,470	N/A	N/A	N/A
27 or More	48,569	N/A	N/A	N/A
% Electing Medical Insurance Coverage				
5 - 9.99	11%	6%		
10 - 14.99	27%	21%		
15 - 19.99	49%	34%	21%	N/A
20 - 24.99	66%	38%	N/A	N/A
25 - 25.99	64%	N/A	N/A	N/A
26 - 26.99	66%	N/A	N/A	N/A
27 or More	80%	N/A	N/A	N/A





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

PARTICIPATION EXPERIENCE: POST-MEDICARE				
Service Years	Membership Tier			
	TRS 1	TRS 2	TRS 3	TRS 4
Number of Retirees Electing Medical Insurance Coverage				
5 - 9.99	1,551	248		
10 - 14.99	4,552	885		
15 - 19.99	10,086	653	11	N/A
20 - 24.99	22,168	110	N/A	N/A
25 - 25.99	3,692	N/A	N/A	N/A
26 - 26.99	3,880	N/A	N/A	N/A
27 or More	116,841	N/A	N/A	N/A
Number of Retirees Eligible for Medical Insurance Coverage				
5 - 9.99	8,786	2,631		
10 - 14.99	10,469	2,716		
15 - 19.99	14,707	1,296	33	N/A
20 - 24.99	25,272	180	N/A	N/A
25 - 25.99	4,156	N/A	N/A	N/A
26 - 26.99	4,343	N/A	N/A	N/A
27 or More	123,521	N/A	N/A	N/A
% Electing Medical Insurance Coverage				
5 - 9.99	18%	9%		
10 - 14.99	43%	33%		
15 - 19.99	69%	50%	33%	N/A
20 - 24.99	88%	61%	N/A	N/A
25 - 25.99	89%	N/A	N/A	N/A
26 - 26.99	89%	N/A	N/A	N/A
27 or More	95%	N/A	N/A	N/A





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

TRS 1					
TRS Service Years	Paid By Employer	Experience		Current	Proposed
		Pre-Med	Post-Med		
5 - 9.99	25%	11%	18%	20%	20%
10 - 14.99	50%	27%	43%	40%	40%
15 - 19.99	75%	49%	69%	70%	70%
20 - 24.99	100%	66%	88%	90%	95%
25 - 25.99	100%	64%	89%	90%	95%
26 - 26.99	100%	66%	89%	90%	95%
27 or More	100%	80%	95%	90%	95%

TRS 2					
TRS Service Years	Paid By Employer	Experience		Current	Proposed
		Pre-Med	Post-Med		
5 - 9.99	10%	6%	9%	20%	20%
10 - 14.99	25%	21%	33%	20%	33%
15 - 19.99	45%	34%	50%	40%	50%
20 - 24.99	65%	38%	61%	50%	65%
25 - 25.99	90%	N/A	N/A	80%	90%
26 - 26.99	95%	N/A	N/A	85%	95%
27 or More	100%	N/A	N/A	90%	95%

TRS 3 and TRS 4					
TRS Service Years	Paid By Employer	Experience		Current	Proposed
		Pre-Med	Post-Med		
5 - 9.99					
10 - 14.99					
15 - 19.99	45%	21%	33%	40%	50%
20 - 24.99	65%	N/A	N/A	50%	65%
25 - 25.99	90%	N/A	N/A	80%	90%
26 - 26.99	95%	N/A	N/A	85%	95%
27 or More	100%	N/A	N/A	90%	95%





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Plan Elections

Background: As KEHP costs vary by plan, the future level of participation in the plans for covered members under 65 should be considered based upon historical participation rates, and how plan eligibility rules, plan choices, and retiree contribution rates have changed over time.

Determination: Based upon recent experience, plan election options can change, and plan election rates can shift over time. As a result, continued monitoring of experience and annual updating of the KEHP coverage assumption is proposed.

Valuation Date	LivingWell Basic	LivingWell Limited	LivingWell CDHP	LivingWell PPO	LivingWell HD	Total
KEHP Retiree Coverage Elections						
6/30/2020	282	67	5,271	4,183	N/A	9,803
6/30/2021	261	52	5,128	3,945	N/A	9,386
6/30/2022	249	40	5,060	3,713	N/A	9,062
6/30/2023	283	N/A	5,063	3,487	N/A	8,833
6/30/2024	272	N/A	4,962	3,287	N/A	8,521
6/30/2025	255	N/A	4,938	3,193	8	8,394
KEHP Retiree Coverage Election %s						
6/30/2020	3%	1%	53%	43%	N/A	100%
6/30/2021	3%	1%	54%	42%	N/A	100%
6/30/2022	3%	0%	56%	41%	N/A	100%
6/30/2023	3%	N/A	58%	39%	N/A	100%
6/30/2024	3%	N/A	58%	39%	N/A	100%
6/30/2025	3%	N/A	59%	38%	0%	100%





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Spouse Participation

Background: Those who are eligible for coverage under the plan should be considered and appropriate assumptions made regarding the coverage of spouses and dependents. Additionally, the impact of plan rules governing changes in coverage after retirement, such as remarriage, if significant should be considered. A review of historical data on spouse and dependent coverage rates when selecting the assumption to be used in the projection should be made.

Determination: The percentage of those electing Health Trust coverage for their spouses has remained steady over time and Health Trust's benefits and rules regarding dependent coverage are not anticipated to change. As a result, we recommend no changes to the assumption.

Valuation Date	Gender		
	Male	Female	Total
Number of Pre-Medicare Retirees Electing to Cover a Spouse			
6/30/2021	548	1,704	2,252
6/30/2022	509	1,567	2,076
6/30/2023	493	1,478	1,971
6/30/2024	443	1,284	1,727
6/30/2025	446	1,220	1,666
<i>Average</i>	<i>488</i>	<i>1,451</i>	<i>1,939</i>
Number of Pre-Medicare Retirees Electing Coverage			
6/30/2021	1,942	7,140	9,082
6/30/2022	1,910	6,865	8,775
6/30/2023	1,879	6,687	8,566
6/30/2024	1,833	6,469	8,302
6/30/2025	1,857	6,352	8,209
<i>Average</i>	<i>1,884</i>	<i>6,703</i>	<i>8,587</i>
% Electing Spousal Coverage			
6/30/2021	28%	24%	25%
6/30/2022	27%	23%	24%
6/30/2023	26%	22%	23%
6/30/2024	24%	20%	21%
6/30/2025	24%	19%	20%
<i>Average</i>	<i>26%</i>	<i>22%</i>	<i>23%</i>
Current Assumption Proposed %	30%	25%	
	30%	25%	





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Terminated and Vested Participation

Background: Although eligible inactive members may begin receiving benefits once meeting the age and service requirements for retirement eligibility, some members may withdraw, and those members electing to receive benefits may not begin receiving benefits at the earliest eligibility date. For eligible inactive members, a rate of benefit participation and an average age in which benefits are to begin must be assumed.

Determination: Based upon the four most recent years of experience, the rates of withdrawal for those active members under the age of 55 who have less than 27 years of service have remained the same. As the average rate of withdrawal has remained relatively steady over time, the use of the historical average is proposed for members under the age of 55 who have less than 27 years of service. We have determined that continuing to use the same rates of vested and terminated benefit participation is appropriate at this time.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Rates of Withdrawal for the Initial Termination of an Active Employee			
Experience Period	Years of Service		
	5 - 10	10 - 15	15 - 27
Number of Active Members Under Age 55 Entering Vested and Terminated Status			
7/1/2020 - 6/30/2021	421	204	167
7/1/2021 - 6/30/2022	389	159	159
7/1/2022 - 6/30/2023	688	295	242
7/1/2023 - 6/30/2024	739	300	228
7/1/2024 - 6/30/2025	705	276	239
<i>Average</i>	<i>588</i>	<i>247</i>	<i>207</i>
Number of Active Members Under Age 55 Entering Vested and Terminated Status or Withdrawing			
7/1/2020 - 6/30/2021	567	251	188
7/1/2021 - 6/30/2022	547	214	190
7/1/2022 - 6/30/2023	857	355	285
7/1/2023 - 6/30/2024	922	363	264
7/1/2024 - 6/30/2025	869	333	258
<i>Average</i>	<i>752</i>	<i>303</i>	<i>237</i>
% of Active Members Under Age 55 Electing to Retain Membership upon Termination			
7/1/2020 - 6/30/2021	74%	81%	89%
7/1/2021 - 6/30/2022	71%	74%	84%
7/1/2022 - 6/30/2023	80%	83%	85%
7/1/2023 - 6/30/2024	80%	83%	86%
7/1/2024 - 6/30/2025	81%	83%	93%
<i>Average</i>	<i>78%</i>	<i>81%</i>	<i>87%</i>
Current Assumption	80%	85%	90%
Proposed %	80%	85%	90%*

* To be used for all other age/service combinations.

% Receiving a Pension Benefit or Returning to Active Service for an Employee Currently in Deferred Vested Status				
	Years of Service			
	5 - 10	10 - 15	15 - 27	27+
Current Assumption	75%	85%	90%	75%
Proposed %	75%	85%	90%	75%





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Determination: Based upon the five most recent years of experience, the average age vested participants being receiving a pension benefit has remained the same. As the average age of initial benefit receipt has remained relatively steady over time, the use of the historical average is proposed for the age of initial benefit receipt.

Experience Period	Years of Service							
	5 - 10	10 - 15	15 - 20	20 - 25	25 - 26	26 - 27	27+	Total
Average Age of Initial Pension Benefit								
7/1/2020 - 6/30/2021	64	62	62	59	56	60	59	62
7/1/2021 - 6/30/2022	66	62	62	59	58	55	58	62
7/1/2022 - 6/30/2023	65	63	62	60	57	52	61	62
7/1/2023 - 6/30/2024	64	61	61	59	57	54	63	62
7/1/2024 - 6/30/2025	65	63	62	61	58	55	60	62
Total	64	62	61	59	57	54	60	62
Average %	64	62	61	59	57	55	60	62
Current Assumption	60							
Proposed	60							





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Spouse Age Difference

Background: The actual data for the age of the covered spouse and dependents of retired participants is used. The spouse and dependents of an active employee today may not be the same spouse and dependents covered at retirement; therefore the actuary should generally select an assumed covered spouse age difference for purposes of projecting future spouse coverage and assumed dependents' ages for projecting dependent coverage.

Determination: The average age difference between Health Trust covered male and female spouses has remained steady over time. As a result, we have determined that continued use of the historical average is appropriate, which supports a two-year age difference consistent with Pension.

Valuation Date	Gender of Retired Subscriber		
	Male	Female	Total
Average Number of Years Male Older than Female			
6/30/2021	2.9	1.7	2.0
6/30/2022	3.0	1.7	2.0
6/30/2023	3.0	1.8	2.1
6/30/2024	2.9	1.8	2.1
6/30/2025	2.7	1.8	2.0
Average	2.9	1.7	2.0
Current Assumption Proposed	3.0	1.0	
	2.0	2.0	





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Adverse Health Claims Experience Reserve

Background: As discussed in the section on the healthcare cost trend rates assumption, for the employees covered by the Health Insurance Trust (Health Trust), health care cost trend rates are needed to project the future cost of providing benefits of the Health Trust, including Kentucky Employees' Health Plan (KEHP) premiums and Medicare Eligible Health Plan (MEHP) costs. In years when health care cost increases are less than expected, the plan experiences an actuarial gain since both active liabilities and retiree liabilities do not increase as much as expected. In years when health care cost increases are more than expected, on the other hand, actuarial losses are recognized.

The historical medical plan costs for Retiree Only coverage are shown below. As can be seen, the plan has experienced volatility; however, on average, cost increases have been lower than expected. Historical healthcare trend experience is not necessarily indicative of future experience and may even suggest the opposite due to factors such as pent-up demand or the exhaustion of plan design change levers, including increased deductibles, copays, coinsurance, and out-of-pocket maximums. In particular we note a decrease in rates in 2020 due to the COVID-19 pandemic and the associated deferrals of care and we note the volatility of the Medicare costs due changes in legislation and reimbursement structures. We show the average increase for each plan since 2021 at the bottom of the chart.

Premium Effective Date	Non-Medicare Costs				Medicare Costs	
	LivingWell CDHP		LivingWell PPO			
	Rate	Change	Rate	Change	Rate	Change
1/1/2016	\$702.10		\$721.14		\$260.48	
1/1/2017	702.10	0.0%	721.14	0.0%	252.00	(3.3%)
1/1/2018	709.46	1.0%	729.34	1.1%	257.85	2.3%
1/1/2019	709.46	0.0%	729.34	0.0%	226.06	(12.3%)
1/1/2020	660.04	(7.0%)	646.96	(11.3%)	224.07	(0.9%)
1/1/2021	732.26	10.9%	753.76	16.5%	177.90	(20.6%)
1/1/2022	750.30	2.5%	772.16	2.4%	211.42	18.8%
1/1/2023	813.02	8.4%	833.64	8.0%	217.23	2.7%
1/1/2024	930.76	14.5%	949.04	13.8%	206.51	(4.9%)
1/1/2025	930.76	0.0%	949.04	0.0%	210.00	1.7%
1/1/2026	1,090.42	17.2%	1,105.54	16.5%	200.00	(4.8%)
	Avg Annual Change Since 2021		Avg Annual Change Since 2021		Avg Annual Change Since 2021	
	8.3%		8.0%		2.4%	





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

We note that the health care cost trend rates reflect the change in per capita health claims rates over time due to the following factors:

- medical inflation
- utilization
- plan design
- technology improvements

Since there is a risk that the items impacting the health care trend rates, particularly utilization and technology improvements, can cause large, unexpected increases in health care costs and since there is a risk that government subsidies and/or plan design changes for Medicare plans could also increase MEHP costs, **we recommend that consideration be given for establishing a reserve for adverse healthcare claims experience.** When healthcare claims cost increases are small or non-existent, the reserve will be credited with the liability gain resulting from this experience. When cost increases exceed expectations, the reserve will be available to be released to offset any loss (or completely released, if less than the loss). In addition to gains due to smaller than expected healthcare claims costs, we recommend crediting the reserve with statutory contributions that exceed the actuarially determined contributions (ADC).

To quantify the value of the reserve, we assumed a moderate, but plausible, negative outcome of an additional 2% added to healthcare trend for all future years and Medicare Advantage rates reverting to the amount paid ten years ago of \$260.48 per member per month.

For illustration, using the June 30, 2025 valuation after the previously described demographic changes due the experience study, the increase in liabilities under this scenario are shown below. The increase in liabilities due to the alternate scenario described above would represent the maximum reserve that would funded through claims and contribution gains:

OPEB Results – Health Insurance Trust (\$ in thousands)			
	2025 Valuation Results After Recommendations	Medicare Advantage Rate of \$260.48 and Additional 2% Trend	Difference = Maximum Reserve
Actuarial Accrued Liability	\$4,240,372	\$6,774,021	\$2,533,649





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Using the healthcare claims experience gain from the June 30, 2025 valuation and the amount the FY 2025 statutory contributions exceeded the ADC, we would increase the liability and recalculate the valuation results as follows:

OPEB Results – Health Insurance Trust (\$ in thousands)			
	2025 Valuation Results After All Changes		After Additional Adjustments
Initial Valuation Results	\$4,240,372	A	\$4,240,372
Claims Experience Gain			75,234
Contributions Gain			255,753
Total Adjustments		B	\$330,987
Adjusted Valuation Results	\$4,240,372	A + B	\$4,571,359
Funded Ratio	89.3%		82.80%
Contribution Rate	3.03%		3.67%

Determination: We recommend doing a similar calculation as described above with the June 30, 2026 valuation and setting up an initial maximum Reserve for Adverse Health Claims Experience.





SECTION V – ASSUMPTIONS SPECIFIC TO THE HEALTH TRUST

Please note that we recommend including the funding of the reserve for the funding valuation and increasing the liabilities based on the previously described methodology, but we do not recommend increasing the GASB 74 and 75 liabilities in this manner. As you know, the GASB liabilities for the Health Insurance Trust are already larger than the liabilities for funding purposes due to the requirement by GASB to age adjust the KEHP liabilities. For comparison purposes, the June 30, 2025 Health Insurance Trust funding liability and the GASB Total OPEB Liability (TOL), both shown before adjustment for this experience study, are exhibited below:

OPEB Results – Health Insurance Trust (\$ in thousands)			
	2025 GASB Results*	2025 Valuation Results	Difference
Total Accrued Liability	\$5,684,031	\$4,245,673	\$1,438,358

* As of the June 30, 2025 measurement date

As you can see, based on the chart above, the funding liability including the funding of the Reserve for Adverse Health Claims Experience is expected to continue to be less than the GASB TOL.





SECTION VI – OTHER ASSUMPTIONS

ADMINISTRATIVE TOOLS: Any administrative tools utilized by the Retirement System should be revised to be based on the mortality table and investment rate of return used in the valuation.

OPTION FACTORS: The option factors currently used by the Retirement System are based on the mortality tables and investment rate of return (discount rate) used in the valuation. **The factors should be revised to be based on the mortality tables determined for future valuations.**

ADMINISTRATIVE EXPENSE: Currently a contribution rate of 0.32% for administrative expenses is assumed each year. After reviewing administrative expenses as a percent of payroll over the past five years, **we recommend a slight change in the contribution rate assumption to 0.33%.** The following table shows actual percentages over the past five years:

Year Ending June 30	Administrative Expenses	Annual Payroll	Percentage
2021	\$12,601,841	\$3,784,400,223	0.33%
2022	12,005,095	4,033,509,177	0.30%
2023	14,470,733	4,138,908,992	0.35%
2024	14,807,287	4,308,468,045	0.34%
2025	14,664,182	4,473,010,085	0.33%

PERCENT MARRIED: Currently, 100% of all members are assumed to be married. Males are assumed to be three years older than females. These assumptions are used to determine if anyone is entitled to a Survivor Benefit from a death in active service. The survivor benefits for members with 10 years of service before death can be paid to either spouses or dependent children or other dependents. An analysis of active members shows that mostly all active members have listed either a spouse or a dependent beneficiary on file. Upon review, we found that the spousal age difference for TRS was closer to 2 years. Therefore, **we recommend changing the assumption for spousal age difference such that males are assumed to be two years older than females.**





SECTION VI – OTHER ASSUMPTIONS

PART-TIMERS: Currently, we assume that all part-time employees will accrue 0.25 years of service each year while in that status. After review of the data for the past 5 years, part-timers are averaging 0.225 years of service each year. **We recommend no change in this assumption at this time.**

UNUSED SICK AND ANNUAL LEAVE: Currently, we assume a liability load of 3.00% for all future service retirements and a liability load of 1.00% for all future disabled retirements for unused sick and annual leave. On page 50 of our 2025 valuation, we provided that the actuarial accrued liability attributable to these liability loads is approximately 1% of the total actuarial accrued liability or \$460M (total plan actuarial accrued liability is \$45B). This will be declining each year in the future as these liability loads will apply to less active members (not applicable to TRS 4 members).

TRS staff supplied CavMac with working data on recent retirees who had sick leave as a component of their final retirement benefit. Of those recent retirees, approximately two-thirds (68%) of service retirements and one-third (30%) of disability retirements had sick leave included in their final service (non-Local School Districts) or Final Average Compensation (School Districts) computations for their final retirement benefit. In addition, only about 6% of service retirements from TRS had annual leave as a component of their final retirement benefit. Disability retirements had minimal annual leave.

The following tables are our basis for our recommended assumptions:

Type of Retirement	Percentage of Sick Leave	Average Increase in Final Benefit	Approximate Liability Load Needed
(A)	(B)	(C)	(D) = (B) x (C)
Disability	30%	1.3%	0.4%
Service	68%	5.0%	3.4%

Type of Retirement	Percentage of Annual Leave	Average Increase in Final Benefit	Approximate Liability Load Needed
(A)	(B)	(C)	(D) = (B) x (C)
Service	6%	3.2%	0.2%

Based on the analysis above, we recommend changing the unused sick leave and annual leave liability load assumptions as a percentage of liability to the following:

Type of Retirement	Proposed Sick Leave Assumption	Proposed Annual Leave Assumption
Disability	0.50%	0.00%
Service	3.32%	0.18%





APPENDIX A – HISTORICAL JUNE CPI (U) INDEX

Year	CPI (U)	Year	CPI (U)
1965	31.6	1996	156.7
1966	32.4	1997	160.3
1967	33.3	1998	163.0
1968	35.7	1999	166.2
1969	34.7	2000	172.4
1970	38.8	2001	178.0
1971	40.6	2002	179.9
1972	41.7	2003	183.7
1973	44.2	2004	189.7
1974	49.0	2005	194.5
1975	53.6	2006	202.9
1976	56.8	2007	208.352
1977	60.7	2008	218.815
1978	65.2	2009	215.693
1979	72.3	2010	217.965
1980	82.7	2011	225.722
1981	90.6	2012	229.478
1982	97.0	2013	233.504
1983	99.5	2014	238.343
1984	103.7	2015	238.638
1985	107.6	2016	241.018
1986	109.5	2017	244.955
1987	113.5	2018	251.989
1988	118.0	2019	256.143
1989	124.1	2020	257.797
1990	129.9	2021	271.696
1991	136.0	2022	296.311
1992	140.2	2023	305.109
1993	144.4	2024	314.175
1994	148.0	2025	322.561
1995	152.5		





APPENDIX B – CAPITAL MARKET ASSUMPTIONS AND ASSET ALLOCATIONS

Aon's 30-year Geometric Real Rates of Return and Standard Deviations by Asset Class

Asset Class	Expected Geometric Rates of Return*	Standard Deviation
Large Cap U.S. Equity	6.9%	19.0%
Small Cap U.S. Equity	7.4%	25.2%
Developed International Equity	6.8%	19.4%
Emerging Markets Equity	7.0%	22.4%
Fixed Income	5.0%	5.5%
High Yield Bonds	6.4%	10.6%
Other Additional Categories	6.3%	7.1%
Real Estate	6.3%	17.7%
Private Equity	9.2%	20.4%
Cash	5.0%	2.2%

* Rates above include an inflation assumption of 2.3%.

Long Term Asset Allocation Targets (Retirement Annuity Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	35.4%
Small Cap U.S. Equity	2.6%
Developed International Equity	15.7%
Emerging Markets Equity	5.3%
Fixed Income	15.0%
High Yield Bonds	2.0%
Other Additional Categories	8.0%
Real Estate	7.0%
Private Equity	7.0%
Cash	2.0%





APPENDIX B – CAPITAL MARKET ASSUMPTIONS AND ASSET ALLOCATIONS

Long Term Asset Allocation Targets (Health Insurance Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	35.4%
Small Cap U.S. Equity	2.6%
Developed International Equity	15.0%
Emerging Markets Equity	5.0%
Fixed Income	9.0%
High Yield Bonds	8.0%
Other Additional Categories	9.0%
Real Estate	6.5%
Private Equity	8.5%
Cash	1.0%

Long Term Asset Allocation Targets (Life Insurance Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	32.0%
Small Cap U.S. Equity	8.0%
Developed International Equity	15.0%
Emerging Markets Equity	5.0%
Fixed Income	21.0%
High Yield Bonds	0.0%
Other Additional Categories	5.0%
Real Estate	7.0%
Private Equity	5.0%
Cash	2.0%





APPENDIX C – SOCIAL SECURITY ADMINISTRATION WAGE INDEX

Year	Wage Index	Annual Increase	Year	Wage Index	Annual Increase
1961	\$4,086.76		1993	\$23,132.67	0.86%
1962	4,291.40	5.01%	1994	23,753.53	2.68
1963	4,396.64	2.45	1995	24,705.66	4.01
1964	4,576.32	4.09	1996	25,913.90	4.89
1965	4,658.72	1.80	1997	27,426.00	5.84
1966	4,938.36	6.00	1998	28,861.44	5.23
1967	5,213.44	5.57	1999	30,469.84	5.57
1968	5,571.76	6.87	2000	32,154.82	5.53
1969	5,893.76	5.78	2001	32,921.92	2.39
1970	6,186.24	4.96	2002	33,252.09	1.00
1971	6,497.08	5.02	2003	34,064.95	2.44
1972	7,133.80	9.80	2004	35,648.55	4.65
1973	7,580.16	6.26	2005	36,952.94	3.66
1974	8,030.76	5.94	2006	38,651.41	4.60
1975	8,630.92	7.47	2007	40,405.48	4.54
1976	9,226.48	6.90	2008	41,334.97	2.30
1977	9,779.44	5.99	2009	40,711.61	-1.51
1978	10,556.03	7.94	2010	41,673.83	2.36
1979	11,479.46	8.75	2011	42,979.61	3.13
1980	12,513.46	9.01	2012	44,321.67	3.12
1981	13,773.10	10.07	2013	44,888.16	1.28
1982	14,531.34	5.51	2014	46,481.52	3.55
1983	15,239.24	4.87	2015	48,098.63	3.48
1984	16,135.07	5.88	2016	48,642.15	1.13
1985	16,822.51	4.26	2017	50,321.89	3.45
1986	17,321.82	2.97	2018	52,145.80	3.62
1987	18,426.51	6.38	2019	54,099.99	3.75
1988	19,334.04	4.93	2020	55,628.60	2.83
1989	20,099.55	3.96	2021	60,575.07	8.89
1990	21,027.98	4.62	2022	63,795.13	5.32
1991	21,811.60	3.73	2023	66,621.80	4.43
1992	22,935.42	5.15	2024	69,846.57	4.84





APPENDIX D – RECOMMENDED RATES

TABLE 1 RATES OF SEPARATION FROM ACTIVE SERVICE MALES					
Age	WITHDRAWAL			DEATH	DISABILITY
	Years of Service				
	0 - 4	5 - 9	10+		
20	0.1900			0.00024	0.00005
21	0.1740			0.00024	0.00005
22	0.1580			0.00024	0.00005
23	0.1420			0.00024	0.00006
24	0.1260			0.00024	0.00006
25	0.1100	0.0400		0.00025	0.00006
26	0.1080	0.0400		0.00026	0.00007
27	0.1060	0.0400		0.00027	0.00008
28	0.1040	0.0400		0.00027	0.00008
29	0.1020	0.0400		0.00028	0.00009
30	0.1000	0.0400	0.0250	0.00029	0.00010
31	0.1010	0.0400	0.0234	0.00030	0.00012
32	0.1020	0.0400	0.0218	0.00032	0.00014
33	0.1030	0.0400	0.0202	0.00033	0.00016
34	0.1040	0.0400	0.0186	0.00035	0.00018
35	0.1050	0.0400	0.0170	0.00036	0.00020
36	0.1070	0.0400	0.0163	0.00038	0.00028
37	0.1090	0.0400	0.0156	0.00041	0.00036
38	0.1110	0.0400	0.0149	0.00044	0.00044
39	0.1130	0.0400	0.0142	0.00047	0.00052
40	0.1150	0.0400	0.0135	0.00050	0.00060
41	0.1140	0.0400	0.0129	0.00054	0.00078
42	0.1130	0.0400	0.0123	0.00059	0.00096
43	0.1120	0.0400	0.0117	0.00064	0.00114
44	0.1110	0.0400	0.0111	0.00070	0.00132
45	0.1100	0.0400	0.0105	0.00076	0.00150
46	0.1100	0.0415	0.0104	0.00083	0.00170
47	0.1100	0.0430	0.0103	0.00091	0.00190
48	0.1100	0.0445	0.0102	0.00099	0.00210
49	0.1100	0.0460	0.0101	0.00109	0.00230
50	0.1100	0.0475	0.0100	0.00120	0.00250
51	0.1170	0.0475	0.0120	0.00131	0.00260
52	0.1240	0.0475	0.0140	0.00144	0.00270
53	0.1310	0.0475	0.0160	0.00158	0.00280
54	0.1380	0.0475	0.0180	0.00174	0.00290
55	0.1450	0.0475		0.00190	0.00300
56	0.1450	0.0480		0.00208	0.00310
57	0.1450	0.0510		0.00228	0.00320
58	0.1450	0.0540		0.00248	0.00330
59	0.1450	0.0570		0.00271	0.00340
60	0.1450			0.00294	0.00350
61	0.1520			0.00320	0.00350
62	0.1590			0.00347	0.00350
63	0.1660			0.00377	0.00350
64	0.1730			0.00410	0.00350
65	0.1800			0.00445	0.00350
66	0.1830			0.00485	0.00350
67	0.1860			0.00528	0.00350
68	0.1890			0.00575	0.00350
69	0.1920			0.00627	0.00350
70	0.1950			0.00684	0.00350
71	0.1950			0.00747	0.00350
72	0.1950			0.00816	0.00350
73	0.1950			0.00891	0.00350
74	0.1950			0.00973	0.00350
75	0.1950			0.01123	0.00350





APPENDIX D – RECOMMENDED RATES

TABLE 2 RATES OF SEPARATION FROM ACTIVE SERVICE FEMALES					
Age	WITHDRAWAL			DEATH	DISABILITY
	Years of Service				
	0 - 4	5 - 9	10+		
20	0.1400			0.00008	0.00005
21	0.1300			0.00008	0.00005
22	0.1200			0.00008	0.00005
23	0.1100			0.00008	0.00006
24	0.1000			0.00008	0.00006
25	0.0900	0.0450		0.00008	0.00006
26	0.0920	0.0450		0.00009	0.00007
27	0.0940	0.0450		0.00010	0.00008
28	0.0960	0.0450		0.00011	0.00010
29	0.0980	0.0450		0.00012	0.00011
30	0.1000	0.0450	0.0200	0.00012	0.00012
31	0.1010	0.0430	0.0200	0.00013	0.00016
32	0.1020	0.0410	0.0200	0.00015	0.00019
33	0.1030	0.0390	0.0200	0.00016	0.00023
34	0.1040	0.0370	0.0200	0.00018	0.00026
35	0.1050	0.0350	0.0200	0.00019	0.00030
36	0.1040	0.0360	0.0186	0.00021	0.00036
37	0.1030	0.0370	0.0172	0.00023	0.00042
38	0.1020	0.0380	0.0158	0.00026	0.00048
39	0.1010	0.0390	0.0144	0.00028	0.00054
40	0.1000	0.0400	0.0130	0.00031	0.00060
41	0.1030	0.0400	0.0122	0.00033	0.00085
42	0.1060	0.0400	0.0114	0.00036	0.00110
43	0.1090	0.0400	0.0106	0.00039	0.00135
44	0.1120	0.0400	0.0098	0.00042	0.00160
45	0.1150	0.0400	0.0090	0.00046	0.00185
46	0.1150	0.0410	0.0094	0.00050	0.00200
47	0.1150	0.0420	0.0098	0.00055	0.00215
48	0.1150	0.0430	0.0102	0.00060	0.00230
49	0.1150	0.0440	0.0106	0.00064	0.00245
50	0.1150	0.0450	0.0110	0.00070	0.00260
51	0.1170	0.0460	0.0120	0.00076	0.00278
52	0.1190	0.0470	0.0130	0.00082	0.00296
53	0.1210	0.0480	0.0140	0.00088	0.00314
54	0.1230	0.0490	0.0150	0.00095	0.00332
55	0.1250	0.0500		0.00103	0.00350
56	0.1280	0.0540		0.00110	0.00350
57	0.1310	0.0580		0.00120	0.00350
58	0.1340	0.0620		0.00130	0.00350
59	0.1370	0.0660		0.00140	0.00350
60	0.1400			0.00153	0.00350
61	0.1520			0.00167	0.00350
62	0.1640			0.00183	0.00350
63	0.1760			0.00203	0.00350
64	0.1880			0.00223	0.00350
65	0.2000			0.00246	0.00350
66	0.2000			0.00272	0.00350
67	0.2000			0.00301	0.00350
68	0.2000			0.00333	0.00350
69	0.2000			0.00370	0.00350
70	0.2000			0.00410	0.00350
71	0.2000			0.00454	0.00350
72	0.2000			0.00503	0.00350
73	0.2000			0.00557	0.00350
74	0.2000			0.00617	0.00350
75	0.2000			0.00684	0.00350





APPENDIX D – RECOMMENDED RATES

TABLE 3
RATES OF RETIREMENT FROM ACTIVE SERVICE
MALES

Age	TRS 1 and 2		TRS 3			
	Years of Service		Years of Service			
	Before 27	After 27*	Before 27	Before 27 & First Eligible	Exactly 27	After 27
45		0.1700			0.1000	0.1500
46		0.1700			0.1000	0.1500
47		0.1700			0.6000	0.1500
48		0.1700			0.6000	0.5000
49		0.1700			0.6000	0.5000
50		0.1700			0.6000	0.3000
51		0.2200			0.6000	0.3000
52		0.1500			0.6000	0.3000
53		0.1500			0.2000	0.3000
54		0.1400			0.2000	0.2000
55	0.0575	0.4200	0.0575		0.2000	0.2000
56	0.0450	0.3600	0.0450		0.2000	0.2000
57	0.0550	0.3400	0.0550		0.2000	0.0500
58	0.0350	0.3500	0.0350		0.2000	0.0500
59	0.0650	0.2800	0.0650		0.2000	0.0500
60	0.1550	0.3200	0.1550	0.1550	0.1000	0.0500
61	0.1400	0.2800	0.0500	0.1400	0.1000	0.0500
62	0.1700	0.2300	0.0750	0.1700	0.1000	0.0500
63	0.1700	0.2300	0.1000	0.1700	0.1000	0.0500
64	0.1500	0.2300	0.1250	0.1500	0.1000	0.0500
65	0.1800	0.3000	0.2000	0.1800	0.1000	0.0500
66	0.2400	0.3000	0.2000	0.2400	0.1000	0.0500
67	0.2800	0.2500	0.2500	0.2800	0.1000	0.0500
68	0.2000	0.2500	0.1500	0.2000	0.1000	0.0500
69	0.3500	0.2500	0.1500	0.3500	0.1000	0.0500
70	0.2200	0.2500	0.1500	0.2200	0.1000	0.0500
71	0.2600	0.2500	0.2000	0.2600	0.1000	0.0500
72	0.2500	0.2500	0.2000	0.2500	0.1000	0.0500
73	0.2000	0.2500	0.2000	0.2000	0.1000	0.0500
74	0.2500	0.2500	0.2000	0.2500	0.1000	0.0500
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

* Plus 15.0% when first eligible for unreduced retirement with 27 years of service.





APPENDIX D – RECOMMENDED RATES

TABLE 4
RATES OF RETIREMENT FROM ACTIVE SERVICE
FEMALES

Age	TRS 1 and 2		TRS 3			
	Years of Service		Years of Service			
	Before 27	After 27*	Before 27	Before 27 & First Eligible	Exactly 27	After 27
45		0.1700			0.6000	0.1500
46		0.1700			0.6000	0.1500
47		0.1700			0.6000	0.1500
48		0.1700			0.5000	0.5000
49		0.1700			0.5000	0.5000
50		0.1700			0.4000	0.3000
51		0.1700			0.3000	0.3000
52		0.1800			0.1500	0.3000
53		0.1800			0.1500	0.3000
54		0.1800			0.2000	0.2000
55	0.0650	0.5000	0.0600		0.3000	0.2000
56	0.0600	0.5000	0.0500		0.3000	0.2000
57	0.0600	0.4000	0.0500		0.3000	0.0500
58	0.0700	0.3600	0.0500		0.3000	0.0500
59	0.0750	0.3000	0.0500		0.3000	0.0500
60	0.2000	0.3800	0.1100	0.1100	0.3000	0.0500
61	0.1700	0.3400	0.1000	0.1000	0.3000	0.0500
62	0.1800	0.3600	0.1500	0.2000	0.3000	0.0500
63	0.1800	0.3600	0.1500	0.2000	0.3000	0.0500
64	0.1800	0.4000	0.1500	0.2000	0.3000	0.0500
65	0.2800	0.3800	0.2250	0.2000	0.3000	0.0500
66	0.2500	0.3000	0.2250	0.2000	0.3000	0.0500
67	0.2500	0.4500	0.2250	0.2000	0.3000	0.0500
68	0.2400	0.3600	0.2250	0.2000	0.3000	0.0500
69	0.2200	0.1500	0.2250	0.2000	0.3000	0.0500
70	0.2200	0.3500	0.2250	0.4000	0.3000	0.0500
71	0.2500	0.3000	0.2250	0.3000	0.3000	0.0500
72	0.3000	0.3000	0.2250	0.2000	0.3000	0.0500
73	0.2000	0.3000	0.2250	0.2000	0.3000	0.0500
74	0.2000	0.3000	0.2250	0.2000	0.3000	0.0500
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

* Plus 16.0% when first eligible for unreduced retirement with 27 years of service.





APPENDIX D – RECOMMENDED RATES

TABLE 5 RATES OF ANTICIPATED MERIT SALARY INCREASES (For Both Males and Females)	
Years of Service	Rate*
1	1.0325
2	1.0325
3	1.0325
4	1.0275
5	1.0225
6	1.0225
7	1.0225
8	1.0225
9	1.0225
10	1.0200
11	1.0175
12	1.0150
13	1.0125
14	1.0125
15	1.0125
16	1.0125
17	1.0125
18	1.0125
19	1.0125
20+	1.0125

* Does not include wage inflation assumption at 2.75% per annum.





APPENDIX D – RECOMMENDED RATES

TABLE 6								
RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF SERVICE*								
Age	Male	Female	Age	Male	Female	Age	Male	Female
15	0.00017	0.00007	51	0.00145	0.00088	87	0.12230	0.09031
16	0.00020	0.00008	52	0.00160	0.00095	88	0.13776	0.10185
17	0.00022	0.00008	53	0.00232	0.00181	89	0.15481	0.11466
18	0.00023	0.00008	54	0.00257	0.00194	90	0.17349	0.12877
19	0.00024	0.00008	55	0.00284	0.00207	91	0.19369	0.14414
20	0.00024	0.00008	56	0.00313	0.00222	92	0.21522	0.16069
21	0.00024	0.00008	57	0.00345	0.00237	93	0.23779	0.17827
22	0.00024	0.00008	58	0.00381	0.00253	94	0.26109	0.19674
23	0.00024	0.00008	59	0.00420	0.00272	95	0.28475	0.21592
24	0.00025	0.00009	60	0.00463	0.00292	96	0.30843	0.23565
25	0.00026	0.00010	61	0.00510	0.00315	97	0.33187	0.25575
26	0.00027	0.00011	62	0.00563	0.00342	98	0.35482	0.27610
27	0.00027	0.00012	63	0.00621	0.00375	99	0.37718	0.29657
28	0.00028	0.00012	64	0.00687	0.00415	100	0.39897	0.31712
29	0.00029	0.00013	65	0.00761	0.00463	101	0.42000	0.33756
30	0.00030	0.00015	66	0.00844	0.00519	102	0.44010	0.35769
31	0.00032	0.00016	67	0.00940	0.00588	103	0.45913	0.37735
32	0.00033	0.00018	68	0.01052	0.00669	104	0.47698	0.39636
33	0.00035	0.00019	69	0.01181	0.00765	105	0.49362	0.41460
34	0.00036	0.00021	70	0.01330	0.00876	106	0.50500	0.43195
35	0.00038	0.00023	71	0.01502	0.01003	107	0.50500	0.44833
36	0.00041	0.00026	72	0.01702	0.01147	108	0.50500	0.46367
37	0.00044	0.00028	73	0.01933	0.01313	109	0.50500	0.47795
38	0.00047	0.00031	74	0.02200	0.01505	110	0.50500	0.48000
39	0.00051	0.00033	75	0.02507	0.01728	111	0.50500	0.48000
40	0.00055	0.00036	76	0.02860	0.01991	112	0.50500	0.48000
41	0.00060	0.00039	77	0.03266	0.02299	113	0.50500	0.48000
42	0.00065	0.00042	78	0.03734	0.02660	114	0.50500	0.48000
43	0.00071	0.00046	79	0.04272	0.03078	115	0.50500	0.48000
44	0.00077	0.00050	80	0.04891	0.03559	116	0.50500	0.48000
45	0.00084	0.00055	81	0.05604	0.04109	117	0.50500	0.48000
46	0.00092	0.00060	82	0.06420	0.04730	118	1.00000	0.96000
47	0.00100	0.00064	83	0.07343	0.05428	119	1.00000	0.96000
48	0.00110	0.00070	84	0.08381	0.06204	120	1.00000	1.00000
49	0.00121	0.00076	85	0.09537	0.07056			
50	0.00132	0.00082	86	0.10818	0.07994			

* Base rates before applying a modified MP-2021 improvement scale projected generationally.





APPENDIX D – RECOMMENDED RATES

TABLE 7
RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF DISABILITY

Age	Male	Female	Age	Male	Female	Age	Male	Female
15	0.00187	0.00070	51	0.01387	0.01025	87	0.18971	0.13197
16	0.00228	0.00075	52	0.01509	0.01115	88	0.20732	0.14265
17	0.00267	0.00079	53	0.01642	0.01213	89	0.22521	0.15414
18	0.00301	0.00080	54	0.01787	0.01319	90	0.24347	0.16659
19	0.00329	0.00082	55	0.01946	0.01435	91	0.26225	0.18013
20	0.00347	0.00084	56	0.02117	0.01561	92	0.28175	0.19488
21	0.00352	0.00087	57	0.02223	0.01698	93	0.30214	0.21094
22	0.00341	0.00093	58	0.02314	0.01733	94	0.32352	0.22833
23	0.00331	0.00102	59	0.02393	0.01766	95	0.34584	0.24701
24	0.00322	0.00111	60	0.02462	0.01800	96	0.36888	0.26684
25	0.00314	0.00121	61	0.02526	0.01835	97	0.39212	0.28760
26	0.00308	0.00132	62	0.02589	0.01874	98	0.41477	0.30893
27	0.00303	0.00144	63	0.02658	0.01920	99	0.43663	0.33033
28	0.00300	0.00157	64	0.02738	0.01976	100	0.45753	0.35162
29	0.00301	0.00171	65	0.02840	0.02047	101	0.47731	0.37259
30	0.00305	0.00186	66	0.02973	0.02138	102	0.49587	0.39307
31	0.00312	0.00201	67	0.03145	0.02256	103	0.51317	0.41288
32	0.00322	0.00218	68	0.03361	0.02408	104	0.52500	0.43188
33	0.00336	0.00236	69	0.03623	0.02598	105	0.52500	0.44995
34	0.00354	0.00255	70	0.03930	0.02828	106	0.52500	0.46701
35	0.00376	0.00275	71	0.04288	0.03104	107	0.52500	0.48299
36	0.00402	0.00297	72	0.04696	0.03429	108	0.52500	0.49786
37	0.00433	0.00320	73	0.05151	0.03807	109	0.52500	0.50000
38	0.00467	0.00345	74	0.05654	0.04236	110	0.52500	0.50000
39	0.00507	0.00373	75	0.06196	0.04709	111	0.52500	0.50000
40	0.00551	0.00403	76	0.06768	0.05217	112	0.52500	0.50000
41	0.00600	0.00437	77	0.07363	0.05742	113	0.52500	0.50000
42	0.00652	0.00476	78	0.07988	0.06267	114	0.52500	0.50000
43	0.00708	0.00518	79	0.08665	0.06800	115	0.52500	0.50000
44	0.00768	0.00566	80	0.09416	0.07364	116	1.00000	0.50000
45	0.00835	0.00617	81	0.10278	0.07986	117	1.00000	1.00000
46	0.00908	0.00674	82	0.11389	0.08708	118	1.00000	1.00000
47	0.00988	0.00733	83	0.12665	0.09502	119	1.00000	1.00000
48	0.01075	0.00797	84	0.14067	0.10351	120	1.00000	1.00000
49	0.01171	0.00867	85	0.15597	0.11248			
50	0.01274	0.00943	86	0.17250	0.12195			





APPENDIX D – RECOMMENDED RATES

TABLE 8 RATES OF MORTALITY FOR BENEFICIARIES OF DECEASED MEMBERS*								
Age	Male	Female	Age	Male	Female	Age	Male	Female
15	0.00017	0.00006	51	0.00829	0.00325	87	0.14902	0.08643
16	0.00020	0.00006	52	0.00855	0.00349	88	0.16622	0.09707
17	0.00022	0.00007	53	0.00883	0.00374	89	0.18400	0.10894
18	0.00023	0.00008	54	0.00912	0.00401	90	0.20172	0.12213
19	0.00024	0.00008	55	0.00943	0.00429	91	0.21914	0.13642
20	0.00024	0.00008	56	0.00976	0.00460	92	0.23632	0.15163
21	0.00024	0.00008	57	0.01012	0.00493	93	0.25353	0.16770
22	0.00024	0.00008	58	0.01051	0.00529	94	0.27113	0.18462
23	0.00024	0.00008	59	0.01093	0.00567	95	0.28951	0.20240
24	0.00025	0.00008	60	0.01140	0.00610	96	0.30898	0.22109
25	0.00026	0.00008	61	0.01192	0.00655	97	0.32963	0.24073
26	0.00027	0.00010	62	0.01251	0.00705	98	0.35131	0.26129
27	0.00027	0.00011	63	0.01319	0.00760	99	0.37345	0.28271
28	0.00028	0.00012	64	0.01398	0.00822	100	0.39502	0.30486
29	0.00029	0.00013	65	0.01489	0.00890	101	0.41584	0.32747
30	0.00030	0.00014	66	0.01596	0.00966	102	0.43574	0.35015
31	0.00032	0.00015	67	0.01721	0.01050	103	0.45458	0.37272
32	0.00033	0.00017	68	0.01870	0.01145	104	0.47226	0.39495
33	0.00035	0.00018	69	0.02048	0.01251	105	0.48873	0.41665
34	0.00036	0.00020	70	0.02257	0.01367	106	0.50000	0.43765
35	0.00038	0.00021	71	0.02501	0.01497	107	0.50000	0.45779
36	0.00041	0.00023	72	0.02784	0.01642	108	0.50000	0.47695
37	0.00044	0.00025	73	0.03109	0.01804	109	0.50000	0.49503
38	0.00047	0.00029	74	0.03481	0.01986	110	0.50000	0.51197
39	0.00050	0.00031	75	0.03903	0.02195	111	0.50000	0.52773
40	0.00054	0.00034	76	0.04379	0.02433	112	0.50000	0.53000
41	0.00059	0.00036	77	0.04914	0.02703	113	0.50000	0.53000
42	0.00064	0.00039	78	0.05509	0.03014	114	0.50000	0.53000
43	0.00503	0.00043	79	0.06168	0.03369	115	0.50000	0.53000
44	0.00546	0.00047	80	0.06897	0.03776	116	0.50000	0.53000
45	0.00592	0.00258	81	0.07705	0.04242	117	0.50000	0.53000
46	0.00642	0.00266	82	0.08602	0.04775	118	1.00000	0.53000
47	0.00696	0.00275	83	0.09603	0.05380	119	1.00000	0.53000
48	0.00755	0.00284	84	0.10719	0.06063	120	1.00000	1.00000
49	0.00779	0.00294	85	0.11966	0.06831			
50	0.00803	0.00303	86	0.13356	0.07687			

* Base rates before applying a modified MP-2021 improvement scale projected generationally.





APPENDIX E – 30-YEAR PROJECTIONS OF IMPACT

30-year Projection Results from 2025 Experience Study Retirement Annuity Trust (\$ in millions)

Valuation Year	Contribution Fiscal Year	Baseline Projection – 2025 Valuation			Experience Study Projection			Breakdown of ADC	
		Unfunded Accrued Liability	Funded Ratio	Actuarially Determined Contribution	Unfunded Accrued Liability	Funded Ratio	Actuarially Determined Contribution	Salary Percentage Contribution	Additional For Unfunded Liability
2025	2028	\$17,498	61.0%	\$1,731	\$17,599	60.9%	\$1,796	\$574	\$1,222
2026	2029	17,734	61.4%	1,763	17,896	61.1%	1,853	586	1,267
2027	2030	16,900	64.0%	1,773	17,134	63.6%	1,866	599	1,267
2028	2031	16,046	66.5%	1,783	16,296	66.2%	1,880	613	1,267
2029	2032	15,412	68.4%	1,794	15,647	68.2%	1,893	626	1,267
2030	2033	14,957	69.9%	1,805	15,170	69.8%	1,908	641	1,267
2031	2034	14,458	71.5%	1,841	14,649	71.5%	1,937	655	1,282
2032	2035	13,912	73.0%	1,883	14,078	73.1%	1,977	670	1,307
2033	2036	13,316	74.6%	1,928	13,458	74.8%	2,022	685	1,337
2034	2037	12,639	76.3%	1,976	12,758	76.6%	2,068	700	1,368
2035	2038	11,872	78.1%	2,075	11,967	78.4%	2,167	716	1,451
2036	2039	11,003	80.0%	2,089	11,076	80.4%	2,183	732	1,451
2037	2040	10,024	82.0%	2,199	10,074	82.4%	2,293	749	1,544
2038	2041	8,873	84.3%	2,284	8,901	84.7%	2,381	767	1,614
2039	2042	7,628	86.7%	2,343	7,633	87.1%	2,443	785	1,658
2040	2043	6,182	89.3%	2,391	6,163	89.8%	2,493	805	1,688
2041	2044	4,548	92.3%	2,177	4,502	92.6%	2,281	825	1,456
2042	2045	2,739	95.4%	2,223	2,665	95.7%	2,330	847	1,483
2043	2046	755	98.7%	2,176	652	99.0%	2,287	870	1,417
2044	2047	-	100.0%	837	-	100.0%	893	893	-
2045	2048	-	100.0%	858	-	100.0%	918	918	-
2046	2049	-	100.0%	880	-	100.0%	944	944	-
2047	2050	-	100.0%	903	-	100.0%	970	970	-
2048	2051	-	100.0%	927	-	100.0%	997	997	-
2049	2052	-	100.0%	952	-	100.0%	1,026	1,026	-
2050	2053	-	100.0%	979	-	100.0%	1,056	1,056	-
2051	2054	-	100.0%	1,007	-	100.0%	1,088	1,088	-
2052	2055	-	100.0%	1,037	-	100.0%	1,122	1,122	-
2053	2056	-	100.0%	1,067	-	100.0%	1,156	1,156	-
2054	2057	-	100.0%	1,098	-	100.0%	1,190	1,190	-
Total		\$48,779			\$51,418			\$26,613	
Cost/(Savings) from Baseline					\$2,639				





APPENDIX E – 30-YEAR PROJECTIONS OF IMPACT

30-year Projection Results from 2025 Experience Study Health Insurance Trust (\$ in thousands)

Valuation Year	Contribution Fiscal Year	Baseline Projection – 2025 Valuation			Experience Study Projection		
		Unfunded Accrued Liability	Funded Ratio	Total Contributions (Member, Employer, and State)	Unfunded Accrued Liability	Funded Ratio	Total Contributions (Member, Employer, and State)
2025	2026	\$460,977	89.1%	\$422,265	\$455,676	89.3%	\$424,873
2026	2027	149,581	96.7%	435,517	144,440	96.8%	441,176
2027	2028	-	100.0%	96,751	-	100.0%	100,598
2028	2029	-	100.0%	98,737	-	100.0%	102,854
2029	2030	-	100.0%	100,909	-	100.0%	105,252
2030	2031	-	100.0%	103,253	-	100.0%	107,800
2031	2032	-	100.0%	105,755	-	100.0%	110,479
2032	2033	-	100.0%	108,433	-	100.0%	113,272
2033	2034	-	100.0%	111,250	-	100.0%	116,135
2034	2035	-	100.0%	114,251	-	100.0%	119,150
2035	2036	-	100.0%	117,441	-	100.0%	122,345
2036	2037	-	100.0%	120,798	-	100.0%	125,756
2037	2038	-	100.0%	124,365	-	100.0%	129,415
2038	2039	-	100.0%	128,165	-	100.0%	133,347
2039	2040	-	100.0%	132,184	-	100.0%	137,599
2040	2041	-	100.0%	136,437	-	100.0%	142,191
2041	2042	-	100.0%	140,933	-	100.0%	147,296
2042	2043	-	100.0%	145,628	-	100.0%	152,762
2043	2044	-	100.0%	150,592	-	100.0%	158,607
2044	2045	-	100.0%	155,806	-	100.0%	164,770
2045	2046	-	100.0%	161,300	-	100.0%	171,248
2046	2047	-	100.0%	167,003	-	100.0%	178,016
2047	2048	-	100.0%	172,991	-	100.0%	185,014
2048	2049	-	100.0%	179,269	-	100.0%	192,295
2049	2050	-	100.0%	185,804	-	100.0%	199,782
2050	2051	-	100.0%	192,952	-	100.0%	208,012
2051	2052	-	100.0%	200,793	-	100.0%	217,118
2052	2053	-	100.0%	209,293	-	100.0%	226,996
2053	2054	-	100.0%	218,402	-	100.0%	237,593
2054	2055	-	100.0%	228,101	-	100.0%	248,733
Total		\$4,965,378			\$5,220,484		
Cost/(Savings) from Baseline					\$255,106		





APPENDIX E – 30-YEAR PROJECTIONS OF IMPACT

30-year Projection Results from 2025 Experience Study Life Insurance Trust (\$ in thousands)

Valuation Year	Contribution Fiscal Year	Baseline Projection – 2025 Valuation			Experience Study Projection		
		Unfunded Accrued Liability	Funded Ratio	Actuarially Determined Contribution in Dollars	Unfunded Accrued Liability	Funded Ratio	Actuarially Determined Contribution in Dollars
2025	2028	\$19,650	84.7%	\$3,659	\$20,566	84.1%	\$3,726
2026	2029	20,747	84.2%	3,710	21,720	83.5%	3,796
2027	2030	17,179	87.2%	3,763	18,190	86.5%	3,868
2028	2031	14,053	89.7%	3,819	15,082	89.0%	3,942
2029	2032	11,599	91.7%	3,876	12,625	91.0%	4,017
2030	2033	10,049	92.9%	3,935	11,053	92.2%	4,093
2031	2034	8,393	94.2%	3,996	9,353	93.5%	4,168
2032	2035	6,622	95.5%	4,060	7,523	94.9%	4,247
2033	2036	4,720	96.8%	4,128	5,549	96.3%	4,327
2034	2037	2,676	98.2%	4,201	3,425	97.7%	4,412
2035	2038	470	99.7%	4,278	1,131	99.3%	4,501
2036	2039	-	100.0%	1,784	-	100.0%	1,873
2037	2040	-	100.0%	1,827	-	100.0%	1,935
2038	2041	-	100.0%	1,867	-	100.0%	1,996
2039	2042	-	100.0%	1,904	-	100.0%	2,054
2040	2043	-	100.0%	1,936	-	100.0%	2,092
2041	2044	-	100.0%	1,968	-	100.0%	2,132
2042	2045	-	100.0%	1,998	-	100.0%	2,169
2043	2046	-	100.0%	2,026	-	100.0%	2,204
2044	2047	-	100.0%	2,051	-	100.0%	2,236
2045	2048	-	100.0%	2,073	-	100.0%	2,264
2046	2049	-	100.0%	2,093	-	100.0%	2,292
2047	2050	-	100.0%	2,112	-	100.0%	2,319
2048	2051	-	100.0%	2,131	-	100.0%	2,349
2049	2052	-	100.0%	2,149	-	100.0%	2,373
2050	2053	-	100.0%	2,161	-	100.0%	2,394
2051	2054	-	100.0%	2,167	-	100.0%	2,407
2052	2055	-	100.0%	2,168	-	100.0%	2,413
2053	2056	-	100.0%	2,166	-	100.0%	2,416
2054	2057	-	100.0%	2,162	-	100.0%	2,414
Total				\$82,168			\$87,429
Cost/(Savings) from Baseline							\$5,261





APPENDIX F – RESOLUTIONS TO THE BOARD

ADOPTION OF TABLES HEREIN PRESENTED

In order that the tables herein presented may have the official approval of the Board of Trustees, the following resolutions have been determined for adoption.

WHEREAS, The investigation of the mortality, service and compensation experience of the members of the Teachers' Retirement System of the State of Kentucky which was prepared as of June 30, 2025 indicated that the mortality tables and active service tables previously adopted by the Board of Trustees require modification in order that they may reflect more closely the actual past experience of the membership, and

WHEREAS, The actuary has prepared new tables of rates for adoption, therefore, be it

RESOLVED, That the Board of Trustees, acting in accordance with Section 161.400 of the retirement law and upon the determination of the actuary, hereby discontinues the use in calculating the State's rates of contribution and in valuing the liabilities of the System of the active service tables and mortality tables currently in use, and approves for use instead the attached active service tables, and mortality tables, and be it further

RESOLVED, That the use of the new tables in the valuation as of June 30, 2026 and in all actuarial valuations, thereafter, is hereby approved.





APPENDIX F – RESOLUTIONS TO THE BOARD

The Board of Trustees of the Teachers' Retirement System of the State of Kentucky approved the preceding resolution at a meeting held on September 21, 2026.

KENTUCKY
BOARD OF TRUSTEES,
TEACHERS' RETIREMENT SYSTEM OF THE STATE OF

By
Chairperson

Attest:

.....
Secretary

