



Alameda County Employees' Retirement Association
BOARD OF RETIREMENT

**ACTUARIAL COMMITTEE/BOARD MEETING
NOTICE and AGENDA**

ACERA MISSION:

To provide ACERA members and employers with flexible, cost-effective, participant-oriented benefits through prudent investment management and superior member services.

**Thursday, September 21, 2023
11:00 am**

LOCATION AND TELECONFERENCE	COMMITTEE MEMBERS	
<p>ACERA C.G. "BUD" QUIST BOARD ROOM 475 14TH STREET, 10TH FLOOR OAKLAND, CALIFORNIA 94612-1900 MAIN LINE: 510.628.3000 FAX: 510.268.9574 The public can observe the meeting and offer public comment by using the below Webinar ID and Passcode after clicking on the below link or calling the below call-in number. https://zoom.us/join Call-In Number: 1 699 900 6833 Webinar ID: 879 6337 8479 Passcode: 699406 For help joining a Zoom meeting, see: https://support.zoom.us/hc/en-us/articles/201362193</p>	OPHELIA BASGAL, CHAIR	APPOINTED
	HENRY LEVY, VICE CHAIR	TREASURER
	KEITH CARSON	APPOINTED
	ROSS CLIPPINGER	ELECTED SAFETY
	GEORGE WOOD	ELECTED GENERAL

The Alternate Retired Member votes in the absence of the Elected Retired Member, or, if the Elected Retired Member is present, then votes if both Elected General members, or the Safety Member and an Elected General member, are absent.

The Alternate Safety Member votes in the absence of the Elected Safety, either of the two Elected General Members, or both the Retired and Alternate Retired members.

This is a meeting of the Actuarial Committee if a quorum of the Actuarial Committee attends, and it is a meeting of the Board if a quorum of the Board attends. This is a joint meeting of the Actuarial Committee and the Board if a quorum of each attends.

Board and Committee agendas and minutes and all documents distributed to the Board or a Committee in connection with a public meeting (unless exempt from disclosure) are posted online at www.acera.org and also may be inspected at 475 14th Street, 10th Floor, Oakland, CA 94612-1900.

Public comments are limited to four (4) minutes per person in total. The order of the items on the agenda is subject to change without notice.

Note regarding accommodations: If you require a reasonable modification or accommodation for a disability, please contact ACERA between 9:00 a.m. and 5:00 p.m. at least 72 hours prior to the meeting at accommodation@acera.org or at 510-628-3000.

ACTUARIAL COMMITTEE/BOARD MEETING

NOTICE and AGENDA, Page 2 of 2 – Thursday, September 21, 2023

Call to Order: 11:00 am

Roll Call

Public Input

Action Items: Matters for Discussion and Possible Motion by the Committee

None

Information Items: These items are not presented for Committee action but consist of status updates and cyclical reports

- 1. Presentation and discussion of the Triennial Experience for years 2020-2022 and the economic and non-economic assumptions.**

-Lisa Johnson

-Eva Yum, Segal

-Andy Yeung, Segal

Trustee Input

Future Discussion Items

October

- Discussion and possible motion to adopt the Triennial Experience for years 2020-2022

Establishment of Next Meeting Date

October 19, 2023

Adjournment



MEMORANDUM TO THE ACTUARIAL COMMITTEE

DATE: September 21, 2023
TO: Members of the Actuarial Committee
FROM: Lisa Johnson, Assistant Chief Executive Officer
SUBJECT: Triennial Actuarial Experience Study (2019-2022)

Executive Summary

The Segal Group (Segal) has prepared ACERA's triennial actuarial experience study for the period covering December 1, 2019¹ to November 30, 2022. The report contains proposed economic and non-economic assumptions for use in conducting the December 31, 2023 through December 31, 2025, annual actuarial valuations. Recommendations for the major actuarial assumption categories are outlined below in a chart for your quick review and on pages 5-8 in the report. Segal recommends continuations or changes to the following major actuarial assumption categories:

Economic Assumption Compendium (See p.5 of experience study for more detail)	
Category	Abridged Recommendation
a) Inflation Assumption	a) Reduce from 2.75% to 2.50% per annum
b) Retiree Cost-of-Living	b) Maintain the COLA at 2.75% per annum for those tiers with a 3.00% maximum adjustment and maintain the COLA at 2.00% per annum for those tiers with 2.00% maximum adjustment
c) Investment Return Assumption	c) Maintain the 7.00% per annum
d) Salary Increase Assumption	d) Slight reduction in aggregate salary increase assumption (decrease in inflation component from 3.25% to 3.00% offset by increase in merit and promotion component)
Demographic Assumption Compendium (See pp. 6- 8 of experience study for more detail)	
Category	Abridged Recommendation
Retirement Rates	Separate set of age-based retirement assumptions, with separate age-based assumptions for under and over 30 years of service for some tiers

¹ For clarity, the December 1, 2019, date reflects the start of the 2020 actuarial year. The experience study covers calendar years 2020 to 2022

Demographic Assumption Compendium - Continued	
Category	Abridged Recommendation
<p>Other Retirement Related Assumptions:</p> <p>a) Retirement age for deferred vested members</p> <p>b) Future reciprocal members and reciprocal salary increases; and</p> <p>c) Percent married and spousal age differences for members not yet retired.</p>	<p>a) Maintain the General and Safety deferred vested retirement age assumption for General and Safety reciprocal members and increase the vested retirement age assumption for General and Safety non-reciprocal members</p> <p>b) Reduce proportion of future reciprocal members. Reciprocal salary increase assumption is reduced from 3.65% to 3.45% for General members and from 4.05% to 4.00% for Safety members; and</p> <p>c) Maintain the married at retirement and the spouse age difference assumptions</p>
Mortality Rates	Recommendations vary depending on category of membership. Refer to pp. 6 -8
Termination Rates	Increase the termination rate assumption for certain service groups while decreasing the termination rate assumption for other service groups. Overall, the proposed rates represent an increase from the current rates for both General and Safety members.
Disability Incidence Rates	Decrease the disability rate assumption for General members and increase the disability rate assumption for Safety members. Increase the percentage of anticipated General member disabilities to be service connected from 65% to 70%, and maintain the service connected disability assumption at 100% for Safety members.
Sick Leave Conversion	Maintain the current assumption at .003 years of additional service credit at retirement for each year of employment for General members and decrease from .007 to .006 years for Safety members
Retiree Health Assumptions	Reduce the percentage of new male retirees expected to cover a spouse from 40% to 35% and the percentage of new females retirees expected to cover a spouse from 20% to 15%. Furthermore, decrease the percentage of new retirees under age 65 expected to enroll in medical coverage from 80% to 75%.

Summary

The final results of the study are provided in the accompanying actuarial report and will be further discussed by the actuaries. The information provided in the chart below is the estimated financial impact of the proposed assumption changes as if they were applied to the December 31, 2012, actuarial valuation.

Cost Impact of Recommended Assumptions		
Change in Costs	Contribution Rate	Estimated Annual Dollars Amount in 000s
Employer	(0.38%)	(\$5,414)
Member	(0.23%)	(\$3,135)
Total	(0.61%)	(\$8,549)
Impact on UAAL and Funded Percentage		
Decrease in UAAL	(\$85million)	
Change in Funded Status	From 86.9% to 87.6%	



Alameda County Employees'
Retirement Association

Actuarial Experience Study

**Analysis of Actuarial Experience During the Period
December 1, 2019 through November 30, 2022**

September 8, 2023

Board of Retirement
Alameda County Employees' Retirement Association
475 14th Street, Suite 1000
Oakland, CA 94612-1900

Re: Review of Actuarial Assumptions for the December 31, 2023 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience for the Alameda County Employees' Retirement Association (ACERA). This study utilizes the census data for the period December 1, 2019 to November 30, 2022 as well as prior periods for some assumptions, and provides the proposed actuarial assumptions, both economic and demographic, to be used in the December 31, 2023 valuation.

We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,

Andy Yeung, ASA, MAAA, FCA, EA
Vice President and Actuary

Eva Yum, FSA, MAAA, EA
Vice President and Actuary

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1. Introduction, Summary, and Recommendations

To project the cost and liabilities of the pension plan, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the projected experience, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are modified, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that year's experience is treated as temporary and that, over the long run, experience will return to what was originally assumed. For example, the actuarial assumptions used in the most recent valuation did not include any possible short-term or long-term impacts on mortality of the covered population that emerged due to COVID-19.¹ Changing assumptions reflects a basic change in thinking about the future, and has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying the promised benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the economic and demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from December 1, 2019 through November 30, 2022. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations"² and ASOP No. 35 "Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations." These Standards of Practice provide guidance for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected future experience, we are recommending various changes in the current actuarial assumptions.

Please note that consistent with past practice, the investment return assumption recommended in this report has been developed without taking into consideration the impact of the 50/50 allocation of future "excess earnings" between the retirement and Supplemental Retiree Benefit Reserve (SRBR) asset pools.

¹ An analysis of the ongoing impact of COVID-19 is beyond the scope of the current experience study.

² References made later in this report are with respect to the revised ASOP 27 adopted in June 2020.

We are recommending changes in the assumptions for inflation, merit and promotion salary increases, additional cashout, retirement from active employment, retirement age for nonreciprocal deferred vested members, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, pre-retirement mortality, healthy life post-retirement mortality, disabled life post-retirement mortality, beneficiary mortality, termination (refunds and deferred vested retirements), percentage expected to receive a refund or deferred vested benefit, disability incidence, percent of disabilities anticipated to be service connected or non-service connected, and sick leave conversion. We are also recommending a change in the allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service as well as some technical changes to the application of the Entry Age Cost allocation method. For the assumptions related to the valuation of the discretionary SRBR OPEB benefits, we are recommending changes in the spousal coverage election and retiree medical coverage election assumptions.

Our recommendations for the major actuarial assumption categories are as follows:

Pg #	Actuarial Assumption Category	Recommendation
13	Inflation: Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary increases.	Reduce the inflation assumption from 2.75% to 2.50% per annum as discussed in Section (3)(A).
16	Retiree Cost-of-Living Increases: Future increases in the cost-of-living adjustment for retirees.	For those tiers with a 3.00% maximum cost-of-living adjustment (COLA), maintain the retiree COLA assumption at 2.75% per annum (based on our recommended inflation assumption of 2.50% plus a margin for adverse deviation of 0.25%) as discussed in Section (3)(A). For those tiers with a 2.00% maximum COLA, maintain the retiree COLA assumption at 2.00% per annum.
18	Investment Return: The estimated average future net rate of return on current and future assets of the Association as of the valuation date. This rate is used to discount liabilities.	Maintain the investment return assumption at 7.00% per annum as discussed in Section (3)(B).
28	<p>Individual Salary Increases: Increases in the salary of a member between the date of the valuation to the date of separation from active service. This assumption has three components:</p> <ul style="list-style-type: none"> • Inflationary salary increases • Real “across the board” salary increases • Merit and promotion increases <p>Additional Cashout: Additional earnings that are expected to be received during the member’s final average earnings period.</p>	<p>Reduce the current inflationary salary increase assumption from 2.75% to 2.50% and maintain the current real “across the board” salary increase assumption of 0.50%. This means that the combined inflationary and real “across the board” salary increases will decrease from 3.25% to 3.00%.</p> <p>We recommend adjusting the merit and promotion rates of salary increase as developed in Section (3)(C) to reflect past experience. Overall future merit and promotion salary increases are higher for General and Safety members under the proposed assumptions.</p> <p>The recommended <u>total</u> rates of salary increase anticipate lower increases overall for General members and just slightly lower increases overall for Safety members than the current assumptions.</p> <p>We recommend overall reductions in the additional cashout assumptions based on recent experience, and the decision made by the Board to change how much vacation sell back and cash out can be included in the compensation earnable for Tier 1 and 2 members who retire after June 17, 2021.</p>

Pg #	Actuarial Assumption Category	Recommendation
36	<p>Retirement Rates: The probability of retirement at each age at which participants are eligible to retire.</p> <p>Other Retirement Related Assumptions including:</p> <ul style="list-style-type: none"> • Retirement age for deferred vested members • Future reciprocal members and reciprocal salary increases • Percent married and spousal age differences for members not yet retired 	<p>For active members, adjust the current retirement rates to those developed in Section (4)(A). For General Tier 4 and Safety Tier 4 members, we are recommending separate sets of age-based retirement assumptions for those with less than 30 years of service and for those with 30 or more years of service.</p> <p>For deferred vested members, maintain the assumed retirement age for reciprocal General and Safety members at age 61 and 55, respectively. Increase the assumed retirement age for non-reciprocal General members from age 61 to age 62; and increase the assumed retirement age for non-reciprocal Safety members from age 55 to age 56.</p> <p>Decrease the current proportion of future terminated members expected to be covered by a reciprocal system from 25% to 20% for General members and from 50% to 45% for Safety members. In addition, reduce the reciprocal salary increase assumption from 3.65% to 3.45% for General members and from 4.05% to 4.00% for Safety members.</p> <p>For active and deferred vested members, maintain the percent married at retirement assumption at 70% for males and 50% for females. Maintain the spouse age difference assumption that male retirees are three years older than their spouses and female retirees are two years younger than their spouses.</p>
53	<p>Mortality Rates: The probability of dying at each age. Mortality rates are used to project life expectancies.</p>	<p>Healthy Retirees:</p> <p><i>For Statutory Retirement Plan Benefits and Discretionary SRBR non-OPEB Benefits</i></p> <p>Current and recommended base table for General Members: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table.</p> <p>Current base table for Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table.</p> <p>Recommended base table for Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males.</p> <p><i>For Discretionary SRBR OPEB Benefits</i></p> <p>Current and recommended base table for General Members: Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Table.</p> <p>Current base table for Safety Members: Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Table.</p> <p>Recommended base table for Safety Members: Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Table with rates increased by 5% for males.</p> <p>All Beneficiaries:</p> <p><i>For Statutory Retirement Plan Benefits and Discretionary SRBR non-OPEB Benefits</i></p> <p>Current base table both not in pay status at the valuation and in pay status at the valuation: Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table increased by 5% for males.</p>

Recommended base table not in pay status at the valuation: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table.

Recommended base table in pay status at the valuation: Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table increased by 5% for males.

For Discretionary SRBR OPEB Benefits

Current base table both not in pay status at the valuation and in pay status at the valuation: Pub-2010 Contingent Survivor Headcount-Weighted Above-Median Mortality Table increased by 5% for males.

Recommended base table not in pay status at the valuation: Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Table.

Recommended base table in pay status at the valuation: Pub-2010 Contingent Survivor Headcount-Weighted Above-Median Mortality Table increased by 5% for males.

For the purposes of the actuarial valuations (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality both before and after the expected death of the General or Safety member. Upon the actual death of the member (i.e., for all beneficiaries in pay status as of the valuation date), we recommend for the purposes of the actuarial valuations that we use the Contingent Survivor mortality tables as stated above.

Pre-Retirement Mortality:

For Statutory Retirement Plan Benefits and Discretionary SRBR non-OPEB Benefits

Current & recommended base table for General Members: Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table.

Current & recommended base table for Safety Members: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table.

For Discretionary SRBR OPEB Benefits

Current & recommended base table for General Members: Pub-2010 General Employee Headcount-Weighted Above-Median Mortality Table.

Current & recommended base table for Safety Members: Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Table.

Disabled Retirees:

For Statutory Retirement Plan Benefits and Discretionary SRBR non-OPEB Benefits

Current & recommended base table for General Members: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with rates decreased by 10% for females.

Current & recommended base table for Safety Members: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table with rates increased by 5% for males.

For Discretionary SRBR OPEB Benefits

Current & recommended base table for General Members: Pub-2010 Non-Safety Disabled Retiree Headcount-Weighted Mortality Table with rates decreased by 10% for females.

Pg #	Actuarial Assumption Category	Recommendation
		<p>Current & recommended base table for Safety Members: Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Table with rates increased by 5% for males.</p> <p>All current tables are projected generationally with the two-dimensional mortality improvement scale MP-2019.</p> <p>All recommended tables are projected generationally with the two-dimensional mortality improvement scale MP-2021. This is the most recent projection scale, as an updated projection scale was not published in 2022.</p> <p>For member contribution rates: change the mortality rates to those developed in Section (4)(B).</p>
71	<p>Termination Rates: The probability of leaving employment at each age or after accruing certain years of service and receiving either a refund of member contributions or a deferred vested retirement benefit.</p>	<p>We recommend adjusting the termination rates to those developed in Section (4)(D) to reflect a higher incidence of termination for General and Safety members. In addition, a slightly lower proportion of members with five or more years of service is expected to elect a refund of member contributions with a higher proportion electing instead to receive a deferred vested benefit under the recommended assumptions.</p>
76	<p>Disability Incidence Rates: The probability of becoming disabled at each age.</p>	<p>We recommend adjusting the disability rates to those developed in Section (4)(E) to reflect a lower incidence of disability overall for General members and a higher incidence of disability overall for Safety members.</p> <p>Increase the percentage of anticipated General member disabilities to be service connected from 65% to 70%, and maintain the service connected disability assumption at 100% for Safety members.</p>
79	<p>Service From Unused Sick Leave Conversions: Additional service that is expected to be received when a member retires due to conversion of unused sick leave.</p>	<p>We recommend maintaining the current assumption for General members and decreasing the assumption for Safety members as shown in Section (4)(F).</p>
80	<p>Retiree Health Assumptions: Assumptions related to the valuation of the discretionary SRBR OPEB benefits.</p>	<p>We recommend lowering the percentage of new retirees expected to cover their spouse to those developed in Section (4)(G). We also recommend lowering the percentage of new retirees expected to enroll in medical coverage.</p> <p>Decrease the percentage of new male retirees expected to cover a spouse from 40% to 35% and the percentage of new female retirees expected to cover a spouse from 20% to 15%.</p> <p>Decrease the percentage of new retirees under age 65 expected to enroll in medical coverage from 80% to 75%.</p>
82	<p>Including change in the allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service.</p>	<p>Adjust the allocation as discussed in Section (4)(H) and make technical changes to the application of the Entry Age Cost allocation method.</p>

We have estimated the impact of all the recommended economic and demographic assumptions as if they were applied to the December 31, 2022 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes including the recommended merit and promotion salary increases (as recommended in Section 3 of this report) and the recommended demographic assumption changes (as recommended in Section 4 of this report).

Cost Impact of the Recommended Assumptions Based on December 31, 2022 Actuarial Valuation

	Impact on Average Employer Contribution Rates
Decrease due to changes in economic assumptions	(0.38%)
Decrease due to changes in demographic assumptions ¹	<u>0.00%</u>
Total increase/(decrease) in average employer rate	(0.38%)
Total estimated increase/(decrease) in annual dollar amount (\$000s)²	\$(5,414)

	Impact on Average Member Contribution Rates
Decrease due to changes in economic assumptions	(0.29%)
Increase due to changes in demographic assumptions ³	<u>0.06%</u>
Total increase/(decrease) in average member rate	(0.23%)
Total estimated increase/(decrease) in annual dollar amount (\$000s)²	\$(3,135)

	Impact on UAAL ⁴ (\$000s)
Decrease due to changes in economic assumptions	\$(21,827)
Decrease due to changes in demographic assumptions	<u>(63,634)</u>
Total increase/(decrease) in UAAL (\$000s)	\$(85,461)

	Impact on Funded Percentage
Change in Funded Percentage on VVA basis	86.9% to 87.6%

The reduction in the contribution rate is mainly caused by the reduction in the inflationary salary increase assumption from 2.75% to 2.50%.

The reduction in the UAAL from changes in economic assumptions is mainly caused by the reduction in the inflationary salary increase assumption from 2.75% to 2.50%. There is also a reduction in the UAAL from changes in demographic assumptions that is mainly due to the refinements in the Entry Age allocation cost method.

¹ The increase in the average employer contribution rate due to the change in the allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 82, is less than 0.01% of payroll.

² Based on December 31, 2022 projected annual payroll as determined under each set of assumptions. These annual amounts are expected to change in the future in proportion to future payroll.

³ The decrease in the average member contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 82, is less than 0.01% of payroll.

⁴ UAAL stands for the Unfunded Actuarial Accrued Liability, which is the excess, if any, of the Actuarial Accrued Liability over the Valuation Value of Assets.

Section 2 provides some background on the basic principles and methodology used for the experience study and for the review of the economic and demographic actuarial assumptions. A detailed discussion of each assumption and reasons for the proposed changes are found in Section 3 for the economic assumptions and Section 4 for the demographic assumptions. The cost impact of the proposed changes is detailed in Section 5.

DRAFT

2. Background and Methodology

In this report, we analyzed both economic and demographic (“non-economic”) assumptions. The primary economic assumptions reviewed are inflation, investment return, salary increases, and additional cashout. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., termination from service, disability retirement, service retirement, and death before and after retirement. In addition to decrements, other demographic assumptions reviewed in this study include the percentage of members with an eligible spouse or domestic partner, spousal age difference, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases and unused sick leave conversion.

Economic Assumptions

Economic assumptions consist of:

- **Inflation:** Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees and drives increases in the allowances of retired members (if any).
- **Investment Return:** Expected long-term rate of return on the Association’s investments after accounting for certain investment expenses and all administrative expenses. This assumption has a significant impact on contribution rates.
- **Salary Increases:** In addition to inflationary increases, it is assumed that salaries will also grow by real “across the board” pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers. These are commonly referred to as merit and promotion increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any real “across the board” pay increases that are assumed.

The setting of these economic assumptions is described in Section 3.

Demographic Assumptions

In order to determine the probability of an event occurring, we examine the “decrements” and “exposures” of that event. For example, taking termination from service, we compare the number of employees who actually terminate in a certain age and/or service category (i.e., the number of “decrements”) with those who could have terminated (i.e., the number of “exposures”). For example, if there were 500 active employees (exposures) in the 20-24 age group at the beginning of the year and 50 of them left during the year (decremented out), we would say the probability of termination in that age group is $50 \div 500$ or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credibility to the probability of termination developed for that age category, especially if it is out

of line with the pattern shown for the other age groups. Similarly, if we are considering the death decrement, there may be a large number of exposures in the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the most recent years.

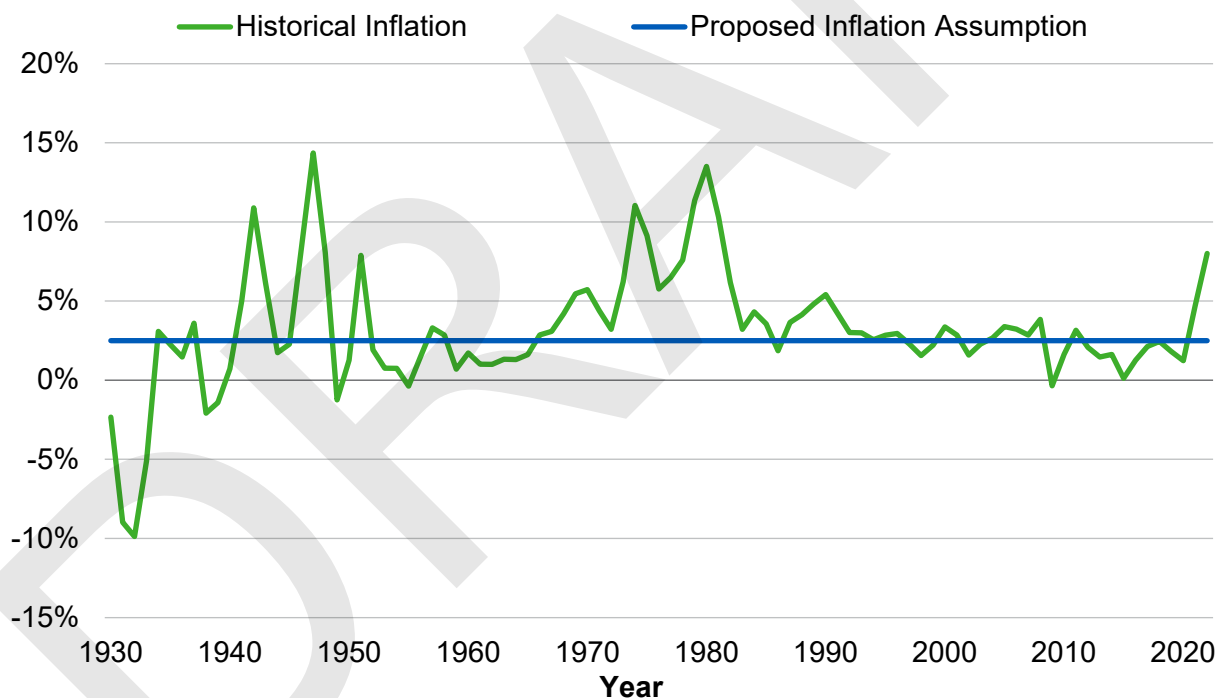
3. Economic Assumptions

A. Inflation

Unless an investment grows at least as fast as prices increase, investors will experience a reduction in the inflation-adjusted value of their investment. There may be times when “riskless” investments return more or less than inflation, but over the long term, investment market forces will generally require an issuer of fixed income securities to maintain a minimum return which protects investors from inflation.

The inflation assumption is long-term in nature, so our analysis begins with a review of historical information. Following is a graph showing historical inflation rates and a comparison with the inflation assumption of 2.50% that we recommend in this report:

Historical Consumer Price Index – 1930 to 2022¹
(U.S. City Average - All Urban Consumers)



There has been a spike in inflation that started in the second quarter of 2021 and continued into 2022. However, the rate of inflation, while still elevated, has leveled off and started to decline since the Federal Reserve began to increase interest rates starting around the second quarter of 2022. In particular, the change in CPI from July 31, 2022 to June 30, 2023 was 3.18%.

Based on information found in the Public Plans Database, which is produced in partnership with the National System of State Retirement Administrators (NASRA), the median inflation

¹ Source: Bureau of Labor Statistics – Based on annual-to-annual CPI for All Items in U.S. city average, all urban consumers, not seasonally adjusted (Series ID: CUUR0000SA0).

assumption used by 194 large public retirement funds in their 2021 fiscal year valuations was 2.50%.¹ In California, CalSTRS and five² 1937 Act CERL systems (including ACERA) currently use an inflation assumption of 2.75%, the other fifteen 1937 Act CERL systems use an inflation assumption of 2.50%³ and CalPERS uses an inflation assumption of 2.30%.

ACERA's investment consultant, Verus, anticipates an annual inflation rate of 2.10% over a 30-year horizon,⁴ while the average inflation assumption provided by Verus and five other investment advisory firms retained by Segal's California public sector clients, as well as Segal's investment advisory division (Segal Marco Advisors),⁵ was 2.43%. Note that, in general, investment consultants use a time horizon for this assumption that is shorter than the time horizon we use for the actuarial valuation.⁶

To find a forecast of inflation based on a longer time horizon, we referred to the Social Security Administration's (SSA) 2023 report on the financial status of the Social Security program.⁷ The projected average increase in the Consumer Price Index (CPI) over the next 75 years under the intermediate cost assumptions used in that report was 2.40%. The SSA report also includes alternative projections using lower and higher inflation assumptions of 1.80% and 3.00%, respectively.

We also compared the yields on the thirty-year inflation indexed U.S. Treasury bonds to comparable 30-year traditional U.S. Treasury bonds.⁸ This "break-even rate" is commonly regarded as a market-based gauge of future inflation expectations. As of August 2023, the difference in yields is about 2.31% which provides a measure of market expectations of inflation. This market expectation for long term inflation can be quite volatile and has dropped from a high of 2.55% over the last 18 months, which is illustrated in the table below. It is worth noting that even during the peak of the recent inflation spike this break-even rate exceeded 2.50% in only a single month, April 2022.

¹ Among 219 large public retirement funds, the 2021 fiscal year inflation assumption was not available for 25 of the public retirement funds in the survey data as of March 2023.

² We note that out of these five 1937 Act CERL Systems, ACERA is the only system served by Segal that currently uses 2.75% as the inflation assumption and seven other systems served by Segal had recently adopted our recommendation to reduce their inflation assumption from 2.75% to 2.50%

³ Seven of these 1937 Act CERL systems use a 2.50% inflation assumption with a 2.75% COLA assumption.

⁴ The annual inflation assumption used by Verus is 2.5% over a 10-year horizon.

⁵ We note that this is the first time we have included inflation and real rate of return assumptions used by Segal Marco Advisors in our review of economic assumptions for ACERA.

⁶ The time horizon used by the six investment consultants included in our review, with the exception of one investment consultant that uses a 1-year horizon, generally ranges from 20 years to 30 years, with Verus using a 30-year horizon.

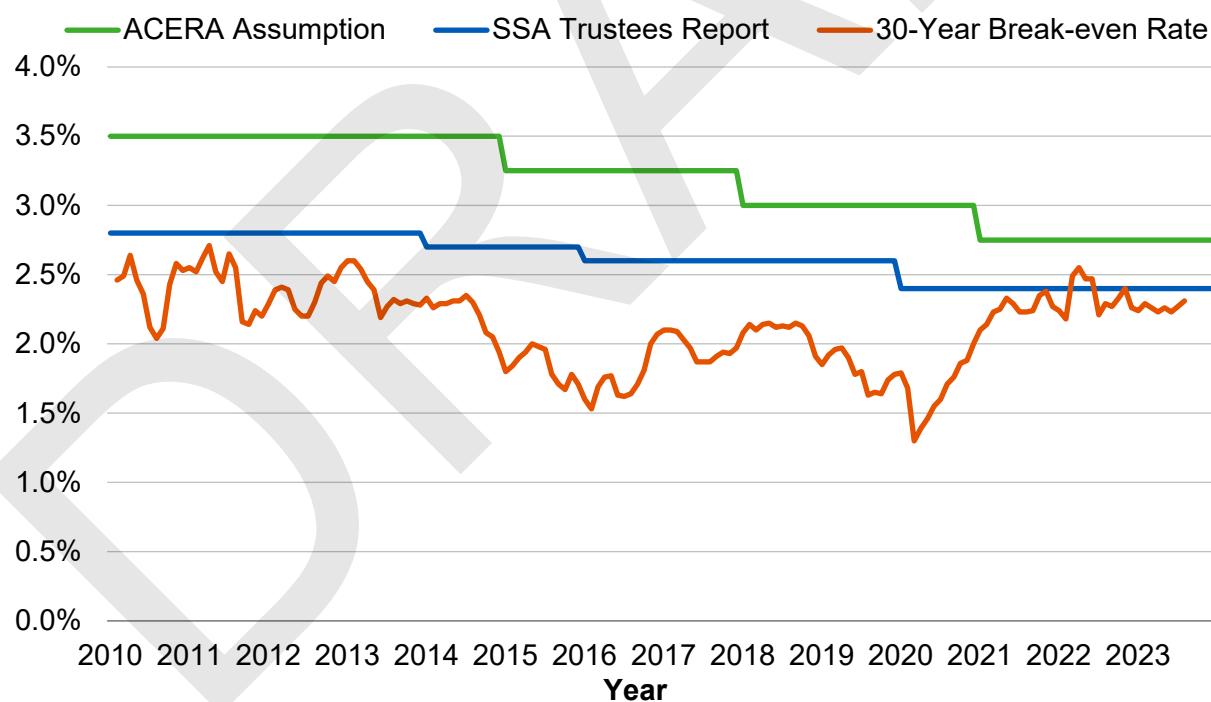
⁷ Source: Social Security Administration: The 2023 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds.

⁸ Source: Board of Governors of the Federal Reserve System.

Observation Month	Difference in Yields	Observation Month	Difference in Yields
March 2022	2.49%	December 2022	2.26%
April 2022	2.55%	January 2023	2.24%
May 2022	2.47%	February 2023	2.29%
June 2022	2.47%	March 2023	2.26%
July 2022	2.21%	April 2023	2.23%
August 2022	2.29%	May 2023	2.26%
September 2022	2.27%	June 2023	2.23%
October 2022	2.33%	July 2023	2.27%
November 2022	2.40%	August 2023	2.31%

The following graph shows ACERA's historical and current proposed inflation assumptions compared to the two other measures just discussed, going back to 2010. In effect, this compares ACERA's assumption to two separate independent forecasts, one based on market observations and one developed by economists at the SSA. The graph shows that over this period, ACERA's assumption has been higher but consistently moving towards these other forecasts.

Historical Inflation Forecasts



The setting of the inflation assumption using the information outlined above is a somewhat subjective process, and Segal does not apply a specific weight to each of the metrics in determining our recommended inflation assumption. Based on a consideration of all of the above metrics, beginning in 2021 we are generally recommending the same 2.50% inflation assumption in our experience studies for our California public retirement system clients.

Based on all of the above information, we recommend reducing the annual inflation assumption from 2.75% to 2.50%.

Retiree Cost-of-Living Increases

In our last experience study as of November 30, 2019, consistent with the 2.75% annual inflation assumption adopted by the Board, the Board adopted a 2.75% cost-of-living adjustment (COLA) assumption (which is lower than the maximum COLA of 3.00% provided by the Association) for all retirees in Tiers 1 and 3 and a 2.00% COLA assumption for retirees in Tiers 2 and 4.

At that time, we set the recommended Tiers 1 and 3 post-retirement COLA assumption to be equal to our recommended inflation assumption. However, we observe in the table below that during the most recent 10-year and 20-year periods ending before December 31, 2022, the changes in the December CPI for the San Francisco-Oakland-Hayward Area used by the Board to set COLAs have exceeded those of the annual average CPI for the U.S. City Average. This difference is not seen during the most recent 5-year period, which had unusually volatile inflation experience.

	Change in December CPI for San Francisco-Oakland-Hayward	Change in December CPI for U.S. City Average
5-Year Period	3.61%	3.78%
10-Year Period	3.29%	2.60%
20-Year Period	2.73%	2.51%

In order to reflect this 10-year and 20-year experience and to mitigate actuarial losses which may arise from future COLA increases greater than the inflation assumption, we believe it is reasonable for the Board to consider adopting an extra margin above the general price inflation in anticipating future COLAs for Tier 1. **Accordingly, for Tiers 1 and 3 retirees with a maximum 3.00% COLA, our recommended COLA assumption of 2.75% includes a 0.25% margin above our recommended inflation assumption, which leaves the COLA assumption unchanged as shown below. We recommend no change in the 2.00% assumption used to value the post-retirement COLA for Tiers 2 and 4.**

Tiers	Maximum COLA	Current Assumption	Proposed Assumption
Tiers 1 and 3	3.00%	2.75% ¹	2.75% ¹
Tiers 2 and 4	2.00%	2.00%	2.00%

In developing the COLA assumption, we also considered the results of a stochastic approach that would attempt to account for the possible impact of low inflation that could occur before COLA banks are able to be established for the member. Although the results of this type of analysis might justify the use of a lower COLA assumption, we are not recommending that at this time. The reasons for this conclusion include the following:

¹ We will continue to assume in the valuation that retired members and beneficiaries with a COLA bank on the date of the valuation will continue to receive the maximum COLA until the balances in their COLA banks are used up.

- The results of the stochastic modeling are significantly dependent on assuming that lower levels of inflation will persist in the early years of the projections. If this is not assumed, then the stochastic modeling will produce results similar to our proposed COLA assumptions.
- Using lower long-term COLA assumptions based on a stochastic analysis would mean that an actuarial loss would occur even when the inflation assumption of 2.50% is met in a year. We question the reasonableness of this result.

We do not see the stochastic possibility of COLAs averaging less than those predicted by the assumed rate of inflation as a reliable source of cost savings that should be anticipated in our COLA assumptions. Therefore, we continue to recommend setting the COLA assumptions consistent with the COLA assumption we have used in prior years.

B. Investment Return

The investment return assumption is comprised of two primary components, inflation and real rate of investment return, with adjustments for certain expenses and risk.

Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Generally, when an investor takes on greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional risk and return is expected to vary by asset class and empirical data supports that expectation. For that reason, the real rate of return assumptions are developed by asset class. Therefore, the real rate of return assumption for a retirement plan's portfolio will vary with the Board's asset allocation among asset classes.

The Association's current target asset allocation and the assumed real rate of return assumptions by asset class are shown in the following table. The first column of real rate of return assumptions are determined by reducing Verus' total or "nominal" 2023 return assumptions by their assumed 2.10% inflation rate. The second column of returns (except for Value Added Real Estate, Opportunistic Real Estate, Absolute Return, and Infrastructure) represents the average of a sample of real rate of return assumptions. The sample includes the expected annual real rate of return provided to us by Verus and five other investment advisory firms retained by Segal's public sector clients, as well as Segal's investment advisory division. We believe these averages are a reasonable consensus forecast of long-term future market returns in excess of inflation.¹

¹ Note that, just as for the inflation assumption, in general the time horizon used by the investment consultants in determining the real rate of return assumption is shorter than the time horizon encompassed by the actuarial valuation.

ACERA's Target Asset Allocation and Assumed Arithmetic Net Real Rate of Return Assumptions by Asset Class and for the Portfolio

Asset Class	Percentage of Portfolio	Verus' Assumed Net Real Rate of Return ¹	Average Assumed Net Real Rate of Return from a Sample of Consultants to Segal's California Public Sector Clients ²
US Large Cap Equity	21.60%	5.30%	6.00%
US Small Cap Equity	2.40%	5.70%	6.65%
International Developed Equity	16.30%	7.40%	7.01%
International Small Cap Equity	2.90%	8.00%	7.34%
Emerging Markets Equity	4.80%	7.60%	8.80%
Core Fixed Income	10.50%	2.60%	1.97%
High Yield Bonds	1.50%	5.00%	4.63%
Global Fixed Income	2.00%	1.00%	1.17%
Private Equity	11.00%	9.60%	9.84%
Core Real Estate	6.30%	4.30%	3.86%
Value Added Real Estate	1.80%	6.70%	6.70% ³
Opportunistic Real Estate	0.90%	8.60%	8.60% ³
Commodities	0.90%	4.40%	4.21%
Private Credit	4.00%	6.90%	6.47%
Absolute Return	8.00%	2.10%	2.10% ³
Infrastructure	5.10%	7.30%	7.30% ³
Total	100.00%	5.83%	5.89%

Generally, the above are representative of “indexed” returns for securities that are publicly traded, returns net of fees for securities that are non-publicly traded and do not include any additional returns (“alpha”) from active management. Consideration of returns without alpha is consistent with the Actuarial Standard of Practice No. 27, Section 3.8.3.d, which states:

“Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy unless the actuary has reason to believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the long term.”

¹ The rates shown have been estimated by Segal by taking Verus' nominal projected arithmetic returns and reducing by Verus' assumed 2.10% inflation rate to develop the assumed real rate of return shown.

² These are based on the projected arithmetic returns provided by Verus and five other investment advisory firms serving the county retirement system of ACERA and 16 other city and county retirement systems in California, as well as Segal's investment advisory division. These return assumptions are net of any applicable investment management expenses.

³ For this asset class, Verus' assumption is applied in lieu of the average because there is a larger disparity in returns for these asset classes among the firms surveyed and using Verus' assumption should more closely reflect the underlying investments made specifically for ACERA.

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients, as well as Segal's investment advisory division, have each provided us with their expected real rates of return for each asset class, over various future periods of time. However, in general, the returns available from investment consultants are projected over time periods that are shorter than the durations of a retirement plan's liabilities.
2. As discussed in the next section, the real rates of return provided this year by the investment consultants reflect a change in how investment expenses are reported.
3. Using a sample average of expected net real rates of return allows the Association's investment return assumption to reflect a broader range of capital market information and should help reduce year to year volatility in the investment return assumption.
4. Therefore, we recommend that the 5.89% portfolio net real rate of return be used to determine ACERA's investment return assumption, but with some caution. This return is 0.33% higher than the 5.56% gross return that was used three years ago in the review of the recommended investment return assumption for the December 31, 2020 valuation even before we consider the approximately 0.75% in investment management expense that, as discussed in the next section, will no longer be subtracted from the 5.89% gross return.
5. The 0.33% increase in the portfolio net real rate of return since the 2020 return is due to changes in the real rate of return assumptions provided to us by the investment advisory firms (+0.09% under the 2020 asset allocation), changes in ACERA's target asset allocation (+0.32%) and the interaction effect between these changes (-0.08%). We believe the increase in portfolio net real rate of return attributable to those real rate of return assumptions may be due to the very low returns earned in the 2022 plan year, as well as the increase in the federal funds rate during 2022, and so should be used with caution in selecting a long-term investment return assumption.

Association Expenses

For funding purposes, the real rate of return assumption for the portfolio needs to reflect investment expenses expected to be paid from investment income. In prior experience studies, we have adjusted the gross real rate of return developed using the target asset allocation by the investment expenses expected to be paid by ACERA. Note that current practice for ACERA also adjusts for expected administrative expenses.

However, as prevailing practice by investment advisory firms is to provide us with the real rates of return net of expected investment expenses, especially for active portfolio management, we now need to make adjustments only for investment consulting fees, custodian fees and other miscellaneous investment expenses (as well as administrative expenses). The following table provides the administrative and investment expenses in relation to the actuarial value of assets as of the beginning of the year, for the six-year period ending December 31, 2022.

**Administrative and Investment Expenses
as a Percentage of Actuarial Value of Assets**
(Dollars in 000's)

Year Ending December 31	Actuarial Value of Assets ¹	Investment Expenses ²	Administrative Expenses	Investment %	Administrative %	Total %
2017	\$7,309,485	\$6,507	\$15,775	0.09	0.22	0.31
2018	7,803,026	7,544	16,470	0.10	0.21	0.31
2019	8,161,706	5,323	16,628	0.07	0.20	0.27
Three-Year Average (2017-2019)				0.09	0.21	0.30
2020	8,528,591	6,565	16,226	0.08	0.19	0.27
2021	8,986,482	4,867	16,577	0.05	0.18	0.23
2022	10,707,916	5,841	17,026	0.05	0.16	0.21
Three-Year Average (2020-2022)				0.06	0.18	0.24
Six-Year Average				0.07	0.19	0.27
Current Assumption (including investment management fees)						0.95
Proposed Assumption (excluding investment management fees)						0.30

Based on the above experience, we recommend reducing the expense component of the investment return assumption from 0.95% to 0.30%.

Note related to investment expenses paid to active managers – As cited above, under Section 3.8.3.d of ASOP No. 27, the effect of an active investment management strategy should be considered “net of investment expenses...unless the actuary believes, based on relevant data, that such superior or inferior returns represent a reasonable expectation over the measurement period.”

We have not performed a detailed analysis to measure how much of the investment expenses paid to active managers might have been offset by additional returns (“alpha”) earned by that active management. For this study, we will continue to use the current approach that any “alpha” that may be identified would be treated as an increase in the risk adjustment and corresponding confidence level that are discussed in the next section. However, as discussed above, the real return assumptions provided by the investment advisory firms assume that active management will generate additional returns to cover the expense of such management, an assumption that is consistent with ASOP No. 27.

Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. ACERA’s asset allocation determines this portfolio risk, since risk levels are driven by the variability of returns for the various asset classes and the

¹ As of the beginning of the plan year. In this year’s analysis, we have switched to use actuarial value of assets (instead of average of beginning and end of year market value of assets) so as to obtain more stable results.

² Equals the sum of investment consulting fees, custodian fees, and other investment expenses and fees. Excludes investment manager fees.

correlation of returns among those asset classes. This portfolio risk is incorporated into the real rate of return assumption through a risk adjustment.

The purpose of the risk adjustment (as measured by the corresponding confidence level) is to increase the likelihood of achieving the actuarial investment return assumption in the long term.¹ This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

The 5.89% expected real rate of return developed earlier in this report was based on expected arithmetic average returns. A retirement system using an expected arithmetic average return as the discount rate in a funding valuation is expected on average to have no surplus or asset shortfall relative to its expected obligations assuming all other actuarial assumptions are met in the future.² That is the basis used in Segal's previous experience studies for ACERA.

Beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. A retirement system using an expected geometric average return as the discount rate in a funding valuation will, over long periods of time, have an equal likelihood of having a surplus or asset shortfall relative to its expected obligations assuming all other actuarial assumptions are met in the future.³

Under either the arithmetic or geometric model, the confidence level associated with a particular risk adjustment represents a relative likelihood that future investment earnings would equal or exceed the assumed earnings over a 15-year period. The 15-year time horizon represents an approximation of the "duration" of the fund's liabilities, where the duration of a liability represents the sensitivity of that liability to interest rate variations.

For comparison purposes we first consider how the earlier model would look if used in this year's study. Three years ago, the Board adopted an investment return assumption of 7.00%. Under the model used in that experience study, that return implied a risk adjustment of 0.36%, corresponding to a 15-year confidence level of 54%, based on an annual portfolio return standard deviation of 12.2% provided by Verus in 2020.

If we use the same 54% 15-year confidence level from our last study to set this year's risk adjustment and the current annual portfolio return standard deviation of 12.9% provided by Verus, the corresponding risk adjustment would be 0.38%. Together with the other investment return components (including for this comparison updated expected arithmetic average returns and the same expense adjustment as used in the prior study), this would result in an investment return assumption of 7.06%, which is higher than the current assumption of 7.00%.

Based on the general practice of using one-quarter percentage point increments for economic assumptions, we evaluated the effect on the confidence level of other alternative investment return assumptions. We also considered that, as discussed above, the increase in the real rates of return provided by the investment consultants may reflect the very low returns earned in the 2022 plan year, as well as the increase in the federal funds rate during 2022, and so could be overly optimistic when used for selecting a long-term investment return assumption. For that

¹ This type of risk adjustment is referred to in the Actuarial Standards of Practice as a "margin for adverse deviation."

² The mathematical terminology for this is that the mean (or average) surplus or asset shortfall is expected to be zero.

³ The mathematical terminology for this is that over time the median surplus or asset shortfall is expected to be zero.

reason, for this comparison value we considered a net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 0.44% which corresponds to a confidence level of 55% under the model and expense adjustment used in prior studies.

As noted above, beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. For any given asset portfolio, the expected geometric average return will be less than the expected arithmetic average return.¹ The difference depends on the variability of the portfolio as measured by its standard deviation. Based on the annual portfolio return standard deviation of 12.9% provided by Verus, the adjustment to an expected geometric average return reduces the expected return by 0.78%.

Together with the other investment return components (now excluding investment management expenses) and prior to any risk adjustment, this would result in a median expected assumption of 7.31%, which is higher than the current assumption of 7.00%. In applying this model to ACERA for the first time we also considered a net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 0.31% which under the expected geometric average return model corresponds to a confidence level of 54%.

Recommended Investment Return Assumption

The following table summarizes the components of the recommended investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study as well as the comparison values discussed above that apply the prior year's model to this year's information.

Assumption Component	December 31, 2023 Recommended Value	December 31, 2023 Comparison Values	December 31, 2020 Adopted Value
Inflation	2.50%	2.50%	2.75%
Portfolio Expected Arithmetic Real Rate of Return	5.89%	5.89%	5.56%
Expense Adjustment	(0.30)%	(0.95)% ²	(0.95)%
Adjustment to Expected Geometric Real Rate of Return	(0.78)%	N/A	N/A
Risk Adjustment	<u>(0.31)%</u>	<u>(0.44)%</u>	<u>(0.36)%</u>
Total	7.00%	7.00%	7.00%
Confidence Level	54%	55%	54%

Based on this analysis, we recommend maintaining the investment return assumption at 7.00% per annum.

¹ This is because the expected geometric average return reflects expected median outcomes, while the expected arithmetic average return reflects expected average or mean outcomes. Expected median outcomes are lower than expected average outcomes because they are less affected by the possibility of extraordinary ("outlier") favorable outcomes.

² For purposes of these comparison values we have assumed the same investment expenses as in the previous study, which included investment management fees.

The table below shows ACERA’s recommended investment return assumption and the corresponding risk adjustment and confidence level compared to the similar values for prior studies.

Historical Investment Return Assumptions, Risk Adjustments and Confidence Levels based on Assumptions Adopted by the Board

Years Ending December 31	Investment Return	Risk Adjustment	Corresponding Confidence Level
2011 - 2013	7.80%	0.53%	56%
2014 - 2016	7.60%	0.29%	53%
2017 - 2019	7.25%	0.20%	53%
2020 - 2022	7.00%	0.36%	54%
2023 (Comparison)	7.00%	0.44%	55%
2023 (Recommended)	7.00%	0.31%	54%

As we have discussed in prior experience studies, the risk adjustment model and associated confidence level is most useful as a means for comparing how ACERA has positioned itself relative to risk over periods of time.¹ The use of a 54% confidence level should be considered in context with other factors, including:

- As noted above, the confidence level is more of a relative measure than an absolute measure, and so can be reevaluated and reset for future comparisons. This is particularly true when comparing confidence levels developed using different models, as we are doing in this transitional year from one model to another.
- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Verus. The standard deviation is a statistical measure of the future volatility of the portfolio and so is itself based on assumptions about future portfolio volatility and can be considered somewhat of a “soft” number.
- We have not taken into account any additional returns (“alpha”) that might be earned on active management. This means that if active management generates enough alpha to cover its related expenses, this would increase returns. This aspect of Segal’s model is further evaluated below.
- As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the later section on “Comparison with Other Public Retirement Systems.”

¹ In particular, it would not be appropriate to use this type of risk adjustment as a measure of determining an investment return rate that is “risk-free.”

Impact of 50/50 Excess Earnings Allocation on Investment Return Assumption

Note that in developing the recommended investment return assumption in the past, we disclosed in our economic assumptions/experience study reports (and in our annual actuarial valuation reports) that the impact of the 50/50 allocation between the retirement and SRBR asset pools of the Article 5.5 “excess earnings” benefits had not been considered. This was based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than is used for interest crediting. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption (which is currently 7.00%).

As required by the Actuarial Standard of Practice (ASOP) No. 4 (“Measuring Pension Obligations and Determining Pension Plan Costs or Contributions”), we performed a simplified stochastic model¹ in 2020 to estimate the impact of the 50% allocation of future excess earnings to the SRBR. The results of our model indicated that the 50/50 allocation of future excess earnings would have about the same impact as an “outflow” (i.e., assets not available to fund the benefits included in the valuation) that would average approximately 0.65% of assets over time. For informational purposes only, when we applied the results of our stochastic model to the most recent December 31, 2022 funding valuation, we included the estimated impact that such an annual outflow would have on the employer’s contribution rate and on the actuarial accrued liability measured in that valuation, using the current 7.00% investment return assumption.

Using the same simplified stochastic model,¹ we have estimated the impact of the 50% allocation of future excess earnings to the SRBR using the data and recommended results included in this study. Based on that analysis, we recommend that the 0.65% assumption be increased to 0.75% in the December 31, 2023 valuation in preparing the informational purposes only disclosures. Similar to our prior review, we have excluded the amount of deferred and unrecognized investment gains/losses as of the date of the most recent December 31, 2022 valuation in this review because those amounts have fluctuated over time.

We observed that this assumption has increased directly in response to the change in the portfolio’s standard deviation. The portfolio’s standard deviation and our recommended assumption for the 50/50 excess earnings allocation in the past experience studies are as follows:

Experience Study Ending December 31	Portfolio Standard Deviation	50/50 Excess Earnings Allocation Impact
2014	14.40%	0.75%
2017	11.52%	0.60%
2020	12.20%	0.65%
2023	12.90%	0.75%

¹ In our model, we assume the median return of the portfolio will equal our expected investment return assumption.

Comparison with Alternative Model used to Review Investment Return Assumption

In previous studies, we have consistently reviewed investment return assumptions based on our model that incorporates expected arithmetic real returns for the different asset classes and for the entire portfolio as one component of that model.¹ The use of “forward looking expected arithmetic returns” is one of the approaches discussed for use in the Selection of Economic Assumptions for measuring Pension Obligations under Actuarial Standards of Practice (ASOP) No. 27.

Besides using forward looking expected arithmetic returns, ASOP No. 27 also discusses setting investment return assumptions using an alternative “forward looking expected geometric returns” approach, which is the model we have used in this study.² Even though as noted earlier expected geometric returns are lower than expected arithmetic returns, public retirement systems that have set investment return assumptions using this geometric approach have in practice adopted investment return assumptions that are comparable to those adopted by the Board for ACERA under the arithmetic approach. This is because under the model used by those retirement systems and by Segal in this report, the investment return assumption is not reduced to anticipate future investment management expenses. That is also why the comparison values and recommended values discussed earlier reach the same 7.00% expected return with comparable confidence levels.

In the interest of still having an alternative model for comparison, we evaluated the recommended 7.00% assumption based on the expected geometric return for the entire portfolio gross of management investment expenses, but using a fully stochastic approach and a different source for capital market assumptions. Under this alternative model, over a 15-year period, there is a 59% likelihood that future average geometric returns will meet or exceed 7.00%³ developed using the capital market assumptions compiled by Horizon Actuarial Services based on their most recent survey published in August 2023. This 59% likelihood is higher than the corresponding likelihood of 55% that we observed in this comparison during the assumption review in 2020 because the capital market assumptions provided in the 2023 survey are higher than those provided in the 2020 survey.

Comparison with Other Public Retirement Systems

One final test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide.

We note that an investment return of 7.00% or lower is becoming more common among California public sector retirement systems. In particular, of the twenty 1937 Act CERL systems, seven use a 7.00% investment return assumption, eight use 6.75%, three use 6.50% and one

¹ Again, as discussed earlier in this section, if a retirement system uses the expected arithmetic average return as the discount rate in the funding valuation, that retirement system is expected to have no surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.

² As also noted earlier in slightly different terms, if a retirement system uses the expected geometric average return as the discount rate in the funding valuation, that retirement system is expected to have an asset value that generally converges to the median accumulated value as the time horizon lengthens assuming all actuarial assumptions are met in the future.

³ We performed this stochastic simulation using the capital market assumptions included in the 2023 survey prepared by Horizon Actuarial Services. That simulation was performed using 10,000 trial outcomes of future market returns, using assumptions from 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2023 survey that included responses from 27 investment advisors.

uses 6.25%. The remaining 1937 Act CERL system currently uses a 7.25% earnings assumption. Furthermore, CalSTRS currently uses a 7.00% earnings assumption and CalPERS uses a 6.80% earnings assumptions, while the San Jose and San Diego City retirement systems use investment return assumptions of 6.625% and 6.50%, respectively.

The following table compares ACERA’s recommended net investment return assumption against those of the 210 large public retirement funds in their 2021 fiscal year valuations based on information found in the Public Plans Database, which is produced in partnership with NASRA:¹

Assumption	ACERA	Public Plans Data ²		
		Low	Median	High
Net Investment Return	7.00%	4.25%	7.00%	8.25%

The detailed survey results show that over 80% of the systems have an investment return assumption in the range of 6.75% to 7.50%. Also, over half of the systems have reduced their investment return assumption from 2017 to 2021. State systems outside of California tend to change their economic assumptions less frequently and so may lag behind emerging practices in this area.

In summary, the recommended assumption of 7.00% provides for an appropriate risk margin within the risk adjustment model, and is consistent with ACERA’s historical practice relative to other public systems.

¹ Among 219 large public retirement funds, the 2021 fiscal year investment return assumption was not available for 9 of the public retirement funds in the Public Plans Database as of March 2023.

² Public Plans Data website – Produced in partnership with the National System of State Retirement Administrators (NASRA).

C. Salary Increase

Salary increases impact plan costs in two ways: (1) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (2) by increasing total active member payroll which in turn generates lower UAAL contribution rates as a percent of payroll. These two impacts are discussed separately as follows:

As an employee progresses through his or her career, increases in pay are expected to come from three sources:

1. **Inflation:** Unless pay grows at least as fast as consumer prices grow, employees will experience a reduction in their standard of living. There may be times when pay increases lag or exceed inflation, but over the long term, labor market forces may require an employer to maintain its employees' standards of living.

As discussed earlier in this report, we recommend reducing the annual inflation assumption from 2.75% to 2.50%. This inflation component is used as part of the salary increase assumption.

2. **Real "Across the Board" Pay Increases:** These increases are typically termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees "across the board". The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real "across the board" pay increases have averaged about 0.5% – 0.8% annually during the last ten to twenty years.

We also referred to the annual report on the financial status of the Social Security program published in March 2023. In that report, real "across the board" pay increases are forecast to be 1.14% per year under the intermediate assumptions.

The real pay increase assumption is generally considered a more "macroeconomic" assumption that is not necessarily based on individual plan experience. However, recent salary experience with public systems in California as well as anecdotal discussions with plans and plan sponsors indicate lower future real wage growth expectations for public sector employees. We note that for ACERA's active members, the actual average inflation plus "across the board" increase (i.e., wage inflation) over the five-year period ending December 31, 2022 was 3.53%, which is lower than the change in CPI of 3.61% during that same period, largely as a result of the inflation spike discussed above:

Valuation Date	Actual Average Increase ¹	Actual December-to-December Change in CPI ²
December 31, 2018	3.37%	4.50%
December 31, 2019	3.36%	2.45%
December 31, 2020	2.47%	2.00%
December 31, 2021	4.19%	4.24%
December 31, 2022	4.26%	4.88%
Five-Year Average	3.53%	3.61%

Even though the actual average salary increase was lower than the average change in the CPI over the 5-year period ending December 31, 2022, this was in part due to the spike in inflation in 2022.

Based on all of the above information, we recommend maintaining the real “across the board” salary increase assumption at 0.50%. This means that the combined inflation and “across the board” salary increase assumption will decrease from 3.25% to 3.00%.

3. **Merit and Promotion Increases:** As the name implies, these increases come from an employee’s career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For ACERA, there are service-specific merit and promotion increase assumptions.

The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real “across the board” pay increases. Increases are measured separately for General and Safety members. This is accomplished by:

- a. Measuring each continuing member’s actual salary increase over each year of the experience period on a salary-weighted basis, with higher weights assigned to experience from members with larger salaries;
- b. Excluding any members with increases of more than 100% or any decreases of more than 50% during any particular year;
- c. Categorizing these increases according to member demographics;
- d. Removing the wage inflation component from these increases (assumed to be equal to the increase in the members’ average salary during the year);
- e. Averaging these annual increases over the experience period; and
- f. Modifying current assumptions to reflect some portion of these measured increases reflective of their “credibility.”

To be consistent with the other economic assumptions, these merit and promotion assumptions should be used in combination with the total 3.00% assumed inflation and real “across the board” increases recommended in this study.

Due to the high variability of the actual salary increases, we have analyzed this assumption using data for the past six years. We believe that when the experience from the current and prior studies is combined, it provides a more reasonable representation of potential future merit and promotion salary increases over the long term.

¹ Reflects the increase in average salary for members at the beginning of the year versus those at the end of the year. It does not reflect the average salary increases received by members who worked the full year.

² Based on the change in the December CPI for the San Francisco-Oakland-Hayward Area compared to the prior year.

The following table shows the General members' actual average merit and promotion increases by years of service over the current three-year period from December 1, 2019 through November 30, 2022, along with the average increases over the six-year period from December 1, 2016 through November 30, 2022 (combining the current three-year period with the three-year period from the prior experience study). The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (3.90% on average for the current three-year period, 3.91% on average for the prior three-year period).

*General
Rate (%)*

Years of Service	Current Assumption	Actual Average Increase from Current Study (Last 3 Years)	Actual Average Increase from Current and Prior Studies (Last 6 Years)	Proposed Assumption
Less than 1	5.10	3.78	4.05	5.00
1 – 2	5.10	5.18	5.92	5.00
2 – 3	4.50	3.66	4.37	4.40
3 – 4	2.90	2.98	3.20	3.00
4 – 5	2.10	2.01	2.15	2.10
5 – 6	1.60	1.68	1.65	1.60
6 – 7	1.50	1.04	1.25	1.50
7 – 8	1.50	1.09	1.42	1.50
8 – 9	1.00	1.47	1.35	1.20
9 – 10	0.90	1.16	1.09	1.00
10 – 11	0.70	1.32	1.01	0.85
11 & Over	0.40	0.75	0.50	0.45

Based on this experience, overall we recommend increasing the merit and promotion salary increase assumptions for General members. The overall salary increase assumptions will decrease for General members after taking into account the lower inflation component of the salary increase assumption.

Chart 1 that follows later in the section compares the actual merit and promotion increase experience with the current and proposed assumptions for General members.

The following table shows the Safety members' actual average merit and promotion increases by years of service over the current three-year period from December 1, 2019 through November 30, 2022, along with the average increases over the six-year period from December 1, 2016 through November 30, 2022 (combining the current three-year period with the three-year period from the prior experience study). The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (3.16% on average for the current three-year period, 4.06% on average for the prior three-year period).

Safety Rate (%)

Years of Service	Current Assumption	Actual Average Increase from Current Study (Last 3 Years)	Actual Average Increase from Current and Prior Studies (Last 6 Years)	Proposed Assumption
Less than 1	8.00	5.99	5.99	8.40
1 – 2	8.00	11.20	10.45	8.40
2 – 3	8.00	9.86	9.80	8.40
3 – 4	4.90	6.32	5.80	5.40
4 – 5	3.70	5.09	4.35	4.00
5 – 6	2.10	3.83	2.96	2.50
6 – 7	1.30	3.14	2.41	1.80
7 – 8	1.20	2.40	2.08	1.60
8 – 9	0.90	2.35	1.29	1.20
9 – 10	0.90	3.05	1.61	1.20
10 – 11	0.80	2.66	0.55	1.00
11 & Over	0.80	2.16	1.37	1.00

Based on this experience, overall we recommend increasing the merit and promotion salary increase assumptions for Safety members. The overall salary increase assumptions will just slightly decrease for Safety members after taking into account the lower inflation component of the salary increase assumption.

Chart 2 compares the actual merit and promotion increase experience with the current and proposed assumptions for Safety members.

Active Member Payroll

Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real "across the board" pay increases. The merit and promotion increases are not an influence, because this average pay is not specific to an individual.

Under the Board's current practice, the UAAL contribution rate is developed by assuming that the total payroll for all active members will increase annually over the amortization periods at the

same assumed rates of inflation plus real “across the board” salary increase assumptions as are used to project the members’ future benefits.

Consistent with the combined recommended inflation and real “across the board” salary increase assumptions, we recommend reducing the payroll growth assumption from 3.25% to 3.00% annually.

Additional Cashout

Under the Ventura Settlement, employers agreed to include several additional pay elements as Earnable Compensation for non-CalPEPRA members. There are two categories within which these additional pay elements fall:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member’s employment years; and
- Additional Cashout Elements – Those that are expected to be received only during the member’s final average earnings pay period.

The first category is recognized in the actuarial calculations by virtue of being included in the current pay of active members. The second category requires an actuarial assumption to anticipate its impact on a member’s retirement benefit.

Data has been collected since 1997 to estimate additional cashout for active members as a percentage of current pay. Because of the uncertainty associated with additional cashout (e.g., vacation accrual and sell off policies, maximum vacation carryover, vacation usage, etc.) a range of estimates was determined. An assumption was then recommended for additional cashout.

Service Retirements

On June 17, 2021, the Board decided to change how much vacation sell back and cash out can be included in the compensation earnable and eliminated "straddling" for Tier 1 and 2 members who retire after June 17, 2021. As a result, we have only considered retirements after June 17, 2021 in setting the additional cashout assumption. In the following table, we have summarized the observed vacation cash out from members who retired from service during June 18, 2021 – November 2021, and December 2021 – November 2022. Note that there was no experience observed for General Tier 3, Safety Tier 2C, or Safety Tier 2D members (and this assumption does not apply to the CalPEPRA tiers, as noted above). In the current valuation, General Tier 3 shares the same additional cashout assumption as General Tier 1 because both of these Tiers use final 1-year average compensation. Similarly, Safety Tier 2C and Safety Tier 2D share the same additional cashout assumption as Safety Tier 2.

Observed Additional Cashout Percentages						
June 18, 2021 – November 2021		December 2021 – November 2022		Combined Period		
Membership Category	Number of Retirees	Additional Cashout*	Number of Retirees	Additional Cashout*	Number of Retirees	Additional Cashout*
General Tier 1	7	3.6%	10	5.0%	17	4.5%
General Tier 2	94	2.9%	288	2.7%	382	2.7%
Safety Tier 1	0	N/A	1	5.9%	1	5.9%
Safety Tier 2	16	2.9%	55	2.2%	71	2.3%

* The total of vacation cash out expressed as a percent of final average compensation before such cash out.

Based on this information, we have recommended a reduction in the additional cashout assumptions for service retirement for General Tier 1 members (and consequently for General Tier 3 members), for General Tier 2 members, for Safety Tier 1 members, and for Safety Tier 2 members (and, consequently, for Safety Tier 2C and Tier 2D members). Note that we will continue to monitor the additional cashout assumptions for all non-CalPEPRA tiers as more experience becomes available under the new additional cashout rules.

The current and recommended additional cashout assumptions for members who are expected to retire from service are as follows:

Additional Cashout Assumptions for Service Retirement		
Membership Category	Current Assumptions	Proposed Assumptions
General Tier 1	7.5%	5.0%
General Tier 2	3.0%	2.7%
General Tier 3	7.5%	5.0%
Safety Tier 1	7.5%	6.0%
Safety Tier 2	2.5%	2.3%
Safety Tier 2C	2.5%	2.3%
Safety Tier 2D	2.5%	2.3%

Disability Retirements

We have also received data to analyze the additional cashout assumptions for disabled retirees. The results are as follows:

Observed Additional Cashout Percentages – Combined Period		
Membership Category	Number of Retirees	Additional Cashout*
General Tier 1	0	N/A
General Tier 2	2	0.6%
Safety Tier 1	0	N/A
Safety Tier 2	11	2.5%

* The total of vacation cash out expressed as a percent of final average compensation before such cash out.

We are recommending a reduction in the additional cashout assumption for disability retirement for General Tier 1 members (and consequently for General Tier 3 members), for General Tier 2 members, and for Safety Tier 1 members. We are recommending an increase in the additional

cashout assumption for disability retirement for Safety Tier 2 members (and, consequently, for Safety Tier 2C and Tier 2D members).

The current and recommended additional cashout assumptions for members who are expected to retire from disability are as follows:

Membership Category	Additional Cashout Assumptions for Disability Retirement	
	Current Assumptions	Proposed Assumptions
General Tier 1	6.5%	4.0%
General Tier 2	1.4%	1.0%
General Tier 3	6.5%	4.0%
Safety Tier 1	6.4%	5.0%
Safety Tier 2	1.9%	2.2%
Safety Tier 2C	1.9%	2.2%
Safety Tier 2D	1.9%	2.2%

Chart 1: Merit and Promotion Salary Increase Rates
General Members

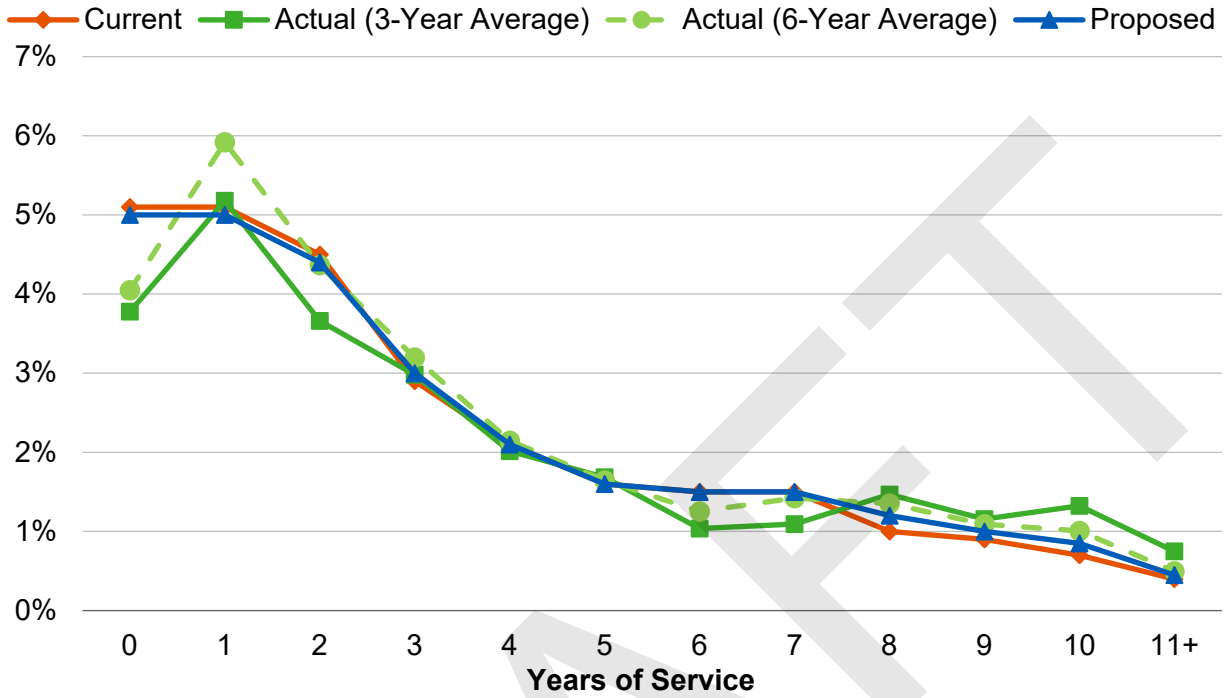
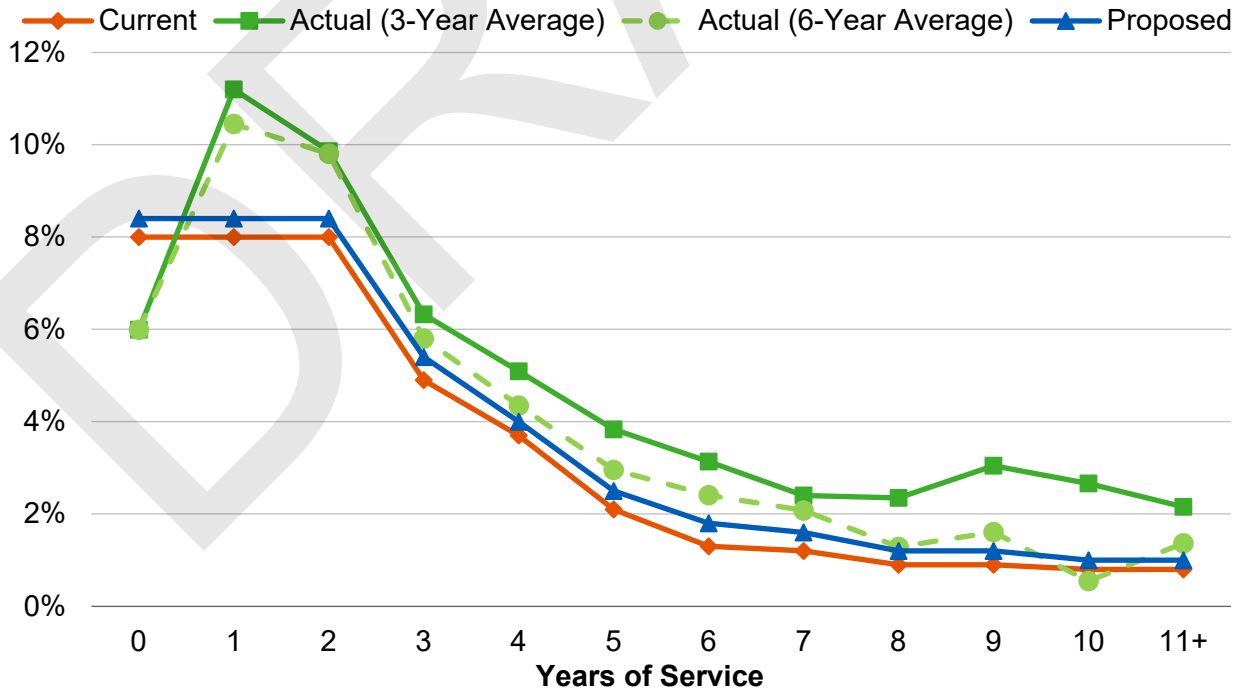


Chart 2: Merit and Promotion Salary Increase Rates
Safety Members



4. Demographic Assumptions

A. Retirement Rates

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

The Association's current retirement rates for the non-CalPEPRA plans are separated into:

- (1) General Tier 1
- (2) General Tier 2
- (3) General Tier 3
- (4) Safety Tier 1
- (5) Safety Tier 2 (and Safety Tier 2D)
- (6) Safety Tier 2C

For members who are covered under the CalPEPRA plans, the retirement rates are separated into:

- (1) General Tier 4
- (2) Safety Tier 4

The retirement experience during the current three-year period indicated that there were generally fewer actual retirements than expected in all member categories. We are recommending lowering the retirement rates for most member categories. For Safety Tier 1, we are not recommending a change in the retirement assumptions because there is insufficient data to support a change.

Currently, the assumed retirement rates for General Tier 2 and Safety Tiers 2 and 2D are a function of both age and years of service. With this year's experience study, we recommend that structure for setting the retirement rates be expanded to the two open tiers, i.e., General Tier 4 and Safety Tier 4. For General Tier 4 and Safety Tier 4, the new structure of retirement assumptions will apply different sets of age-based retirement assumptions for those with less than 30 years of service and those with 30 or more years of service. For General Tiers 1 and 3 and Safety Tiers 1¹ and 2C¹ that are closed to new entrants and have relatively fewer active members, we will continue to recommend that retirement rates be structured as a function of only age.

The following table shows the observed service retirement rates for General Tier 1 members based on the actual experience over the past three years. The actual service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. This same methodology is followed throughout this report and was described in Section 2. Also shown are the current assumed rates and the rates we propose.

¹ Safety Tiers 1 and 2C also include a retirement rate of 100% after a member accrues a benefit of 100% of final average earnings.

General Tier 1
Rate of Retirement (%)

Age	Current Rate	Actual Rate	Proposed Rate
50	2.00	0.00	2.00
51	4.00	0.00	4.00
52	4.00	0.00	4.00
53	5.00	0.00	5.00
54	5.00	0.00	5.00
55	6.00	0.00	6.00
56	10.00	0.00	10.00
57	12.00	15.38	14.00
58	12.00	16.67	14.00
59	14.00	15.38	14.00
60	20.00	25.00	25.00
61	20.00	44.44	25.00
62	35.00	25.00	30.00
63	30.00	17.39	26.00
64	30.00	23.08	26.00
65	30.00	20.00	26.00
66	30.00	29.41	26.00
67	30.00	29.41	26.00
68	30.00	23.08	26.00
69	35.00	20.00	31.00
70	40.00	42.86	36.00
71	40.00	0.00	36.00
72	40.00	33.33	36.00
73	40.00	100.00	36.00
74	40.00	N/A	36.00
75 & Over	100.00	12.50	100.00

Based on this experience, we recommend decreasing the retirement rate assumption at certain ages while increasing the retirement rate assumption at other ages. Overall, the proposed rates represent a decrease from the current rates for General Tier 1 members.

Chart 3 that follows later in this section compares the actual retirement experience with the current and proposed assumptions for General Tier 1 members.

The following table shows the observed service retirement rates for General Tier 2 members based on the actual experience over the past three years, separately for those with less than 30 years of service and more than 30 years of service. Also shown are the current assumed rates and the rates we propose.

General Tier 2 Rate of Retirement (%)

Age	Less than 30 Years of Service			30 or More Years of Service		
	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
50	2.00	1.28	1.50	4.00	0.00	3.00
51	2.00	1.34	1.50	4.00	0.00	3.00
52	2.00	1.81	2.00	4.00	0.00	3.00
53	2.00	1.56	2.00	4.00	0.00	3.00
54	2.00	2.93	2.50	4.00	2.38	3.00
55	2.00	3.76	3.00	4.00	5.41	5.00
56	2.50	4.21	3.50	4.50	4.65	5.00
57	4.00	4.26	4.00	5.00	3.51	5.00
58	4.00	5.07	4.50	5.00	8.13	7.00
59	4.50	5.35	5.00	8.00	12.20	10.00
60	8.00	7.14	7.50	8.50	16.67	12.00
61	9.00	10.16	9.50	13.50	9.40	12.00
62	15.00	17.22	15.00	22.50	23.23	23.00
63	15.00	13.65	15.00	22.50	27.14	25.00
64	18.00	16.12	17.00	27.00	29.82	28.00
65	25.00	27.95	27.00	27.50	45.24	35.00
66	30.00	23.21	27.00	33.00	45.45	35.00
67	30.00	23.08	27.00	33.00	40.74	35.00
68	30.00	28.04	30.00	33.00	21.05	35.00
69	35.00	25.30	30.00	38.50	30.00	35.00
70	40.00	22.89	30.00	40.00	0.00	30.00
71	40.00	17.74	30.00	40.00	0.00	30.00
72	40.00	28.21	30.00	40.00	37.50	30.00
73	40.00	20.00	30.00	40.00	0.00	30.00
74	40.00	22.22	30.00	40.00	33.33	30.00
75 & Over	100.00	30.77	100.00	100.00	26.67	100.00

Based on this experience, we recommend decreasing the retirement rate assumption at certain ages while increasing the retirement rate assumption at other ages. Overall, the proposed rates represent a decrease from the current rates for General Tier 2 members.

Chart 4 compares the actual retirement experience with the current and proposed assumptions for General Tier 2 members with less than 30 years of service.

Chart 5 compares the actual retirement experience with the current and proposed assumptions for General Tier 2 members with 30 or more years of service.

The following table shows the observed service retirement rates for General Tier 3 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose.

General Tier 3
Rate of Retirement (%)

Age	Current Rate	Actual Rate	Proposed Rate
50	10.00	0.00	10.00
51	10.00	0.00	10.00
52	10.00	0.00	10.00
53	10.00	33.33	10.00
54	10.00	0.00	10.00
55	12.00	0.00	12.00
56	14.00	0.00	14.00
57	16.00	0.00	16.00
58	18.00	0.00	18.00
59	20.00	0.00	20.00
60	20.00	0.00	20.00
61	20.00	0.00	20.00
62	30.00	0.00	30.00
63	25.00	N/A	25.00
64	25.00	0.00	25.00
65	50.00	50.00	50.00
66	50.00	0.00	50.00
67	50.00	100.00	50.00
68	50.00	N/A	50.00
69	50.00	N/A	50.00
70	65.00	N/A	60.00
71	65.00	N/A	60.00
72	65.00	N/A	60.00
73	65.00	N/A	60.00
74	65.00	N/A	60.00
75 & Over	100.00	N/A	100.00

For General Tier 3 and before age 70, we do not have credible experience from the past three years to propose new rates based on actual retirements for members. However, we are recommending revising the rates after age 69 commensurate with the overall change to the retirement rates that we observed and are recommending for General Tiers 1 and 2. In particular, we recommend decreasing the retirement rate assumption at ages 70-74. Overall, the proposed rates represent a decrease from the current rates for General Tier 3 members.

Chart 6 compares the actual retirement experience with the current and proposed assumptions for General Tier 3 members.

The following table shows the observed service retirement rates for General Tier 4 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose.

General Tier 4
Rate of Retirement (%)

Age	Current Rate	Actual Rate	Proposed Rate – Less than 30 Years of Service	Proposed Rate – 30 or More Years of Service*
52	4.00	0.00	3.00	3.00
53	2.00	0.00	2.00	2.00
54	2.00	1.56	2.00	2.00
55	5.00	0.00	2.00	5.00
56	2.50	1.82	2.00	2.50
57	3.50	0.00	2.00	3.50
58	3.50	6.56	4.00	4.00
59	4.50	2.78	4.00	4.50
60	5.00	2.78	4.00	5.00
61	5.00	1.52	4.00	5.00
62	18.00	4.69	12.00	18.00
63	15.00	5.56	12.00	15.00
64	17.00	6.12	12.00	17.00
65	25.00	21.21	23.00	25.00
66	30.00	19.35	23.00	30.00
67	30.00	10.34	23.00	30.00
68	30.00	15.38	23.00	30.00
69	35.00	5.88	20.00	30.00
70	25.00	25.00	20.00	25.00
71	25.00	0.00	20.00	25.00
72	25.00	15.38	20.00	25.00
73	25.00	0.00	20.00	25.00
74	25.00	0.00	20.00	25.00
75 & Over	100.00	16.67	100.00	100.00

* There were no actual rates of retirement observed for General Tier 4 members with 30 or more years of service.

As noted earlier, we are recommending that the retirement rate assumption be structured as a function of both age and service similar to the structure set for the General Tier 2 legacy plan before the introduction of General Tier 4 as a result of CalPEPRA. Based on the above experience, we recommend decreasing the retirement rate assumption at certain ages while increasing the retirement rate assumption at other ages for members with less than 30 years of service. We recommend maintaining the retirement rate

assumption for members with 30 or more years of service, except for an increase in the rate at age 58. Overall, the proposed rates represent a decrease from the current rates for General Tier 4 members.

Chart 7 compares the actual retirement experience with the current and proposed assumptions for General Tier 4 members with less than 30 years of service.

Chart 8 compares the current and proposed assumptions for General Tier 4 members with 30 or more years of service.

The following table shows the observed service retirement rates for Safety Tier 1 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose.

Safety Tier 1
Rate of Retirement (%)

Age	Current Rate ¹	Actual Rate ²	Proposed Rate ¹
50	35.00	N/A	35.00
51	30.00	N/A	30.00
52	25.00	N/A	25.00
53	35.00	N/A	35.00
54	45.00	N/A	45.00
55	45.00	N/A	45.00
56	45.00	N/A	45.00
57	45.00	N/A	45.00
58	45.00	N/A	45.00
59	45.00	N/A	45.00
60	45.00	N/A	45.00
61	45.00	N/A	45.00
62	45.00	0.00	45.00
63	45.00	0.00	45.00
64	45.00	0.00	45.00
65 & Over	100.00	50.00	100.00

¹ Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

² Excluding members who have accrued a benefit of 100% of final average earnings.

Due to very limited experience, we are not recommending any changes in the retirement rates for Safety Tier 1 members.

Chart 9 compares the actual retirement experience with the current and proposed assumptions for Safety Tier 1 members.

Currently the retirement rates for Safety Tier 2 members (with 3% @ 50 benefits) are also used for members in Safety Tier 2D (with 3% @ 55 benefits). Note that we only have six Safety Tier 2D members who retired during the current experience study period (compared to 140 Safety

Tier 2 retirements), so we recommend utilizing the proposed Safety Tier 2 rates for Safety Tier 2D. We will monitor this assumption as further experience develops for Tier 2D. The following table shows the observed service retirement rates for Safety Tiers 2 and 2D members based on the actual experience over the past three years, separately for those with less than 30 years of service and more than 30 years of service. Also shown are the current assumed rates and the rates we propose.

Safety Tiers 2 and 2D
Rate of Retirement (%)

Age	Less than 30 Years of Service			30 or More Years of Service		
	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
45	0.00	3.23	2.00	0.00	N/A	0.00
46	0.00	3.77	2.00	0.00	N/A	0.00
47	0.00	1.61	2.00	0.00	N/A	0.00
48	0.00	5.75	4.00	0.00	N/A	0.00
49	12.00	8.05	10.00	18.00	100.00	18.00
50	12.00	16.31	14.00	18.00	N/A	18.00
51	10.00	8.33	10.00	24.00	100.00	24.00
52	10.00	6.06	10.00	24.00	N/A	24.00
53	10.00	13.86	10.00	25.00	N/A	25.00
54	12.00	5.41	11.00	27.00	25.00	27.00
55	12.00	16.39	11.00	29.00	20.00	29.00
56	14.00	10.87	12.00	32.00	25.00	32.00
57	16.00	6.52	12.00	32.00	0.00	32.00
58	18.00	12.20	14.00	30.00	33.33	37.00
59	18.00	7.41	14.00	30.00	66.67	37.00
60	25.00	28.57	30.00	30.00	50.00	37.00
61	25.00	43.48	30.00	30.00	0.00	37.00
62	25.00	46.15	30.00	30.00	0.00	37.00
63	25.00	30.00	30.00	30.00	50.00	37.00
64	30.00	16.67	30.00	30.00	100.00	37.00
65 & Over	100.00	30.30	100.00	100.00	0.00	100.00

Based on this experience, we recommend increasing the retirement rate assumption at certain ages while decreasing the retirement rate assumption at other ages. Overall, the proposed rates represent an increase from the current rates for Safety Tiers 2 and 2D members.

Chart 10 compares the actual retirement experience with the current and proposed assumptions for Safety Tiers 2 and 2D members with less than 30 years of service.

Chart 11 compares the actual retirement experience with the current and proposed assumptions for Safety Tiers 2 and 2D members with 30 or more years of service.

The following table shows the observed service retirement rates for Safety Tier 2C members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose.

Safety Tier 2C
Rate of Retirement (%)

Age	Current Rate ¹	Actual Rate	Proposed Rate ¹
50	4.00	50.00	4.00
51	2.00	0.00	2.00
52	2.00	0.00	2.00
53	3.00	N/A	3.00
54	6.00	N/A	6.00
55	10.00	N/A	10.00
56	12.00	N/A	12.00
57	20.00	N/A	20.00
58	10.00	N/A	10.00
59	15.00	N/A	15.00
60	60.00	N/A	40.00
61	60.00	N/A	40.00
62	60.00	0.00	40.00
63	60.00	N/A	40.00
64	60.00	N/A	40.00
65 & Over	100.00	N/A	100.00

¹ Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Due to very limited experience, we are not recommending any changes in the retirement rates for Safety Tier 2C members at ages 50-59. Based on changes we recommend for Safety Tier 4 members with less than 30 years of service at ages 60-64, we recommend decreasing the retirement rates for Safety Tier 2C members at those same ages.

Chart 12 compares the actual retirement experience with the current and proposed assumptions for Safety Tier 2C members.

The following table shows the observed service retirement rates for Safety Tier 4 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose.

Safety Tier 4 Rate of Retirement (%)

Age	Current Rate	Actual Rate	Proposed Rate – Less than 30 Years of Service	Proposed Rate – 30 or More Years of Service*
50	4.00	0.00	4.00	4.00
51	2.00	0.00	2.00	2.00
52	2.00	0.00	2.00	2.00
53	3.00	0.00	3.00	3.00
54	6.00	0.00	6.00	6.00
55	10.00	14.29	10.00	10.00
56	12.00	0.00	12.00	12.00
57	20.00	27.27	20.00	20.00
58	10.00	16.67	10.00	10.00
59	15.00	14.29	15.00	15.00
60	60.00	16.67	40.00	60.00
61	60.00	22.22	40.00	60.00
62	60.00	0.00	40.00	60.00
63	60.00	33.33	40.00	60.00
64	60.00	N/A	40.00	60.00
65 & Over	100.00	N/A	100.00	100.00

* There were no actual rates of retirement observed for Safety Tier 4 members with 30 or more years of service.

We are recommending that the retirement rate assumption be structured as a function of both age and service similar to the structure set for the Safety Tiers 2 and 2D legacy plans before the introduction of Safety Tier 4 as a result of CalPEPRA. As shown above, we recommend decreasing the current retirement rate assumptions for Safety Tier 4 members with less than 30 years of service at ages 60-64. We recommend maintaining the retirement rate assumption for members with 30 or more years of service.

Chart 13 compares the actual retirement experience with the current and proposed assumptions for Safety Tier 4 members with less than 30 years of service.

Chart 14 compares the current and proposed assumptions for Safety Tier 4 members with 30 or more years of service.

Deferred Vested Members

Under the current assumptions, deferred vested General members are assumed to retire at age 61 and Safety members are assumed to retire at age 55, regardless if the member went to work at a reciprocal retirement system or not. The following table shows the observed deferred vested retirement age for General non-reciprocal, General reciprocal, Safety non-reciprocal, and Safety reciprocal members based on the actual experience over the past three years. Also shown are the current assumed retirement ages and the retirement ages we propose.

Deferred Vested Retirement Age

	General Non-Reciprocal Members	General Reciprocal Members	Safety Non-Reciprocal Members	Safety Reciprocal Members
Current Assumption	61.0	61.0	55.0	55.0
Actual Average Age	62.6	61.1	56.1	54.9
Proposed Assumption	62.0	61.0	56.0	55.0

Based on this experience, we recommend increasing the deferred vested retirement age assumption for General non-reciprocal members from age 61 to age 62, maintaining the deferred vested retirement age for General reciprocal members at age 61, increasing the deferred vested retirement age assumption for Safety non-reciprocal members from age 55 to age 56, and maintaining the deferred vested retirement age for Safety reciprocal members at age 55.

Reciprocity

Under current assumptions, it is assumed that 25% of General and 50% of Safety future deferred vested members will be covered under a reciprocal retirement system and receive annual salary increases of 3.65% and 4.05% from termination until retirement for General and Safety, respectively. During the last three valuations, on average about 19% of the General deferred vested and 35% of the Safety deferred vested members went on to be covered by a reciprocal retirement system.

Based on this experience, we recommend decreasing the future reciprocal assumption for General members from 25% to 20% and decreasing the future reciprocal assumption for Safety members from 50% to 45%. This recommendation takes into account the experience of all deferred vested members during the last three valuations instead of just new deferred vested members during the three-year period. This is because there is a lag between a member's date of termination and the time that it is known if they have reciprocity with a reciprocal retirement system.

In addition, we recommend 3.45% and 4.00% annual salary increase assumptions for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from ACERA to the expected date of retirement for deferred members covered by a reciprocal employer. These assumptions are based on the ultimate 0.45% and 1.00% merit and promotion salary increase assumptions for General and Safety members, respectively, together with the 2.50% inflation and 0.50% real "across the board" salary increase assumptions that are recommended earlier in Section 3 of this report.

Survivor Continuance

Under current assumptions, it is assumed that 70% of all active and inactive male members and 50% of all active and inactive female members would be married or have an eligible domestic partner at the time of their retirement or pre-retirement death. We reviewed experience for new retirees during the three-year period and determined the actual percentage of these new retirees that had an eligible spouse or eligible domestic partner at the time of retirement. The results of that analysis are shown below.

New Retirees – Actual Percent with Eligible Spouse or Domestic Partner

Year Ending December 31	Male	Female
2020	73%	53%
2021	72%	54%
2022	70%	47%
Total	71%	51%

According to experience of members who retired during the last three years, about 71% of all male members and 51% of all female members were married or had a domestic partner at retirement.

Based on this experience, we recommend maintaining the percent married assumption for male members at 70%, and maintaining the percent married assumption for female members at 50%.

Since the present value of the survivor's automatic continuance benefit is dependent on the survivor's age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience for members who retired during the most recent three-year period (results shown in the table below) and studies done for other retirement systems, **we recommend the following:**

1. Since most of the actual survivors are of the opposite sex, even with the inclusion of domestic partners, **we will continue to assume that all active and inactive members have a survivor of the opposite sex.**
2. **Based on the experience over three years, we recommend maintaining the spouse age difference assumption that male retirees are three years older than their spouses and maintaining the spouse age difference assumption that female retirees are two years younger than their spouses.** These assumptions will continue to be monitored in future experience studies.

Member's Age as Compared to Spouse's Age

	Male Retiree	Female Retiree
Current Assumption	3 years older	2 years younger
Actual Experience	2.90 years older	1.82 years younger
Proposed Assumption	3 years older	2 years younger

Chart 3: Retirement Rates
General Tier 1 Members

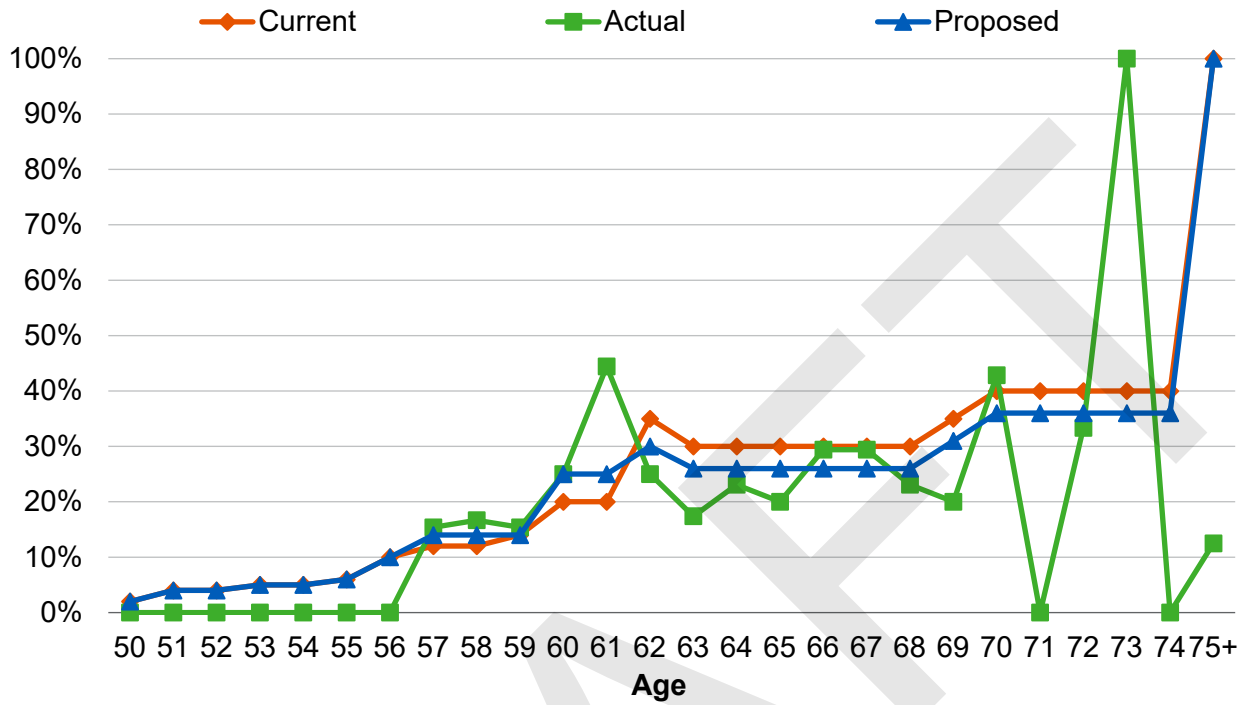


Chart 4: Retirement Rates
General Tier 2 Members with Less than 30 Years of Service

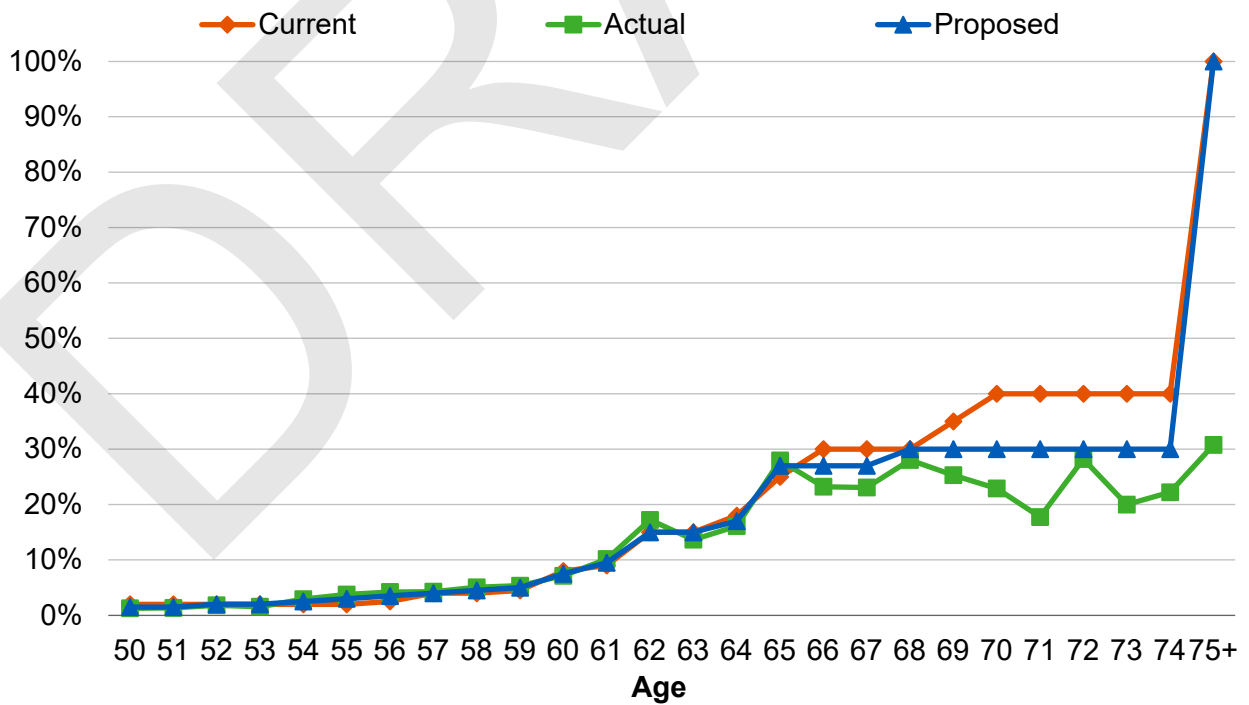


Chart 5: Retirement Rates
General Tier 2 Members with 30 or More Years of Service

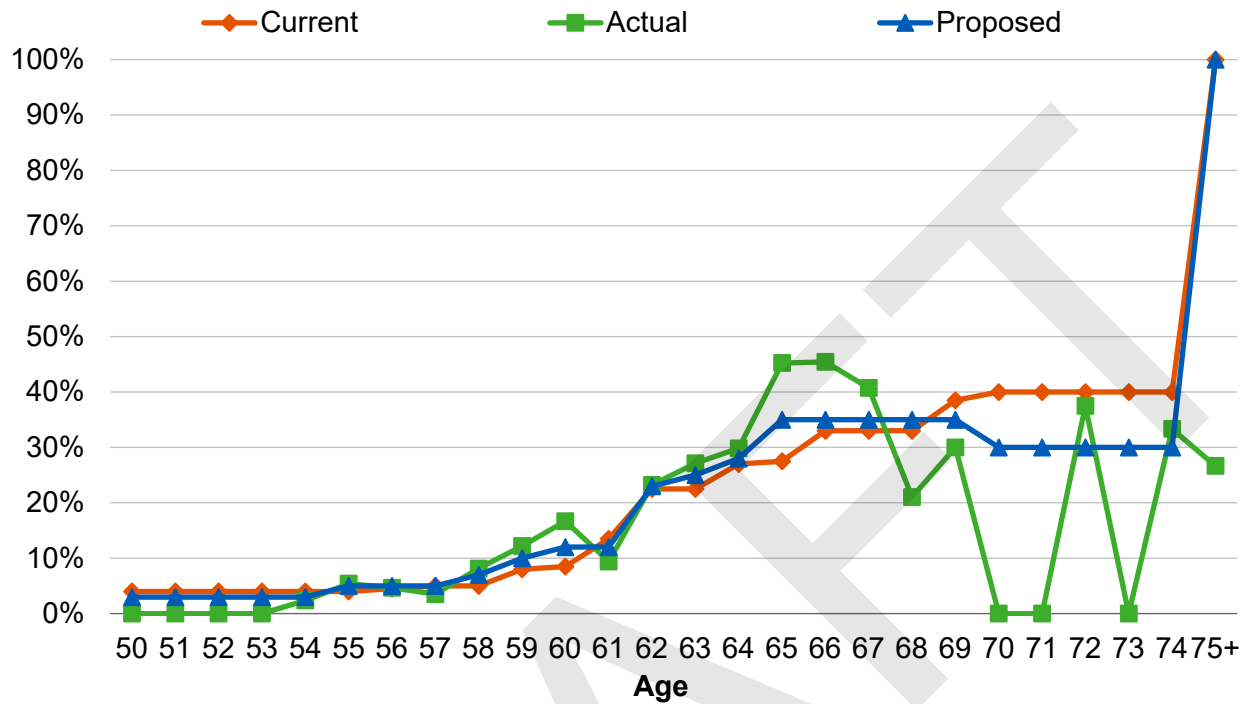


Chart 6: Retirement Rates
General Tier 3 Members

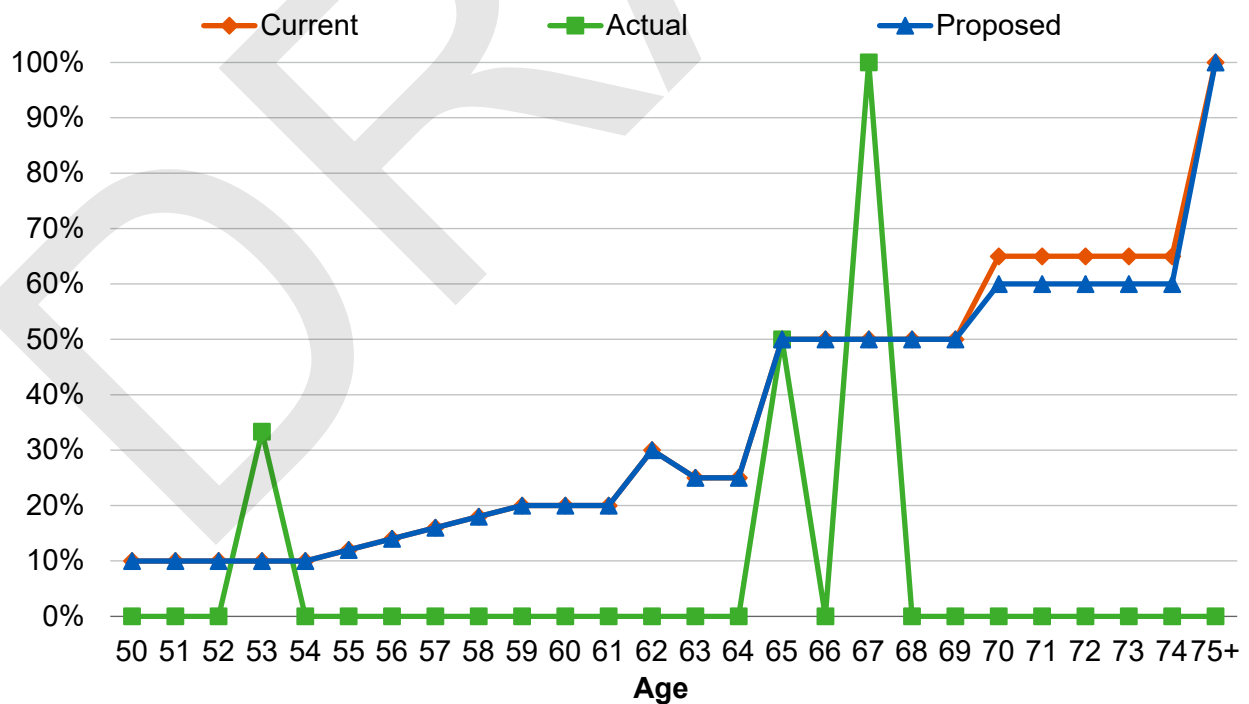


Chart 7: Retirement Rates
General Tier 4 Members with Less than 30 Years of Service

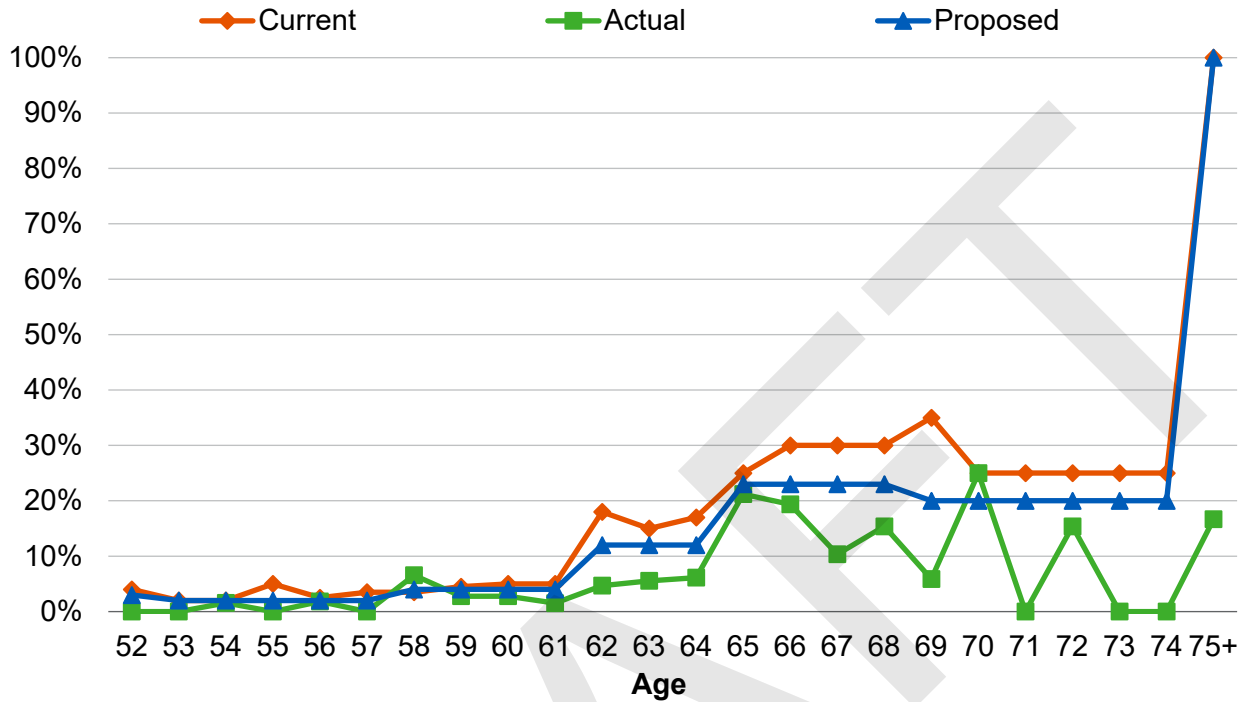


Chart 8: Retirement Rates
General Tier 4 Members with 30 or More Years of Service

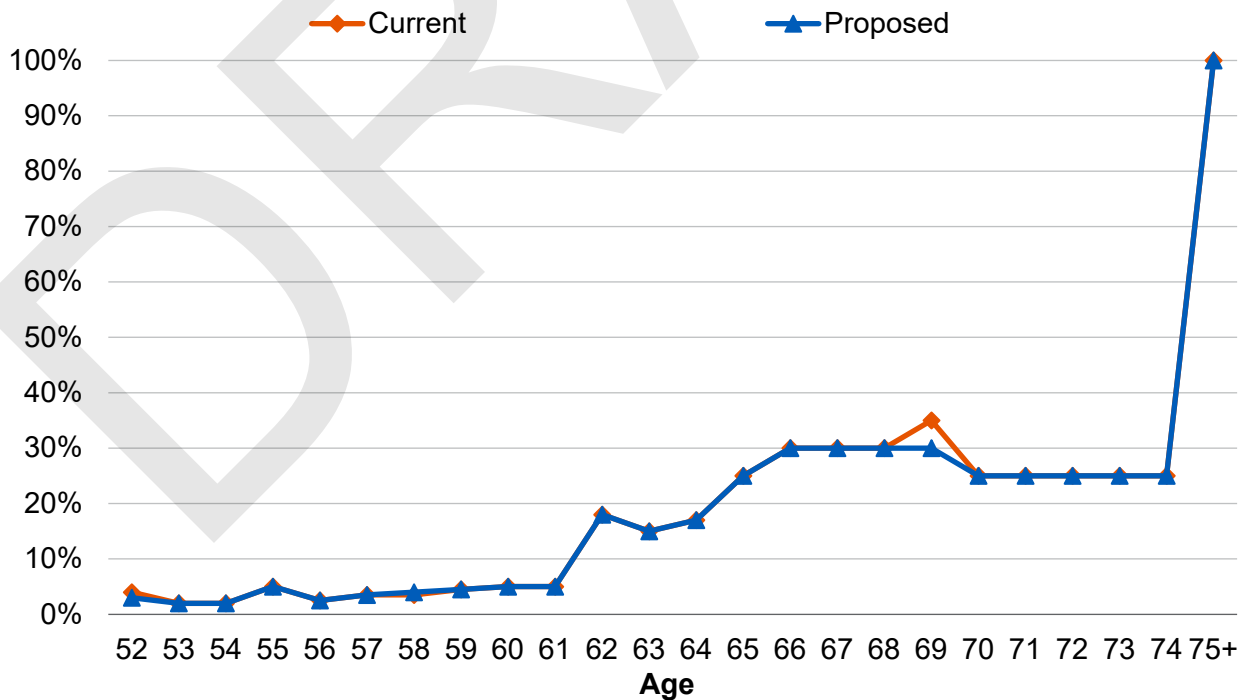


Chart 9: Retirement Rates
Safety Tier 1 Members

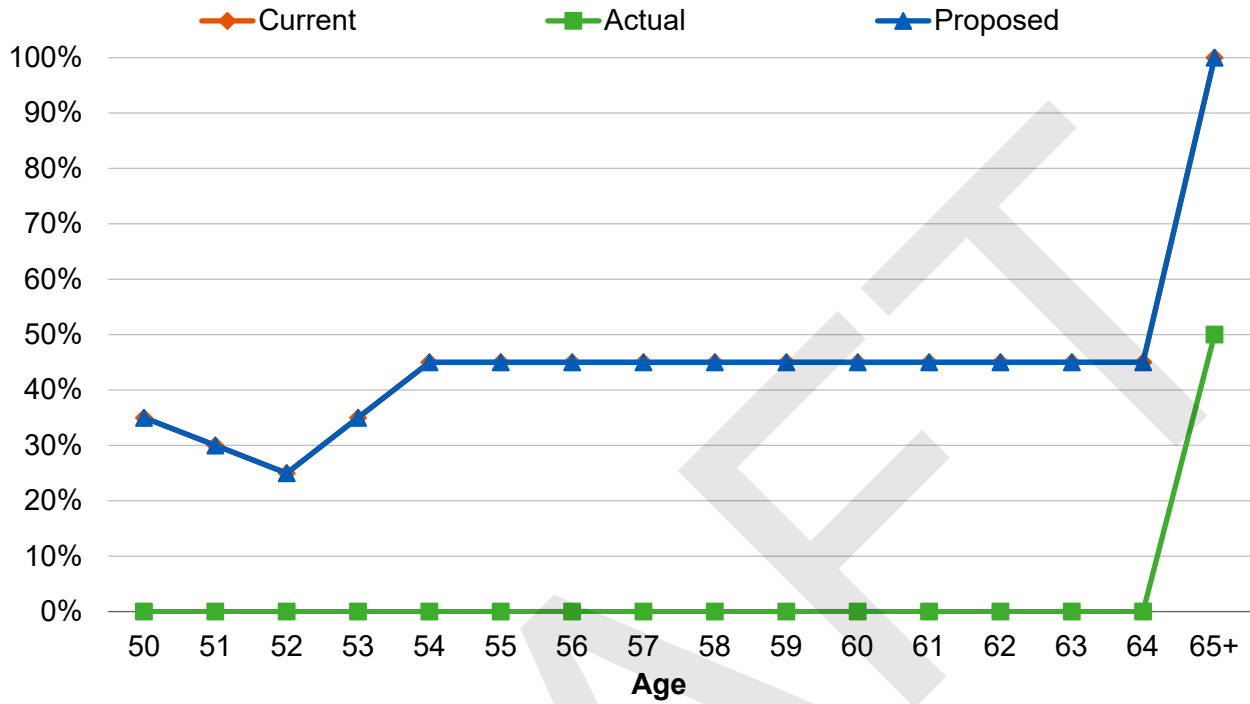


Chart 10: Retirement Rates
Safety Tier 2 and Tier 2D Members with Less than 30 Years of Service

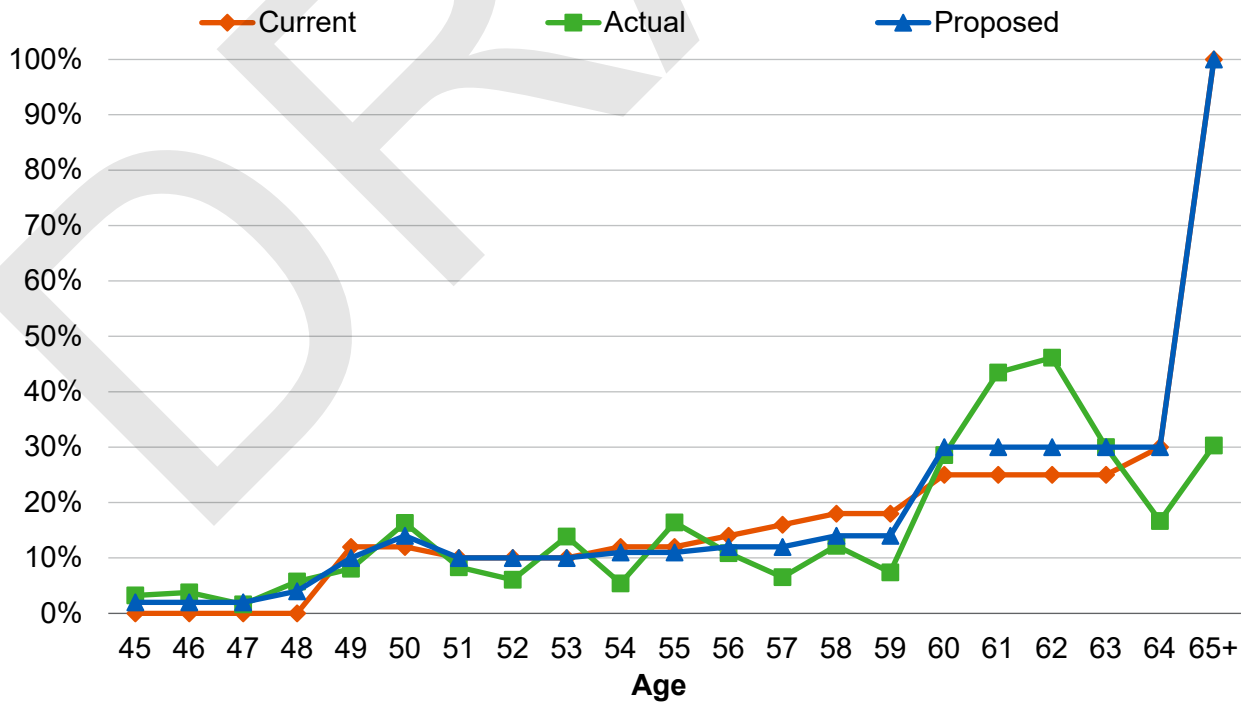


Chart 11: Retirement Rates
 Safety Tier 2 and Tier 2D Members with 30 or More Years of Service

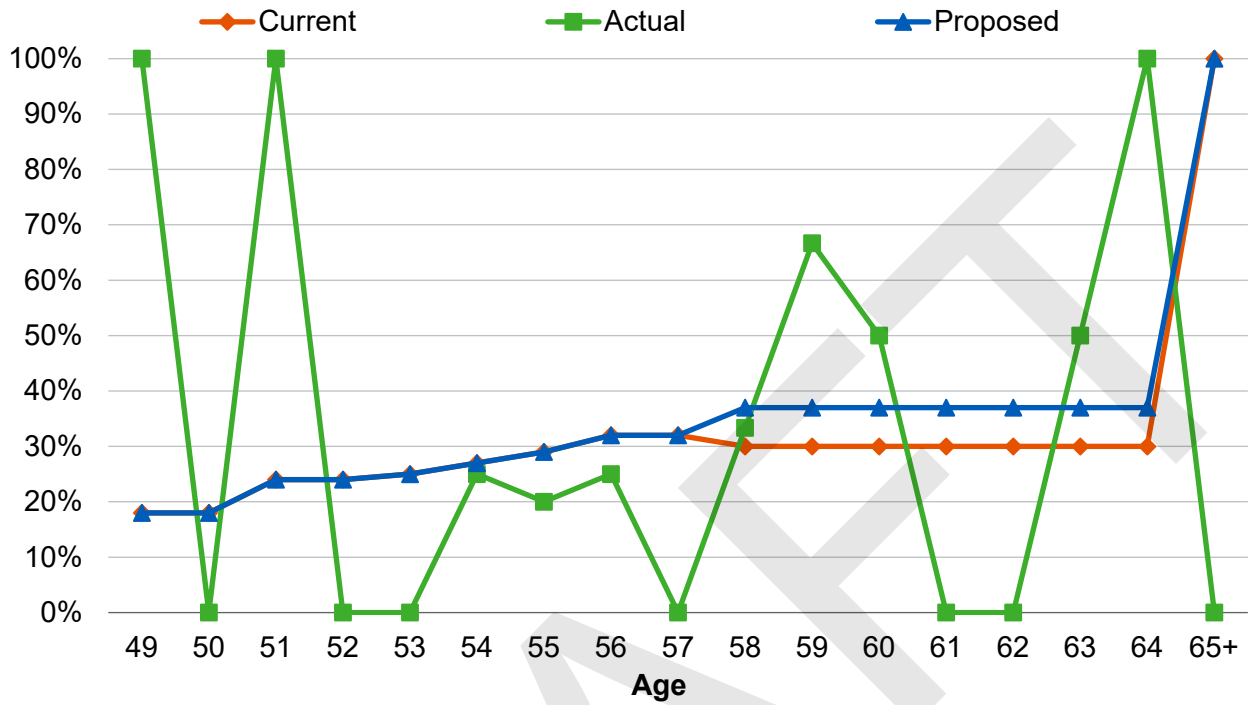


Chart 12: Retirement Rates
 Safety Tier 2C Members

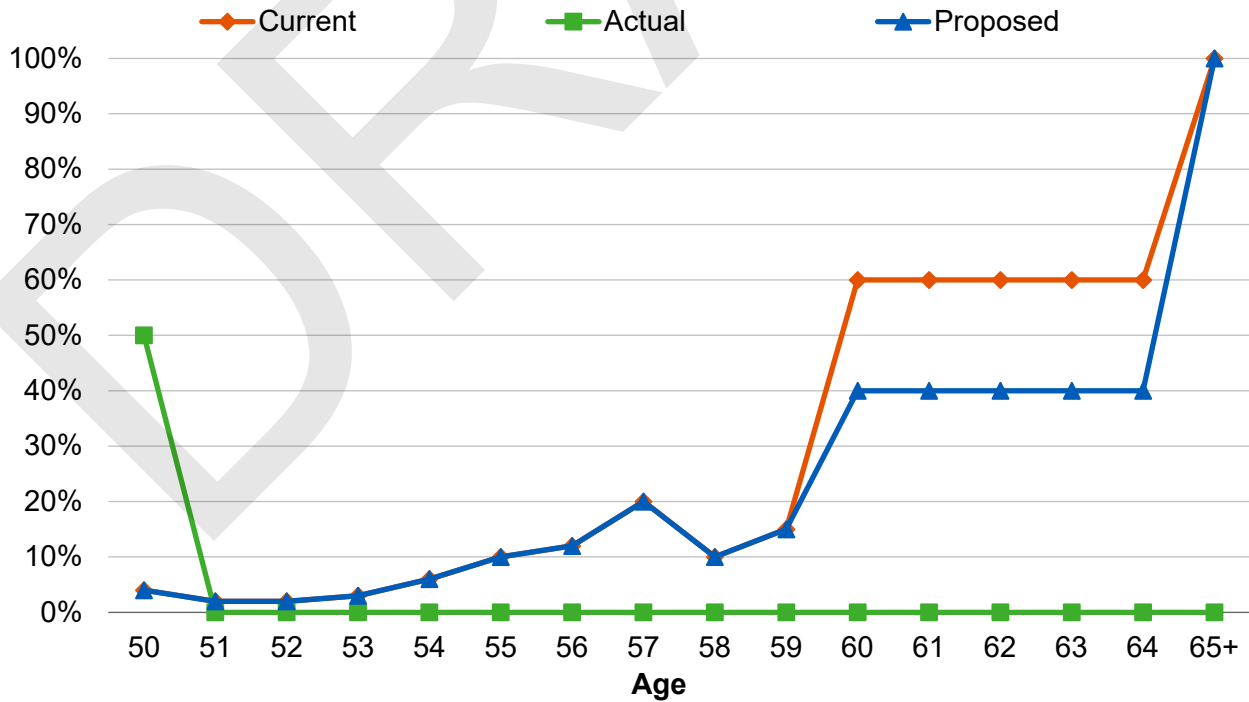


Chart 13: Retirement Rates
Safety Tier 4 Members with Less than 30 Years of Service

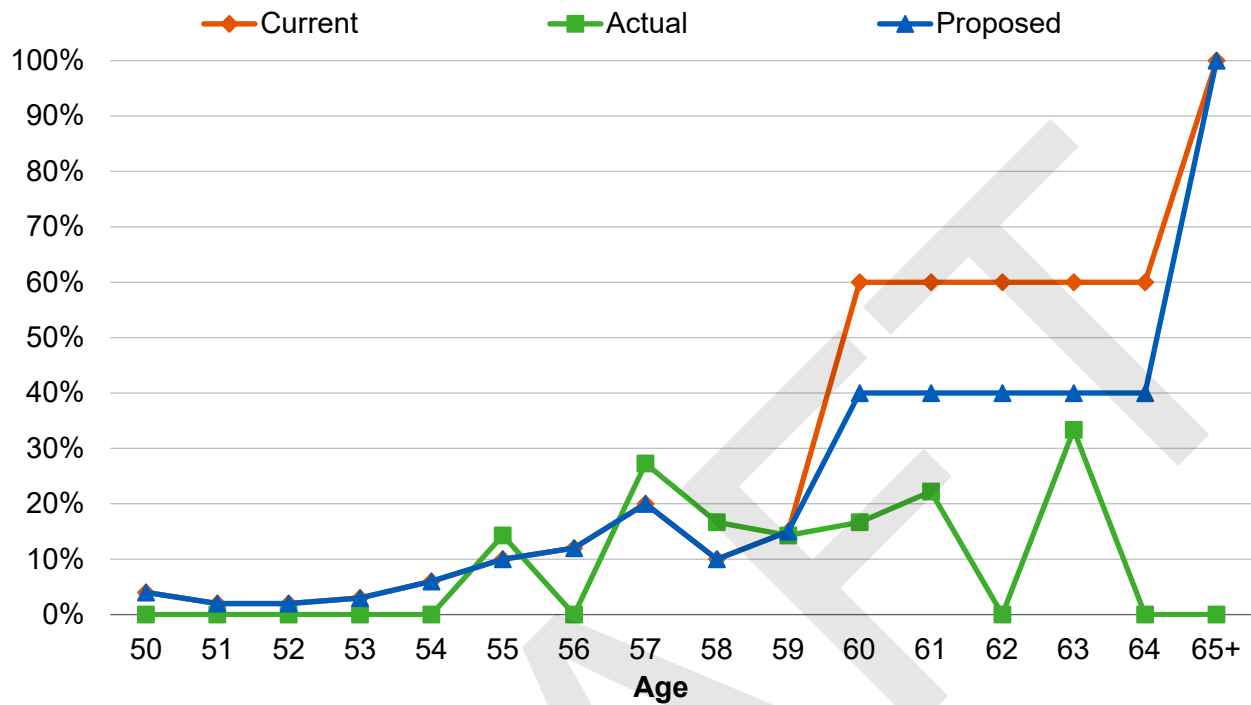
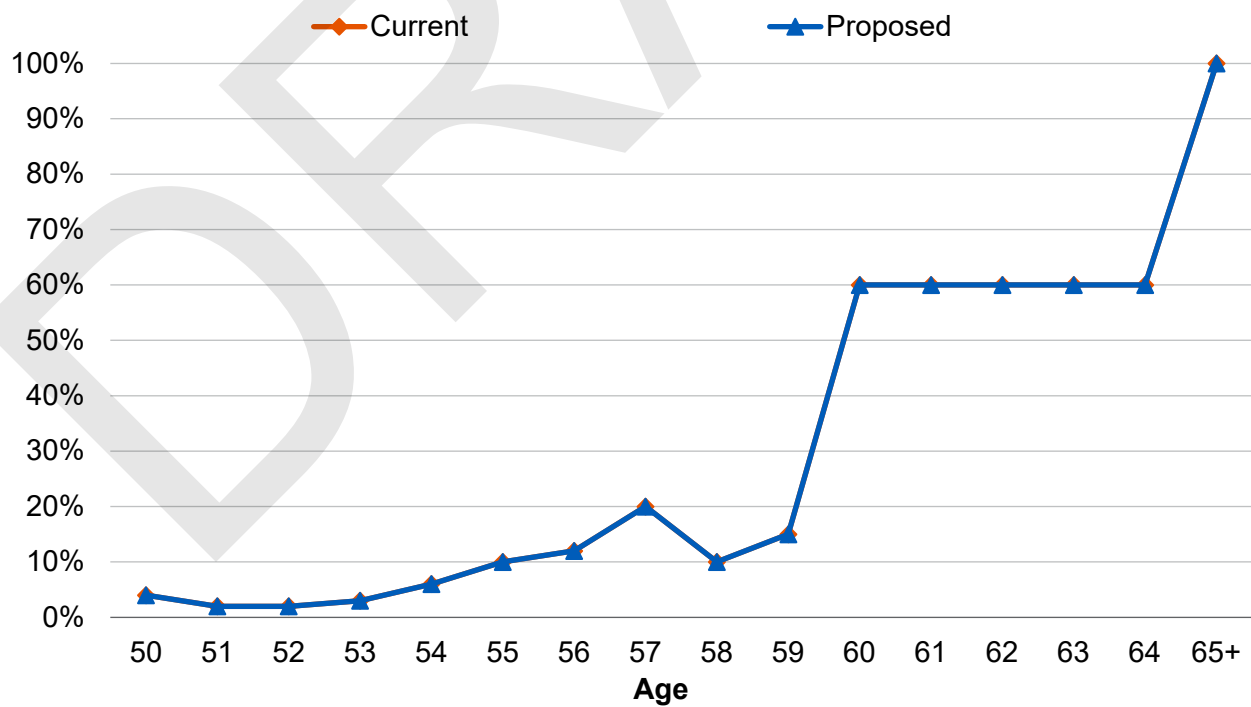


Chart 14: Retirement Rates
Safety Tier 4 Members with 30 or More Years of Service



B. Mortality Rates – Healthy

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement mortality rates project what proportion of members will die before retirement. For General members in the retirement valuation, the table currently being used for post-service retirement mortality rates is the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019. For Safety members in the retirement valuation, the table currently being used for post-service retirement mortality rates is the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019. For all beneficiaries in the retirement valuation, the table currently being used is the Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females), with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The Public Retirement Plans Mortality tables (Pub-2010) were published by the Retirement Plans Experience Committee (RPEC) of the SOA in 2019. For the first time, the published mortality tables are based exclusively on public sector pension plan experience in the United States. Within the Pub-2010 family of mortality tables, there are separate tables by job categories of General, Safety and Teachers. Included with the mortality tables is the analysis prepared by RPEC that continues to observe that benefit amount for healthy retirees and salary for employees are the most significant predictors of mortality differences within the job categories. Therefore, Pub-2010 includes mortality rates developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. We continue to recommend using the “amount weighted” above-median version of the Pub-2010 mortality tables for General and Safety (adjusted for ACERA experience as discussed herein) for the Retirement Plan.

We also continue to recommend that the mortality improvement scale be applied generationally where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. The “generational” approach is now the established practice within the actuarial profession.

A generational mortality table provides dynamic projections of mortality experience for each cohort of retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the Plan over time as participants’ life expectancies are projected to increase.

We understand that RPEC intends to publish annual updates to their mortality improvement scales. Improvement scale MP-2021 is the latest improvement scale available as RPEC decided not to release an updated projection scale in 2022. According to RPEC, they have been relying on the most recent population mortality experience in their model to project future mortality trends. In 2022, if they were to follow their past practice, they would have relied on the newest mortality data available from 2020 to prepare their “MP-2022” mortality improvement scale. However, population data from 2020 was severely affected by the COVID-19 pandemic. They believed it would not be appropriate to incorporate, without adjustment, the substantially

higher rates of population mortality experience from 2020 into their graduation and projection models used to forecast future mortality. As a result, they elected not to release a new mortality improvement scale for 2022. We recommend that the Board adopt the Amount-Weighted Above-Median Pub-2010 mortality tables for General and Safety members (adjusted for ACERA experience as discussed herein), and project the mortality improvement generationally using the MP-2021 mortality improvement scale, for the Retirement Plan.

In order to reflect more ACERA experience in our analysis, we have used experience for a twelve-year period by using data from the current (from December 1, 2019 through November 30, 2022 and the last three (from December 1, 2016 through November 30, 2019; from December 1, 2013 to November 30, 2016; and from December 1, 2010 to November 30, 2013) experience study periods in order to analyze this assumption. ACERA reported 36 COVID-19 related deaths during the current three-year period, which is relatively low compared to the total number of deaths during the three-year period. While the long-term impact of COVID-19 is still unknown, we have included the mortality data from 2020-2022 in setting our proposed mortality assumptions.

Even with the use of twelve years of experience, based on standard statistical theory the data is only partially credible especially under the recommended amount-weighted basis when dispersion of retirees' benefit amounts is taken into account. In 2008 the SOA published an article recommending that mortality assumptions include an adjustment for credibility. Under this approach, the number of deaths needed for full credibility for a headcount-weighted mortality table is just over 1,000, where full credibility means a 90% confidence that the actual experience will be within 5% of the expected value. Therefore, in our recommended assumptions, we have only partially adjusted the Pub-2010 mortality tables to fit ACERA's experience. In future experience studies, more data will be available which may further increase the credibility of the ACERA experience.

Post-Retirement Mortality (Service Retirements)

Among all retired members, the actual deaths weighted by benefit amounts under the current assumptions for the twelve-year period are shown in the table below. We also show the deaths weighted by benefit amount under the proposed assumptions. We continue to recommend the use of a generational mortality table, which incorporates a more explicit assumption for future mortality improvement. Accordingly, the goal is to start with a mortality table that closely matches the current experience (without a margin for future mortality improvement), and then reflect mortality improvement by projecting lower mortality rates in future years.

The proposed mortality table also reflects current experience to the extent that the experience is credible based on standard statistical theory. For ACERA, the volume of Safety member data is much less than the General member data, which makes the Safety group substantially less credible. As shown in the table below, the proposed mortality tables have actual to expected ratios of 102% and 108% for General and Safety, respectively, after adjustments that account for partial credibility. In future years the ratio should remain around 102% and 108% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the twelve-year period are as follows:

Healthy Retiree Mortality Experience – Benefit Weighted (Dollars in millions)

Gender	General Members			Safety Members		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	\$2.98	\$3.10	\$2.98	\$1.03	\$1.15	\$1.08
Female	<u>3.09</u>	<u>3.07</u>	<u>3.07</u>	<u>0.20</u>	<u>0.23</u>	<u>0.20</u>
Total	\$6.07	\$6.17	\$6.05	\$1.23	\$1.38	\$1.28
Actual / Expected	102%		102%	112%		108%¹

Notes:

1. Experience shown above is weighted by monthly benefit amounts for deceased members.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General members, we recommend updating the post-retirement mortality to follow the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety members, we recommend updating the post-retirement mortality to follow the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For the purpose of setting the assumptions for the OPEB SRBR valuation, we have also provided in the table below the actual and expected deaths computed without weighting these by benefit amounts using the headcount-weighted version of the Pub-2010 tables. This is similar to how actual and expected death ratios were developed based on the prior headcount approach.

¹ If we used the benchmark Pub-2010 Safety Healthy Retiree table without any adjustment, the proposed actual to expected ratio would be 113%.

Healthy Retiree Mortality Experience – Headcount Weighted

Gender	General Members			Safety Members		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	811	889	810	166	187	174
Female	<u>1,209</u>	<u>1,209</u>	<u>1,206</u>	<u>39</u>	<u>45</u>	<u>38</u>
Total	2,021	2,098	2,016	204	232	212
Actual / Expected	104%		104%	113%		109%

Notes:

1. Experience shown above is weighted by headcounts for deceased members instead of by monthly benefit amounts
2. Expected deaths under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General members in the medical (OPEB) SRBR valuation, we recommend updating the current tables to the Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety members in the medical (OPEB) SRBR valuation, we recommend updating the current tables to the Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 15 that follows later in this section compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for service retirement General members.

Chart 16 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for service retirement Safety members.

Chart 17 compares actual to expected deaths on a headcount-weighted basis for General members under the current and proposed assumptions over the twelve-year period provided for OPEB SRBR valuation.

Chart 18 compares actual to expected deaths on a headcount-weighted basis for Safety members under the current and proposed assumptions over the twelve-year period provided for OPEB SRBR valuation.

Chart 19 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for General members on a benefit-weighted basis. Life expectancies under the proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase as a result of the mortality improvement scale.

Chart 20 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for Safety members on a benefit-weighted basis. Life expectancies under the proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase as a result of the mortality improvement scale.

Beneficiary Mortality

For all beneficiaries, the table currently being used for the Retirement Plan is the Pub-2010 General Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females), with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019. The table currently being used for the OPEB SRBR valuation is the Pub-2010 General Contingent Survivor Headcount-Weighted Above-Median Mortality Table (separate tables for males and females), with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The Pub-2010 Contingent Survivors Table is developed based only on contingent survivor data after the death of the retirees. This is consistent with the mortality experience that we have available for beneficiaries. The Pub-2010 Contingent Survivor mortality rates are comparable to ACERA's actual mortality experience for beneficiaries. However, in contrast to service retirees, there is less beneficiary data, so it is given less credibility when adjusting the base table. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 103%, after adjustments that account for partial credibility. In future years the ratio should remain around 103% as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the twelve-year period are as follows:

Beneficiary Mortality Experience – Benefit Weighted (Dollars in millions)

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	\$0.22	\$0.25	\$0.22
Female	<u>0.99</u>	<u>0.99</u>	<u>0.99</u>
Total	\$1.22	\$1.25	\$1.21
Actual / Expected	103%		103%¹

Notes:

1. Experience shown above is weighted by monthly benefit amounts for deceased beneficiaries.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For all beneficiaries under the retirement plan, we recommend updating the beneficiary mortality to follow the Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For the purpose of setting the assumptions for the OPEB SRBR valuation, we have also provided in the table below the actual and expected deaths computed without weighting these by benefit amounts using the headcount-weighted version of the Pub-2010 tables. This is similar to how actual and expected death ratios were developed based on the prior headcount approach.

¹ If we used the benchmark Pub-2010 Contingent Survivor table without any adjustment, the proposed actual to expected ratio would be 104%.

Beneficiary Mortality Experience – Headcount Weighted

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	173	186	173
Female	<u>521</u>	<u>524</u>	<u>520</u>
Total	693	710	692
Actual / Expected	102%		103%

Notes:

1. Experience shown above is weighted by headcounts for deceased members instead of by monthly benefit amounts
2. Expected deaths under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For all beneficiaries under the OPEB SRBR plan, we recommend updating the mortality assumption to follow the Pub-2010 Contingent Survivor Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

As noted above, the Contingent Survivor mortality tables are developed based on contingent survivor data only after the death of the retirees (i.e., it does not reflect any contingent survivor data before the death of the retirees). In the last experience study, we recommended that the Board applied the Contingent Survivor mortality tables to predict the mortality rates for the beneficiaries both before and after the death of the retirees. According to analysis provided by RPEC, the mortality rates for the beneficiaries could be somewhat overstated before the death of the retirees as the Contingent Survivor mortality tended to be higher than retiree mortality and the difference was statistically significant. Based on this analysis, for the purposes of the actuarial valuations (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member, we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality both before and after the expected death of the General or Safety member. Upon the actual death of the member (i.e., for all beneficiaries in pay status as of the valuation date), we recommend for the purposes of the actuarial valuations that we use the Contingent Survivor mortality tables as stated above. We note that the use of different mortality tables (before and after the death of the member) has been found by the RPEC to be reasonable.

Pre-Retirement Mortality

For General members, the table currently being used for pre-retirement mortality rates is the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional scale MP-2019. For Safety members, the table currently being used for pre-retirement mortality rates is the

Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional scale MP-2019. When analyzing pre-retirement mortality, there is much less data available, so it is given little credibility when adjusting the base table.

For General members, we recommend maintaining the assumption that the pre-retirement mortality follow the Pub-2010 General Employee Amount-Weighted Mortality Table (separate tables for males and females), projected generationally. We recommend updating the two-dimensional mortality improvement scale used for the generational projection from MP-2019 to MP-2021.

For Safety members, we recommend maintaining the assumption that the pre-retirement mortality follow the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally. We recommend updating the two-dimensional mortality improvement scale used for the generational projection from MP-2019 to MP-2021.

Based on actual experience during the three-year experience study period, we also recommend maintaining the current assumption for pre-retirement mortality of 100% non-service connected for both General and Safety members.

For General members in the OPEB SRBR valuation, we recommend updating the pre-retirement mortality to follow the Pub-2010 General Employee Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety members in the OPEB SRBR valuation, we recommend updating the pre-retirement mortality to follow the Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

Mortality Table for Member Contributions, Optional Forms of Payments, and Reserves

There are administrative reasons why a generational mortality table is more difficult to implement for determining member contributions for legacy tiers (i.e., General Tiers 1, 2, and 3, and Safety Tiers 1, 2, 2C, and 2D), and optional forms of payment and reserves. One emerging practice is to approximate the use of a generational mortality table by the use of a static table with projection of the mortality improvement from the measurement year over a period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation for determining member contributions for employees in the legacy tiers.

For General members, we recommend that the mortality table used for determining contributions for General members be updated to a blended table based on the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 30% male and 70% female.

For Safety members, we recommend that the mortality table used for determining contributions for Safety members be updated to a blended table based on the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), increased by 5% for males, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 75% male and 25% female.

For optional forms of payment and reserves, there are some administrative issues that we may need to resolve with ACERA and its vendor maintaining the pension administration software before we would recommend a comparable generational scale to anticipate future mortality improvement. We will provide a recommendation to the Association for use in reflecting mortality improvement for determining optional forms of payments and reserves after we have those discussions with the Association and its vendor.

Chart 15: Post-Retirement Benefit-Weighted Deaths (\$ in Millions)
 Service Retirement General Members
 (December 1, 2010 through November 30, 2022)

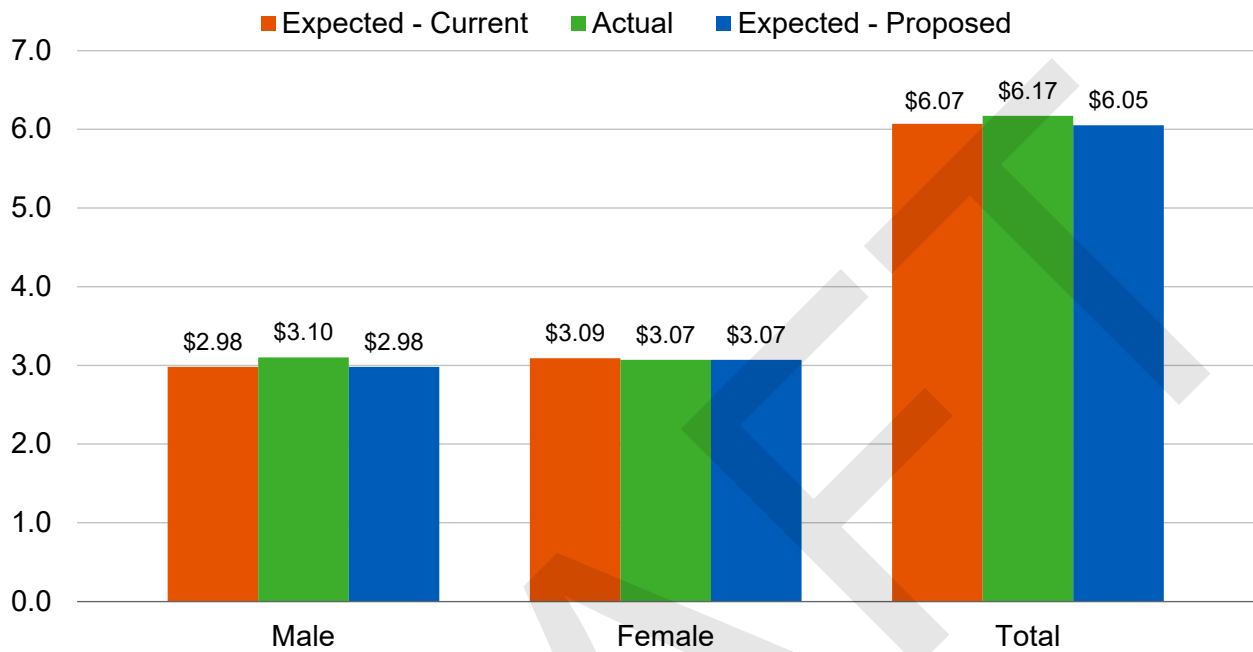


Chart 16: Post-Retirement Benefit-Weighted Deaths (\$ in Millions)
 Service Retirement Safety Members
 (December 1, 2010 through November 30, 2022)

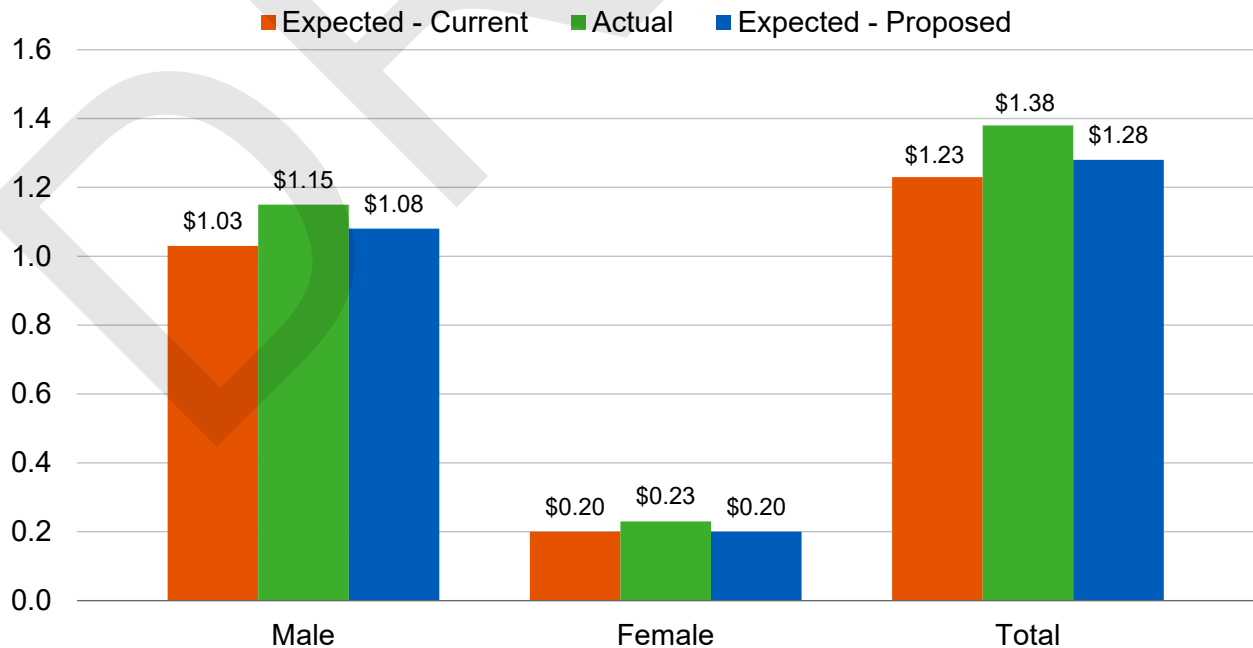


Chart 17: Post-Retirement Headcount-Weighted Deaths
 Service Retirement General Members For OPEB SRBR Valuation
 (December 1, 2010 through November 30, 2022)

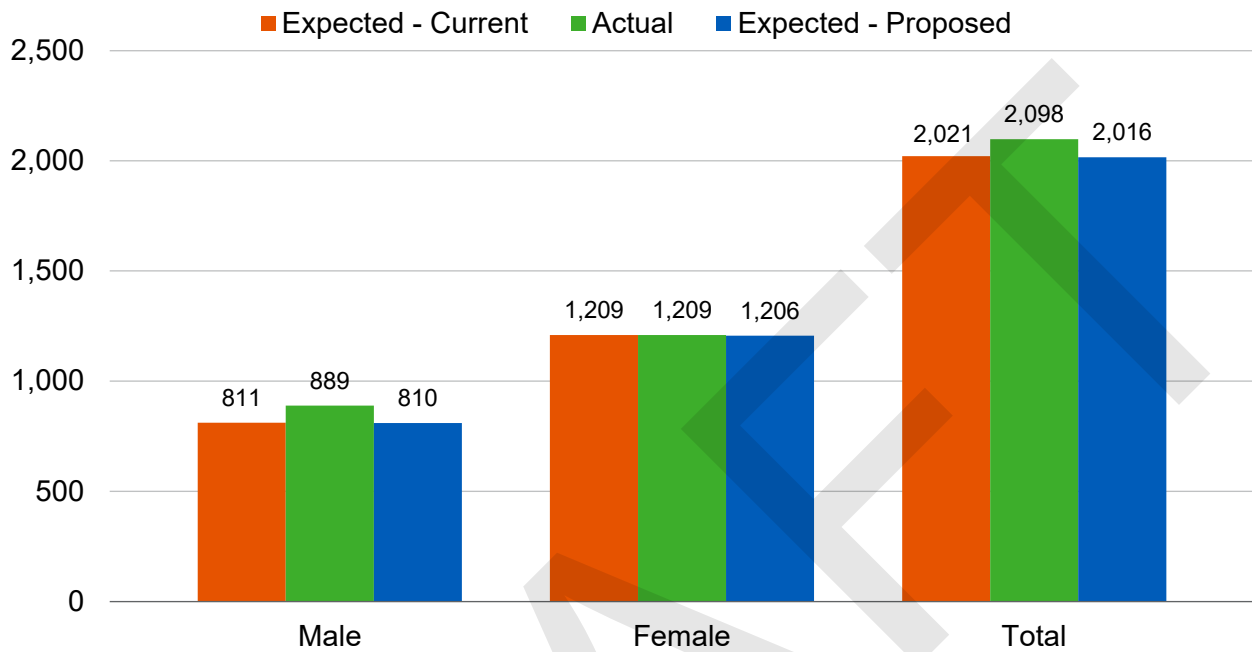


Chart 18: Post-Retirement Headcount-Weighted Deaths
 Service Retirement Safety Members For OPEB SRBR Valuation
 (December 1, 2010 through November 30, 2022)

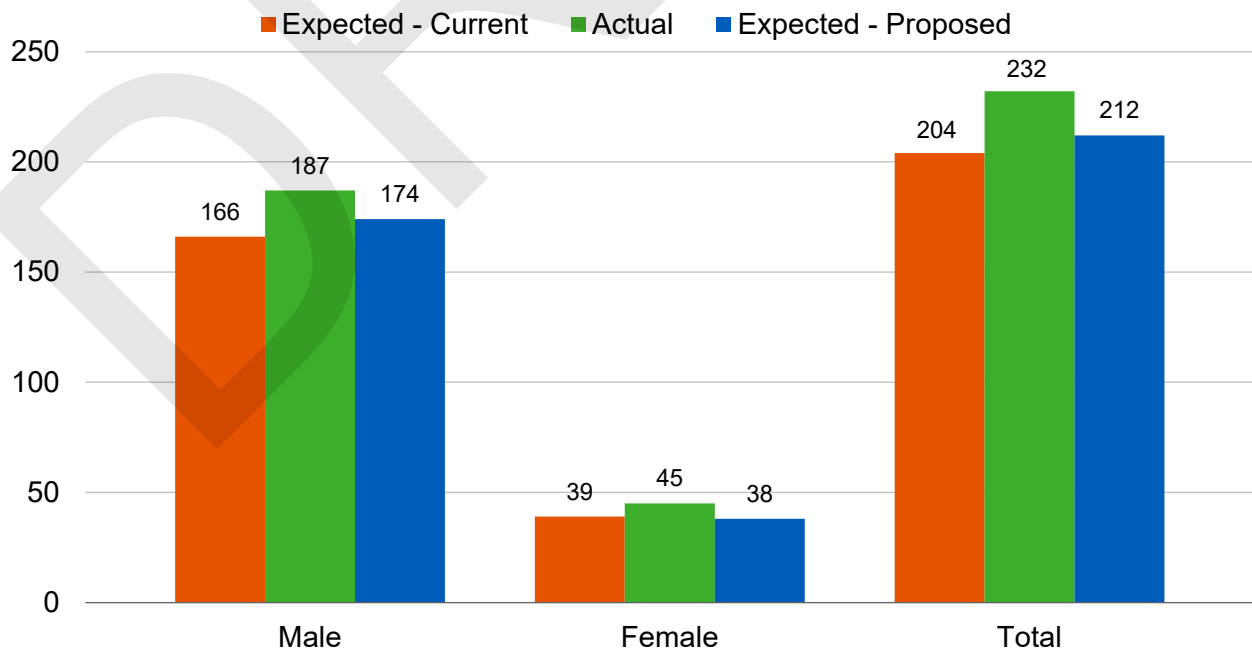


Chart 19: Benefit-Weighted Life Expectancies
Service Retirement General Members

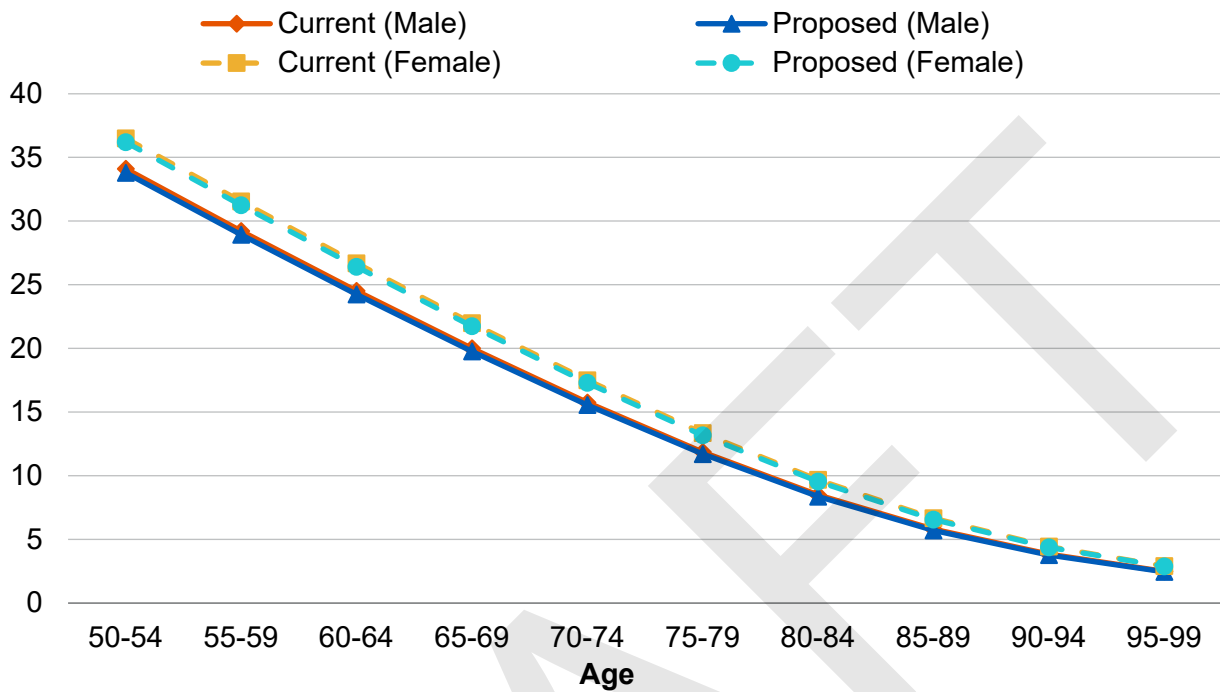
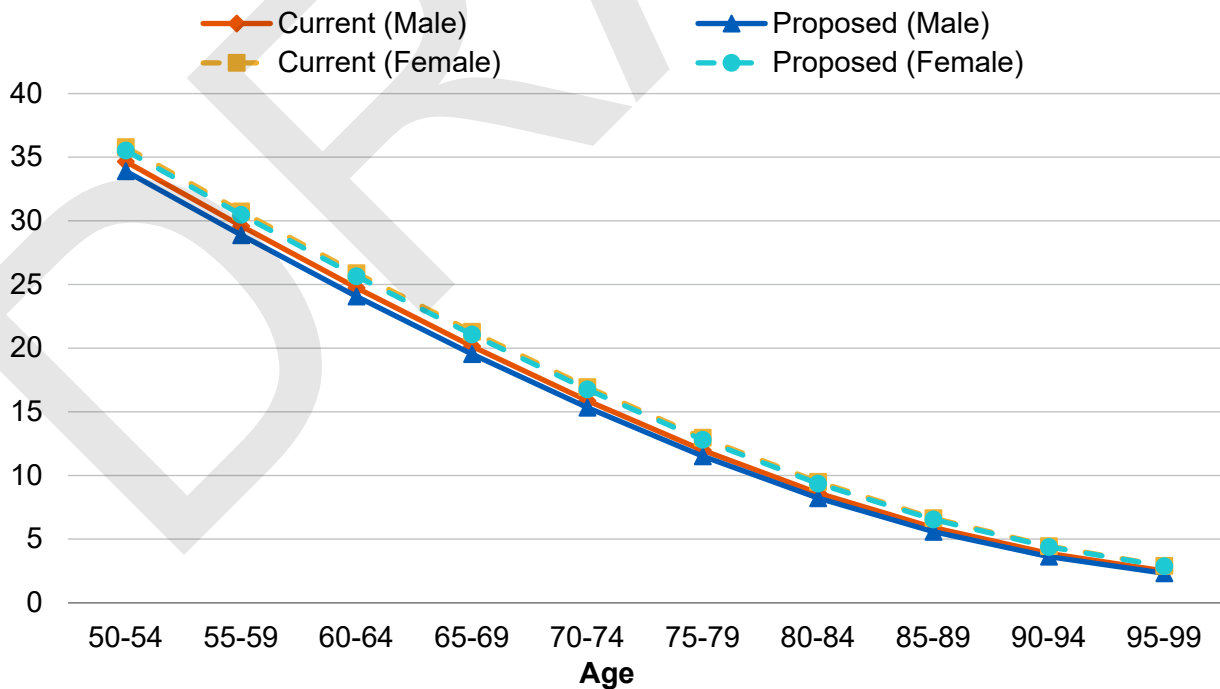


Chart 20: Benefit-Weighted Life Expectancies
Service Retirement Safety Members



C. Mortality Rates – Disabled

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used. For General members the table currently being used is the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019. For Safety members, the table currently being used is the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Similar to mortality rates for service retirees, the proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For ACERA, there is far less data for disabled retirees, so it is given little credibility, even using experience for a twelve-year period. As shown in the table below, the proposed mortality tables have actual to expected ratios of 83% and 104% for General and Safety respectively, after adjustments that account for partial credibility. In future years the ratio should remain around 83% and 104% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the twelve-year period are as follows:

Disabled Retiree Mortality Experience – Benefit Weighted (Dollars in millions)

Gender	General Members			Safety Members		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	\$0.20	\$0.17	\$0.20	\$0.17	\$0.19	\$0.17
Female	<u>0.35</u>	<u>0.28</u>	<u>0.34</u>	<u>0.03</u>	<u>0.02</u>	<u>0.03</u>
Total	\$0.55	\$0.45	\$0.55	\$0.20	\$0.21	\$0.20
Actual / Expected	83%		83%¹	103%		104%²

Notes:

1. Experience shown above is weighted by monthly benefit amounts for deceased members.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General disabled members, we recommend updating the disabled mortality to follow the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate

¹ If we use the benchmark Pub-2010 Non-Safety Disabled table without any adjustment, the proposed actual to expected ratio would be 77%.

² If we use the benchmark Pub-2010 Safety Disabled table without any adjustment, the proposed actual to expected ratio would be slightly higher but still round to 108%.

tables for males and females) with rates decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety disabled members, we recommend updating the disabled mortality to follow the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For the purpose of setting the assumptions for the OPEB SRBR valuation, we have also provided in the table below the actual and expected deaths computed without weighting these by benefit amounts and using the headcount-weighted version of the Pub-2010 tables. This is similar to how actual and expected death ratios were developed based on the prior headcount approach.

Disabled Retiree Mortality Experience – Headcount Weighted

Gender	General Members			Safety Members		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	74	65	74	41	41	41
Female	157	133	157	10	7	10
Total	231	198	230	51	48	51
Actual / Expected	86%		86%	93%		94%

Notes:

1. Experience shown above is weighted by headcounts for deceased members instead of by monthly benefit amounts
2. Expected deaths under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General disabled members in the OPEB SRBR valuation, we recommend updating the disabled mortality to follow the Pub-2010 Non-Safety Disabled Retiree Headcount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety disabled members in the OPEB SRBR valuation, we recommend updating the disabled mortality to follow the Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Table (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 21 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for disabled General members.

Chart 22 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for disabled Safety members.

Chart 23 compares actual to expected deaths on a headcount-weighted basis for disabled General members under the current and proposed assumptions over the twelve-year period provided for OPEB SRBR valuation.

Chart 24 compares actual to expected deaths on a headcount-weighted basis for disabled Safety members under the current and proposed assumptions over the twelve-year period provided for OPEB SRBR valuation.

Chart 25 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled General members on a benefit-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, life expectancies will be assumed to increase as a result of the mortality improvement scale.

Chart 26 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled Safety members on a benefit-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, life expectancies will be assumed to increase as a result of the mortality improvement scale.

Chart 21: Post-Retirement Benefit-Weighted Deaths (\$ in Millions)
 Disabled General Members
 (December 1, 2010 through November 30, 2022)

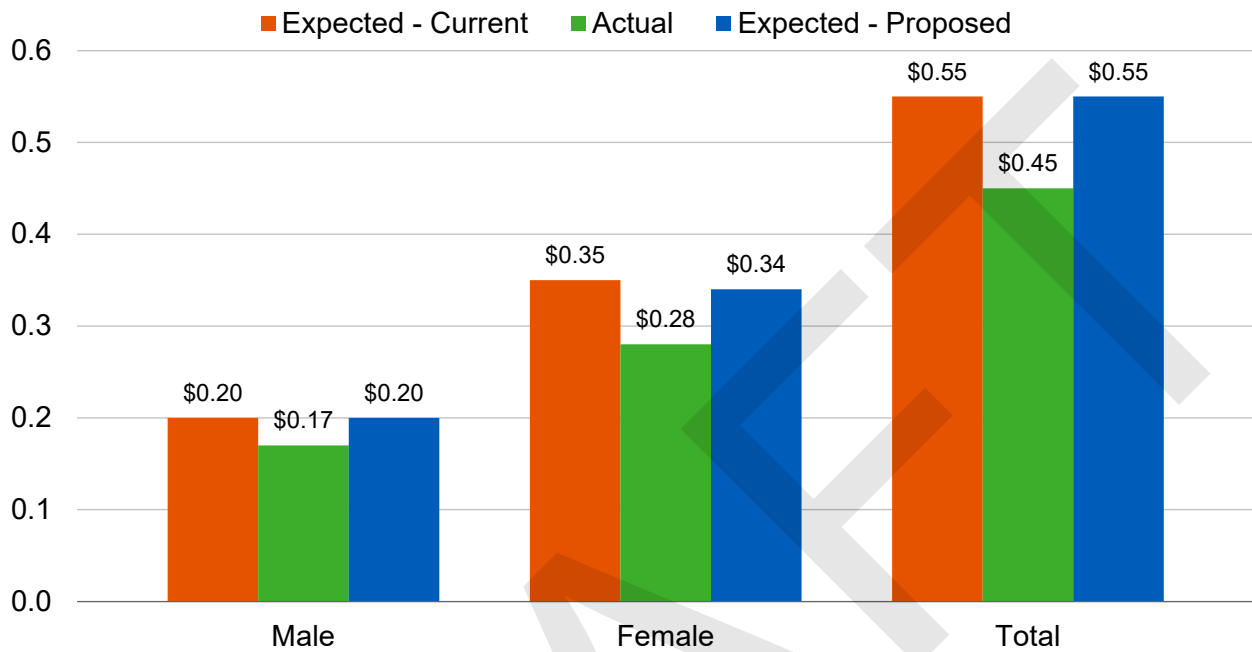


Chart 22: Post-Retirement Benefit-Weighted Deaths (\$ in Millions)
 Disabled Safety Members
 (December 1, 2010 through November 30, 2022)

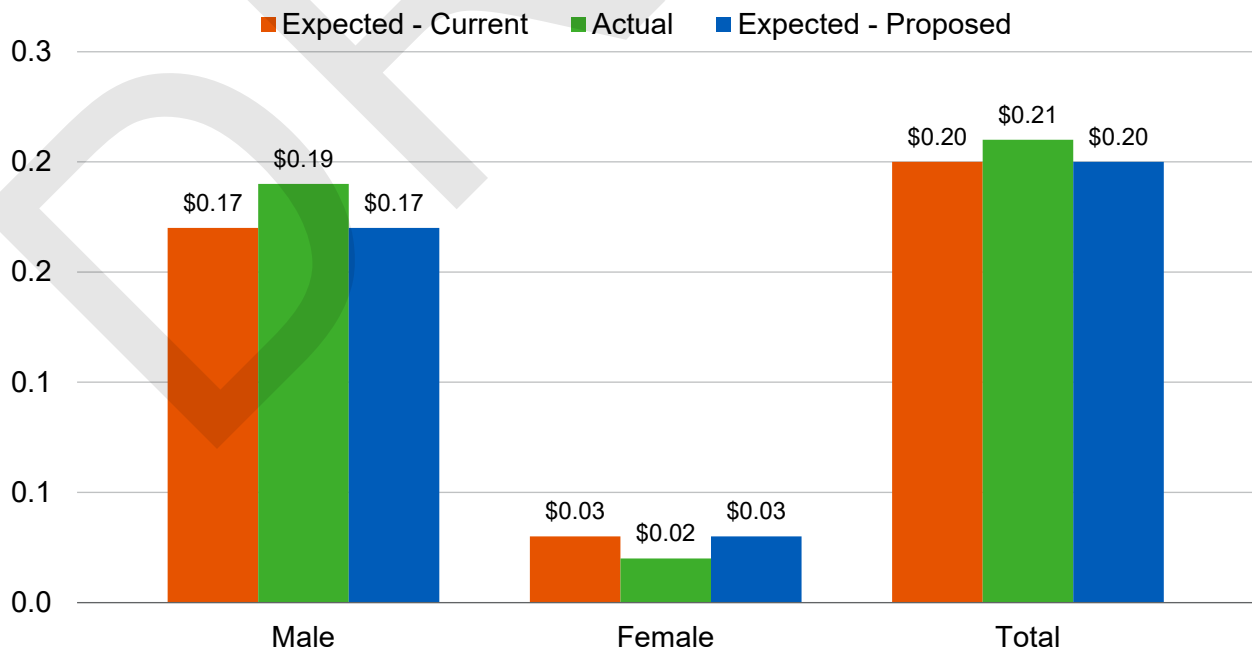


Chart 23: Post-Retirement Headcount-Weighted Deaths Disabled General Members For OPEB SRBR Valuation
(December 1, 2010 through November 30, 2022)

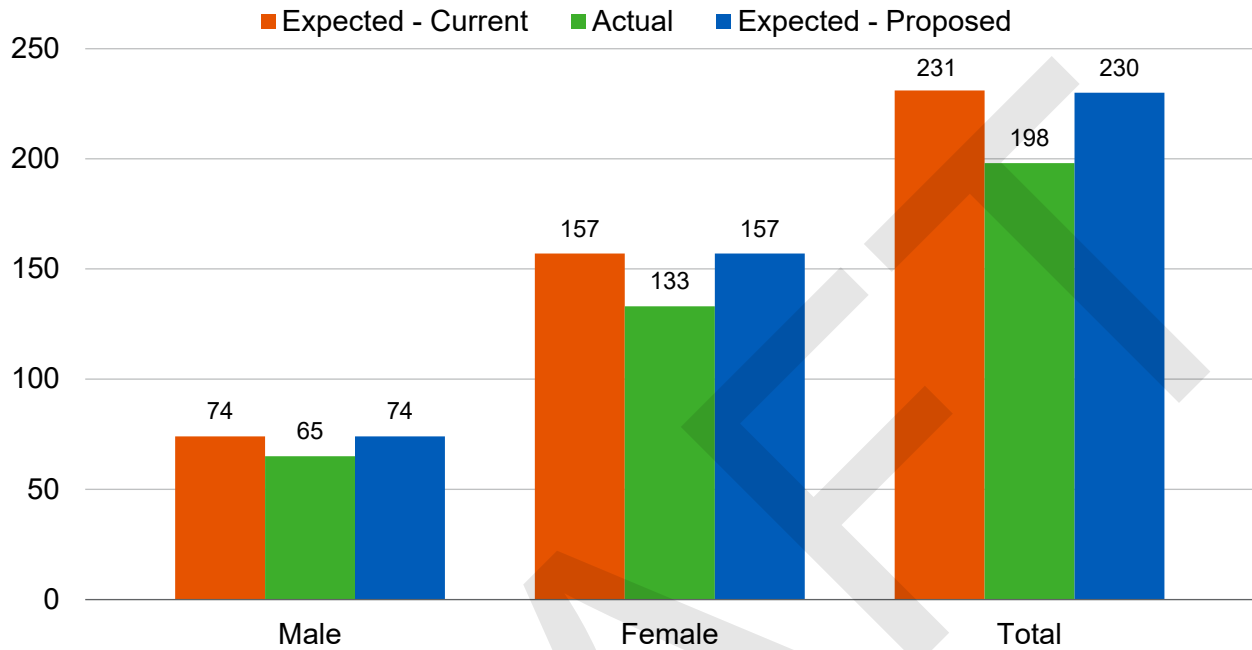


Chart 24: Post-Retirement Headcount-Weighted Deaths Disabled Safety Members For OPEB SRBR Valuation
(December 1, 2010 through November 30, 2022)

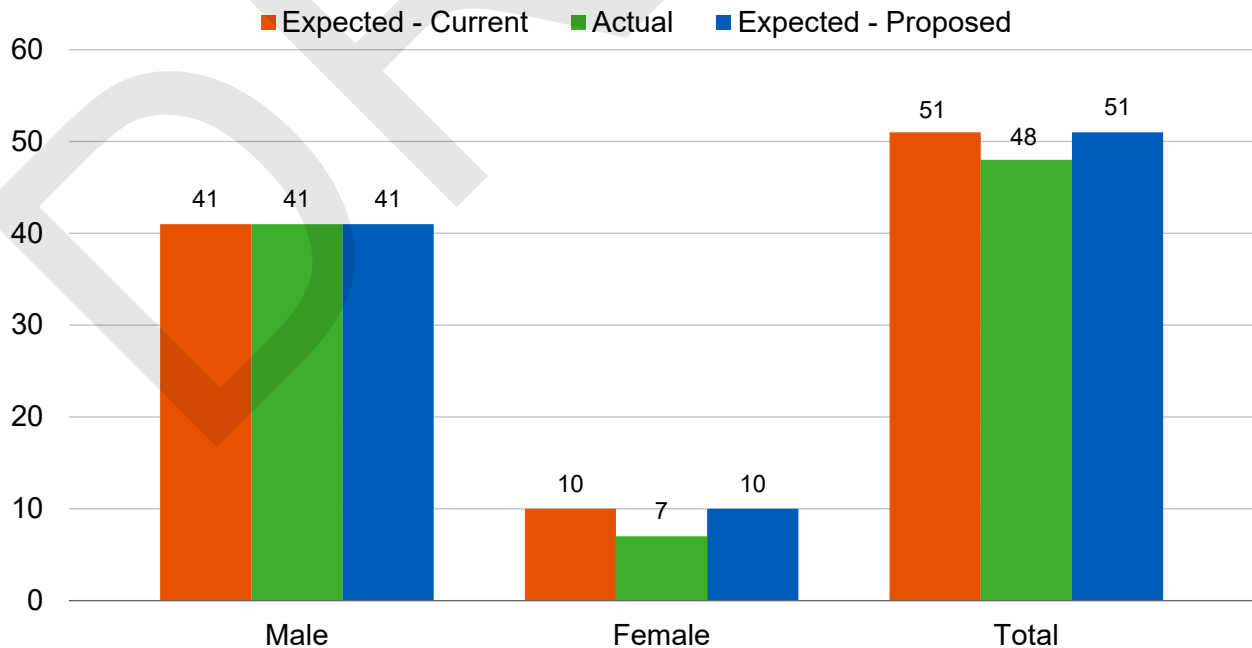


Chart 25: Benefit-Weighted Life Expectancies
Disabled General Members

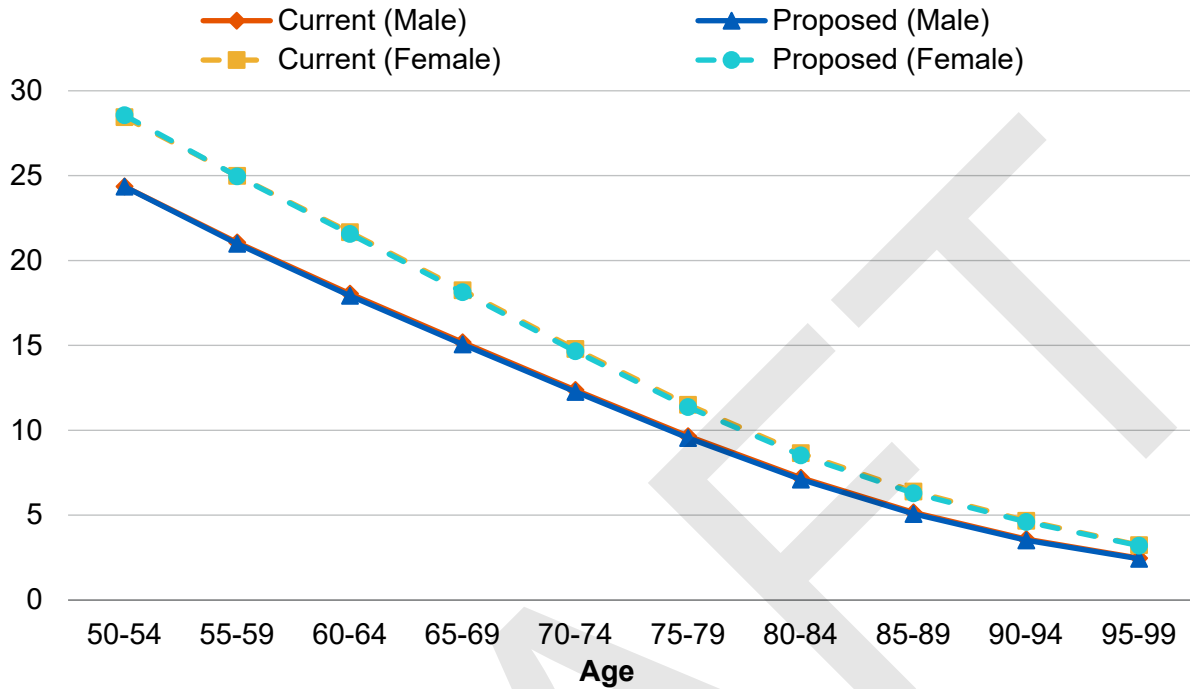
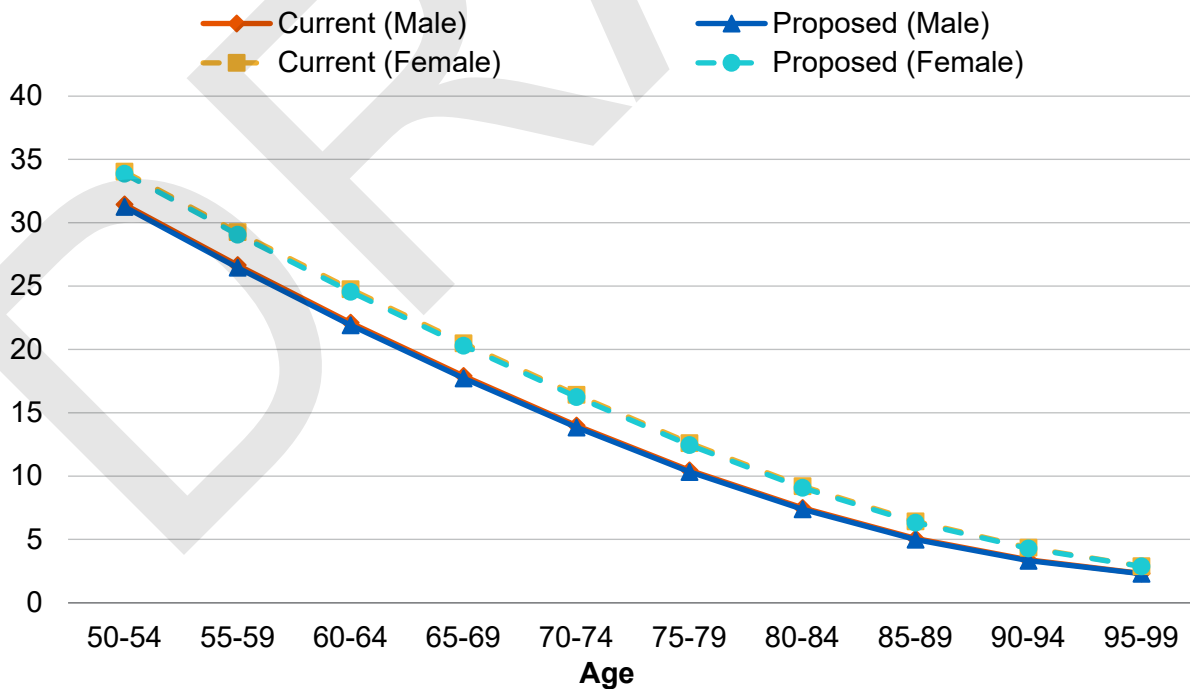


Chart 26: Benefit-Weighted Life Expectancies
Disabled Safety Members



D. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is an overall incidence of total termination assumed, combined with a separate assumption for the percentage of members who would be expected to elect a refund of contributions versus a deferred retirement benefit. Under the current assumptions, termination rates are a function of the member's years of service.

For members who terminate employment with less than five years of service, it is anticipated under the current assumptions that 55% of General and Safety members would elect a refund while the remaining 45% of General and Safety members would elect a deferred retirement benefit.

For members with five or more years of service, it is anticipated under the current assumptions that 30% of General and Safety members would elect a refund of contributions while the remaining 70% of General and Safety members would elect a deferred retirement benefit.

The termination experience over the last three years for General and Safety members is shown by years of service in the following tables. Also shown are the current assumed rates and the rates we propose. Please note that we have excluded any members that were eligible for retirement.

Termination Rates (%)

Service	General			Safety		
	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 1	12.00	12.66	12.25	4.00	6.58	5.20
1 – 2	9.00	9.56	9.25	4.00	2.69	4.20
2 – 3	8.00	8.17	8.00	4.00	4.29	4.20
3 – 4	6.00	6.10	6.25	3.50	2.58	4.00
4 – 5	6.00	6.50	6.25	3.00	3.31	4.00
5 – 6	6.00	7.27	6.25	2.00	6.98	4.00
6 – 7	5.25	6.06	5.75	1.80	10.00	4.00
7 – 8	4.25	5.81	5.00	1.70	2.98	2.40
8 – 9	3.75	3.83	4.00	1.60	1.57	2.00
9 – 10	3.50	4.59	4.00	1.50	0.00	2.00
10 – 11	3.50	4.91	4.00	1.50	7.69	2.00
11 – 12	3.50	4.12	4.00	1.50	1.14	2.00
12 – 13	3.50	2.74	3.25	1.50	3.41	2.00
13 – 14	3.50	2.71	3.25	1.50	1.43	2.00
14 – 15	3.50	2.64	3.25	1.50	2.82	2.00
15 – 16	3.50	4.64	3.25	1.50	1.47	1.50
16 – 17	3.40	2.12	3.00	1.40	0.00	1.40
17 – 18	3.30	2.59	3.00	1.30	1.33	1.30
18 – 19	3.20	3.46	3.00	1.20	1.12	1.20
19 – 20	3.10	1.32	2.75	1.10	0.83	1.10
20 or more	3.00	2.95	2.75	1.00	100.00	1.00

It is important to note that not every service category has enough exposures and/or decrements such that the results in that category are statistically credible. This is mainly the case for those members in the highest service categories because most members in those categories are eligible to retire and have been excluded from our review of this termination experience as mentioned above.

Based on this experience, we recommend increasing the termination rate assumption for certain service groups while decreasing the termination rate assumption for other service groups. Overall, the proposed rates represent an increase from the current rates for both General and Safety members.

We also continue to recommend that no termination is assumed after a member is first assumed to retire. In other words, at those ages, members will either retire in accordance with the retirement rate assumptions or continue working, rather than terminate and defer their benefit.

Chart 27 compares the number of actual to expected terminations over the past three years for the current and proposed assumptions.

Chart 28 compares the actual termination experience with the current and proposed assumptions for General members.

Chart 29 compares the actual termination experience with the current and proposed assumptions for Safety members.

Among the terminations, we recommend assumptions for the percentage of members who would elect a refund of contributions (versus those who would elect to leave their contributions on deposit and receive a deferred vested benefit). The table below shows the proportion of members assumed to elect a refund of contributions upon termination, separately for members with less than five years of service and members with five or more years of service, for General and Safety members.

Proportion of Total Termination Assumed to Elect a Refund of Contributions Rates (%)

	Less than Five Years of Service			Five or More Years of Service		
	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
General	55.0	27.8	55.0	30.0	14.6	25.0
Safety	55.0	29.0	55.0	30.0	10.6	25.0

As shown above, we recommend maintaining the assumption for the percentage of members electing a refund of contributions for members with less than five years of service (i.e., 55%) for both General and Safety members. We also recommend a reduction in the assumption for the percentage of members electing a refund of contributions for members with five or more years of service (i.e., from 30% to 25%) for both General and Safety members. We recommend modest changes for members with five or more years of service (and maintaining the assumption for members with less than five years of service) even though observed experience differs significantly from the current assumption regardless of service level. This is because there often appears to be a lag between a member terminating employment and ultimately electing a refund of contributions. Accordingly, we have also looked at the experience over the three-year study period of members who have been initially classified as inactive vested members and then ultimately elected a refund of contributions in making the above recommendations.

Chart 27: Actual Number of Terminations
Compared to Expected
(December 1, 2019 through November 30, 2022)

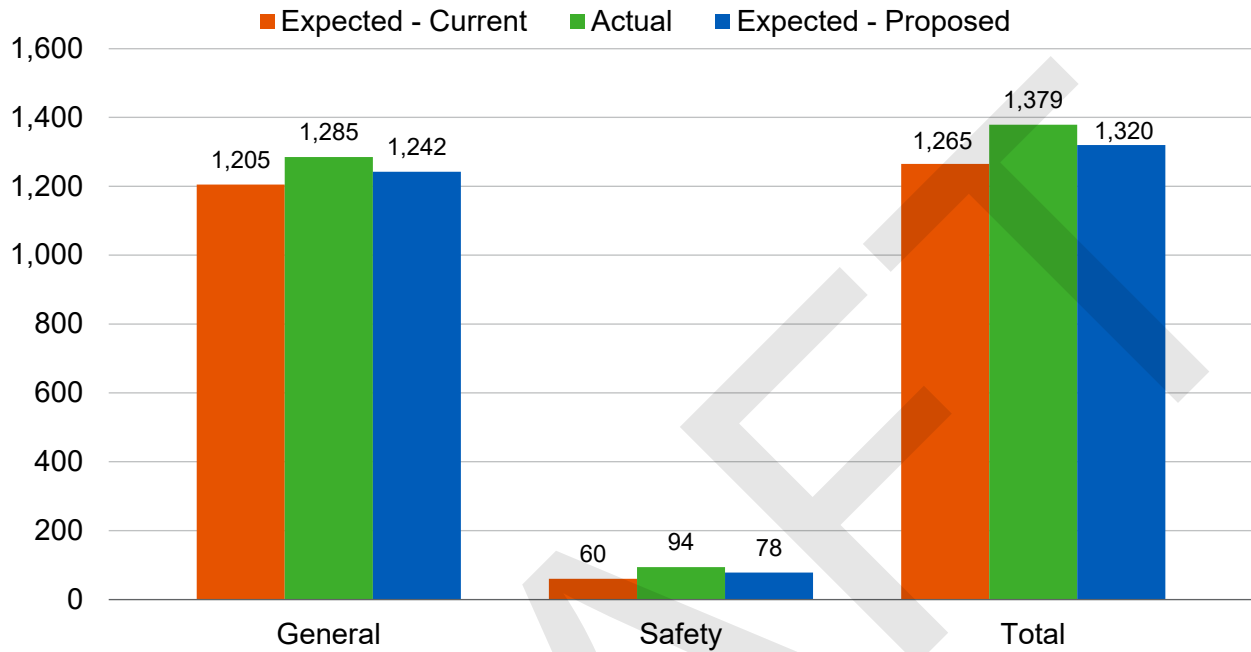


Chart 28: Termination Rates for General Members

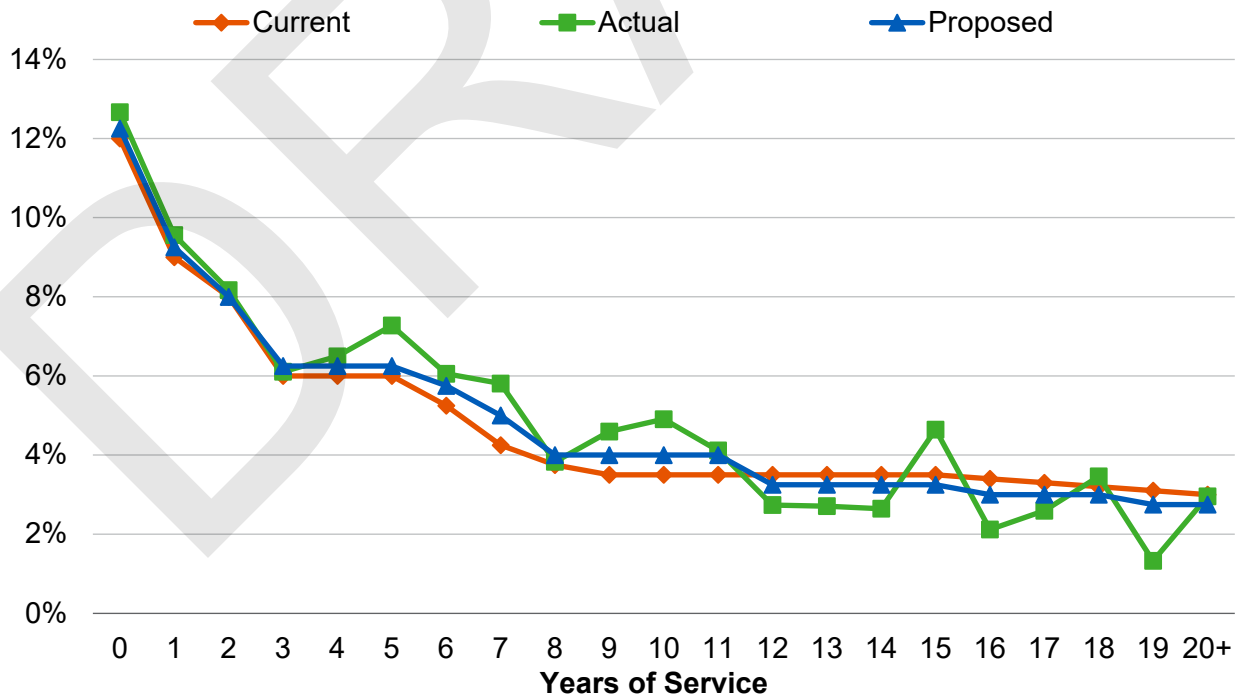
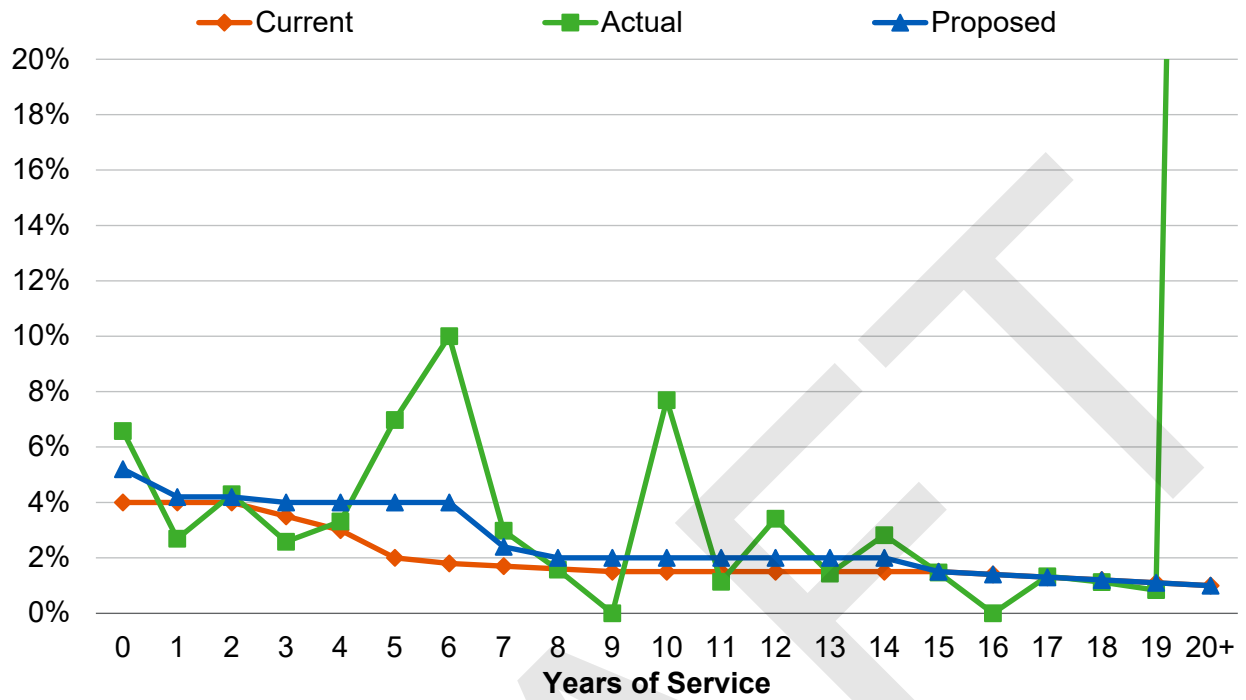


Chart 29: Termination Rates for Safety Members



Note: The actual termination rate for 20+ years of service is 100%.

E. Disability Incidence Rates

When a member becomes disabled, he or she may be entitled to at least a 50% of pay pension (service connected disability), or a pension that depends upon the member's years of service (non-service connected disability).

The following table shows the observed disability incidence rates based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. Please note that we have combined service-connected and non-service-connected disability incidence in the table below.

Disability Incidence¹
Rates (%)

Age	General			Safety		
	Current Rate ²	Actual Rate	Proposed Rate ²	Current Rate ²	Actual Rate	Proposed Rate ²
20 – 24	0.00	0.00	0.00	0.00	0.00	0.00
25 – 29	0.01	0.00	0.01	0.05	0.00	0.05
30 – 34	0.05	0.00	0.03	0.40	0.79	0.60
35 – 39	0.08	0.05	0.06	0.80	1.60	1.20
40 – 44	0.10	0.07	0.09	1.50	1.87	1.70
45 – 49	0.20	0.10	0.15	1.50	1.72	1.70
50 – 54	0.30	0.23	0.25	2.50	2.98	2.75
55 – 59	0.35	0.34	0.35	2.75	5.71	4.20
60 – 64	0.40	0.33	0.35	4.50	4.80	4.60
65 – 69	0.50	0.45	0.50	0.00	3.33	0.00
70 – 74	0.00	0.92	0.70	0.00	14.29	0.00

Based on this experience, we recommend decreasing the disability incidence rate assumption for General members while extending rates through age 74, and increasing the disability incidence rate assumption for Safety members.

Chart 30 that follows later in this section compares the number of actual to expected non-service connected and service connected disabilities over the past three years for the current and proposed assumptions. Note that we have reflected in the observed disability incidences those members whose applications for a disability retirement are pending as of the end date of the experience study. Based on the actual number of those pending disabilities in the prior experience study who were granted a disability benefit during the last three years, we have applied a 90% probability to anticipate the number that will be granted a disability benefit.

Chart 31 compares the actual disability incidence experience with the current and proposed assumptions for General members.

¹ Total rate for duty and non-duty connected disabilities.

² At central age in the age range shown.

Chart 32 compares the actual disability incidence experience with the current and proposed assumptions for Safety members.

The following table shows the observed percentage of members that received a service-connected versus non-service-connected disability based on the actual experience over the past three years. Also shown are the current assumed percentages and the percentages we propose.

Service-Connected vs. Non-Service-Connected Disability

Service-Connected %	General	Safety
Current Assumption	65%	100%
Actual Experience	71%	99%
Proposed Assumption	70%	100%

Based on this experience, we recommend increasing the current assumption that 65% of General disabilities will be service-connected disabilities to 70%. The remaining 30% will be assumed to be non-service-connected disabilities. We recommend maintaining the current assumption that 100% of Safety disabilities will be service-connected disabilities.

Chart 30: Actual Number of Disabilities Compared to Expected (December 1, 2019 through November 30, 2022)

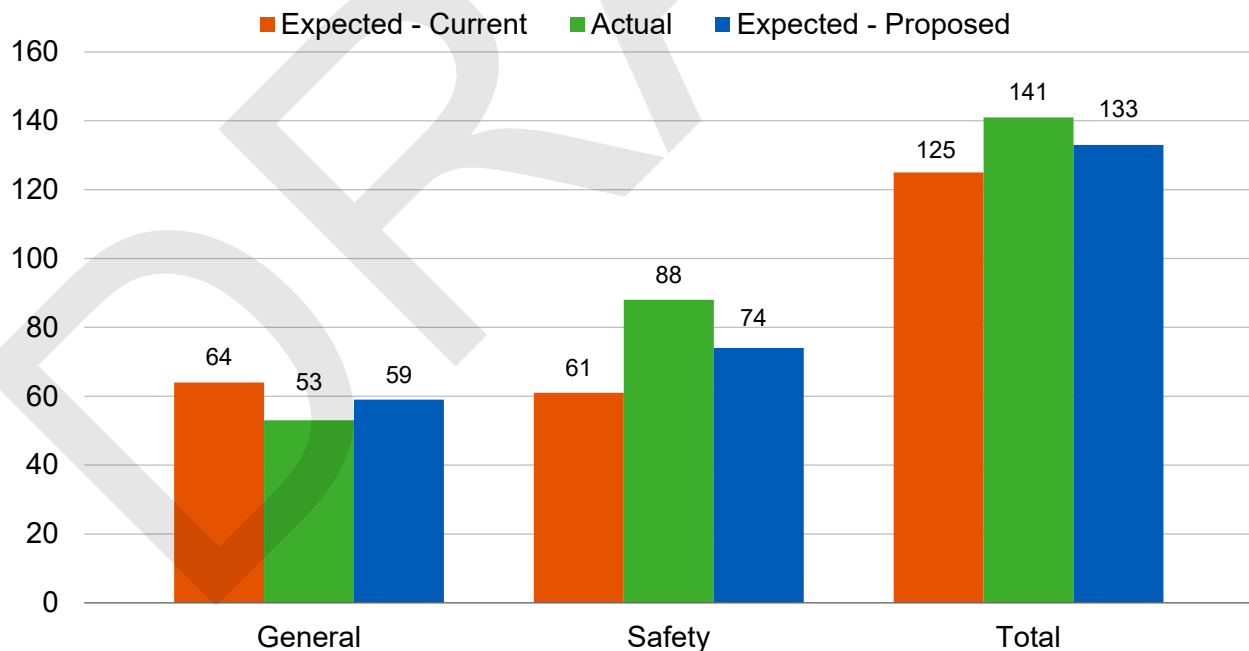


Chart 31: Disability Incidence Rates for General Members

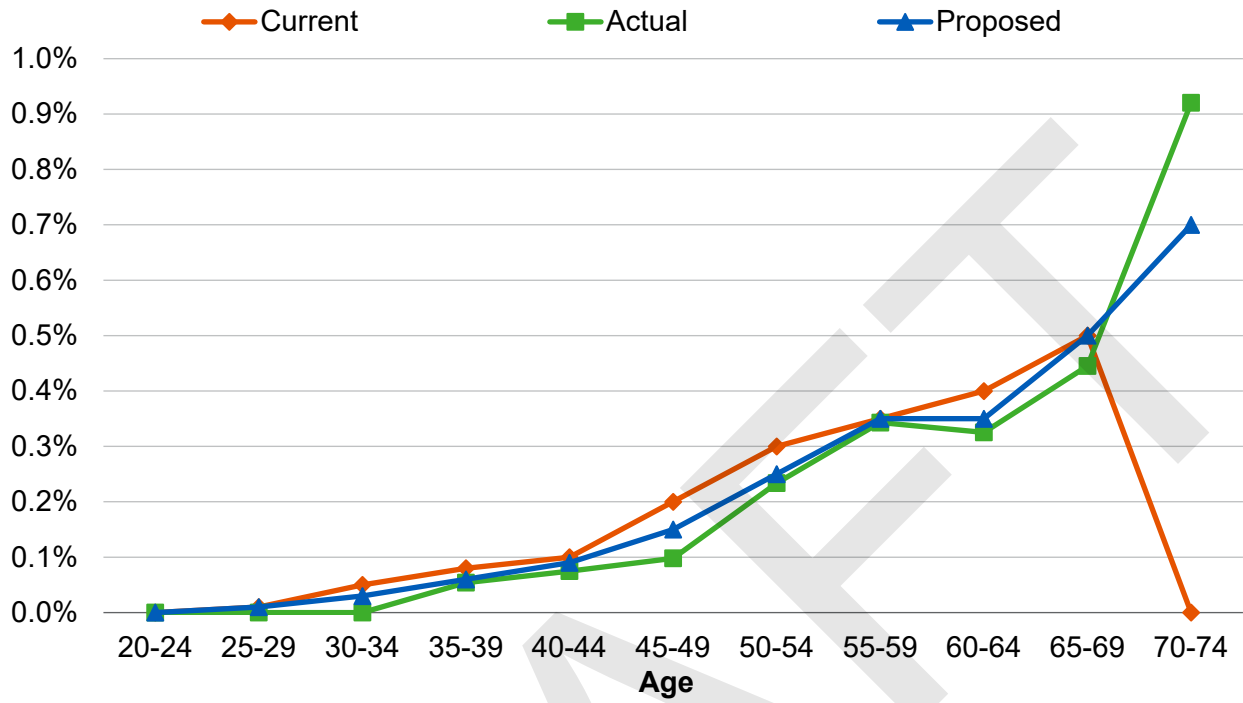
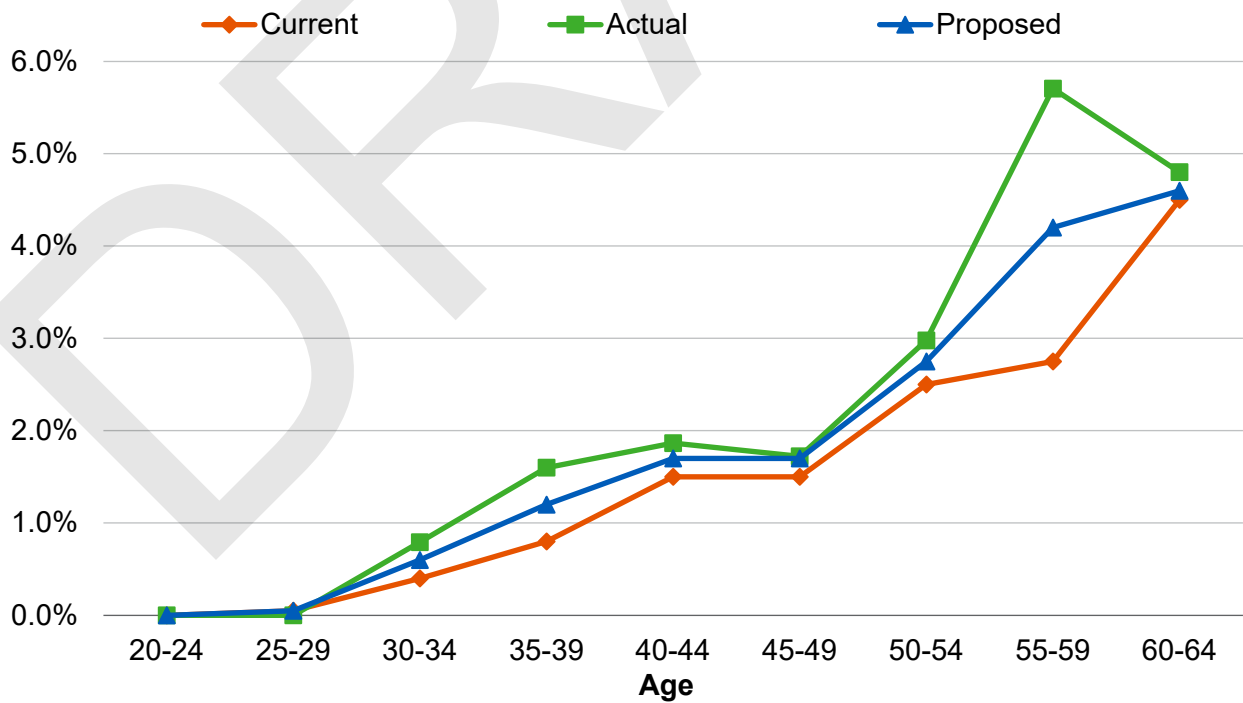


Chart 32: Disability Incidence Rates for Safety Members



F. Service from Unused Sick Leave Conversions

At retirement, members can convert their unused sick leave to increase the service credit used in the calculation of their retirement benefit. The actuarial valuation anticipates this additional benefit using an assumption to estimate the increase in service that will occur due to unused sick leave conversions.

We collected information on the actual amount of sick leave converted to service credit for retirees during the three-year period studied. Consistent with the format of the current assumption, the actual converted sick leave was expressed as additional service credit at retirement for each year of employment,

The table below shows the actual sick leave converted to years of additional service credit at retirement separately for General and Safety members.

Service from Unused Sick Leave Conversion (Years of Additional Service Credit)

	New Retirees		
	Current Assumption	Actual Years	Proposed Assumption
General	0.0030	0.0030	0.0030
Safety	0.0070	0.0054	0.0060

Based on this observed experience, we recommend that the sick leave conversion assumption be maintained at 0.003 years of additional service credit at retirement for each year of employment for General members, and that the assumption be decreased from 0.007 to 0.006 years for Safety members.

G. Retiree Health Assumptions

Retiree Medical Coverage Election

Based on the plan’s experience and re-enrollment options, the retiree medical coverage assumption is based on the member’s age. The actual election rates shown below are based on retirements during calendar years 2020 through 2022. Also shown are the current and proposed assumptions.

Eligible Retirees who Elected Medical

	Current Rate	Actual Rate	Proposed Rate
Under Age 65*	80%	74.2%	75%
Age 65 and Older	90%	87.3%	90%

* 60% of eligible retirees under age 65 without medical coverage are assumed to elect medical coverage upon reaching age 65.

Based on the above, we recommend maintaining the current assumption for retirees over age 65, and we recommend decreasing the assumption for retirees under age 65.

Spousal Coverage

The implicit medical retiree subsidy varies depending on whether future retirees that elect to continue health coverage at retirement also have an eligible spouse that opts for health coverage. Spouses of future retirees can only receive the implicit subsidy; the spousal coverage assumption applies only for the implicit subsidy.

The following table shows the observed percentage of new retirees receiving a medical subsidy who were reported with a covered Spouse based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

New Retirees with Spouse Coverage

	New Male Retiree	New Female Retiree
Current Assumption	40%	20%
Actual Experience	34%	16%
Proposed Assumption	35%	15%

Based on the above, we recommend decreasing the percentage of new retirees assumed to cover their spouse.

Covered Spouse Age Difference

The following tables show the observed spouse's age for new retirees who elected to cover their spouse based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

Covered Spouse's Age Compared to the Member's Age

	New Male Retiree	New Female Retiree
Current Assumption	3 years younger	1 years older
Actual Experience	3 years younger	1 year older
Proposed Assumption	3 years younger	1 year older

Based on the above, we recommend maintaining the current assumptions.

H. Other Change in Method

Change in Allocation of the Cost of COLA Benefits for Legacy Safety Members with 30 Years of Service

With this experience study and starting with the December 31, 2023 valuation, we recommend a change to allocate the suspended COLA normal cost contributions for legacy Safety members with at least 30 years of service to the employers instead of to the remaining legacy Safety members with less than 30 years of service. This is consistent with the current practice to allocate the suspended basic normal cost contributions for legacy Safety members with over 30 years of service to the employer normal cost.

Based on our understanding of the 1937 CERL, the basic normal cost for legacy Safety members with at least 30 years of service has been allocated to the employer. In contrast, in prior actuarial valuations one-half of the COLA normal cost for legacy Safety members with at least 30 years of service has been allocated to the legacy Safety members with less than 30 years of service. This prior practice has produced stable member rates as long as there have been (1) relatively few Safety members who continue to work after 30 years of service and (2) relatively small changes in the proportions of payroll for members with less than 30 years of service compared to payroll for members with at least 30 years of service.

However, the proportions of payroll could continue to shift over time with the enrollment of new Safety members in the CalPEPRA plans instead of the Legacy plans. For that reason, we believe it would be practical and reasonable to treat suspended COLA member contributions the same as current practice for suspended basic member contributions.

This change would result in a net increase in the average employer contribution rate for Safety Tiers 2, 2C and 2D of about: 0.05%, 0.15% and 0.04% of payrolls for each tier, respectively, and a corresponding net decrease in the average member contribution rates of about the same amount. The average employer contribution rate increase is less than 0.01% of payroll. (The variability in the rate increases among the three tiers is due to the different proportions of payroll for members with less than 30 years compared to payroll for members with over 30 years of service.)

Other Technical Changes Under the Entry Age Cost Allocation Method

We are also recommending three other technical changes to the application of the Entry Age cost allocation method. One is an improvement in reflecting the timing of decrements in calculating the total normal cost rate for each plan. Another is to use the individual (instead of the aggregate) version of the Entry Age cost allocation method to determine the normal cost of the COLA benefits. Lastly, we are recommending a refinement to the entry age calculation in how the service is rounded. These changes would have an impact of increasing total employer and employee contributions rates by 0.06% and 0.08% of payroll, respectively.

5. Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the December 31, 2022 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes including the recommended merit and promotion salary increases (as recommended in Section 3 of this report) and the recommended demographic assumption changes (as recommended in Section 4 of this report).

Cost Impact of the Recommended Assumptions Based on December 31, 2022 Actuarial Valuation

	Impact on Average Employer Contribution Rates
Decrease due to changes in economic assumptions	(0.38%)
Decrease due to changes in demographic assumptions ¹	0.00%
Total increase/(decrease) in average employer rate	(0.38%)
Total estimated increase/(decrease) in annual dollar amount (\$000s)²	\$(5,414)

	Impact on Average Member Contribution Rates
Decrease due to changes in economic assumptions	(0.29%)
Decrease due to changes in demographic assumptions ³	0.06%
Total increase/(decrease) in average member rate	(0.23%)
Total estimated increase/(decrease) in annual dollar amount (\$000s)²	\$(3,135)

	Impact on UAAL ⁴ (\$000s)
Decrease due to changes in economic assumptions	\$(21,827)
Decrease due to changes in demographic assumptions	(63,634)
Total increase/(decrease) in UAAL (\$000s)	\$(85,461)

	Impact on Funded Percentage
Change in Funded Percentage on VVA basis	86.9% to 87.6%

¹ The increase in the average employer contribution rate due to the change in the allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 82, is less than 0.01% of payroll.

² Based on December 31, 2022 projected annual payroll as determined under each set of assumptions. These annual amounts are expected to change in the future in proportion to future payroll.

³ The decrease in the average member contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 82, is less than 0.01% of payroll.

⁴ UAAL stands for the Unfunded Actuarial Accrued Liability, which is the excess, if any, of the Actuarial Accrued Liability over the Valuation Value of Assets.

The reduction in the contribution rate is mainly caused by the reduction in the inflationary salary increase assumption from 2.75% to 2.50%.

The reduction in the UAAL from changes in economic assumptions is mainly caused by the reduction in the inflationary salary increase assumption from 2.75% to 2.50%. There is also a reduction in the UAAL from changes in demographic assumptions that is mainly due to the refinements in the Entry Age allocation cost method.

The table on the following page shows the changes in key valuation results due to the recommended assumption changes, as if they were applied in the December 31, 2022 actuarial valuation. If all of the proposed assumption changes were implemented, the Plan's average employer rate would have decreased by 0.38% of compensation, and the average member rate would have decreased by 0.23% of compensation, for a total contribution rate decrease of 0.61% of payroll. The Plan's Unfunded Actuarial Accrued Liability would have decreased by \$85.5 million, causing the funded ratio to increase from 86.9% to 87.6% on a valuation value of assets basis.

Summary of Key Valuation Results as of December 31, 2022 (Dollar amounts in thousands)						
Employer Contribution Rates:	Current Assumptions		New Assumptions		Change	
	Total Rate (%)	Estimated Annual Amount	Total Rate (%)	Estimated Annual Amount	Total Rate (%)	Estimated Annual Amount
County Only						
General Tier 1	24.77	\$967	24.13	\$941	-0.64	-\$26
General Tier 2	23.19	82,165	22.73	80,332	-0.46	-1,833
General Tier 4	23.10	72,737	22.60	70,988	-0.50	-1,749
Safety Tier 1	42.29	163	40.47	156	-1.82	-7
Safety Tier 2	25.53	25,672	25.69	25,820	0.16	148
Safety Tier 2C ¹	30.50	873	31.01	885	0.51	12
Safety Tier 2D ¹	26.37	4,861	26.69	4,887	0.32	26
Safety Tier 4	23.55	19,515	23.46	19,432	-0.09	-83
County Combined	23.57	206,953	23.22	203,441	-0.35	-3,512
AHS, Court & First 5 Only						
General Tier 1	25.80	145	25.18	141	-0.62	-4
General Tier 2	24.22	41,211	23.78	40,394	-0.44	-817
General Tier 4	24.13	48,335	23.65	47,299	-0.48	-1,036
Other Districts						
General Tier 1 (non-LARPD)	30.95	867	30.39	849	-0.56	-18
General Tier 2	29.37	113	28.99	110	-0.38	-3
General Tier 4 (non-LARPD)	29.28	599	28.86	589	-0.42	-10
General Tier 1 (LARPD)	10.97	63	10.56	61	-0.41	-2
General Tier 3	17.15	260	16.68	252	-0.47	-8
General Tier 4 (LARPD)	9.30	138	9.03	134	-0.27	-4
All Categories Combined	23.74	298,684	23.36	293,270	-0.38	-5,414
General (non-LARPD)	23.55	247,139	23.08	241,643	-0.47	-5,496
LARPD	12.88	461	12.52	447	-0.35	-14
All Safety	24.91	51,084	24.98	51,180	0.07	96
General (Non-LARPD) Salary		1,049,350		1,047,057		-2,293
LARPD Salary		3,580		3,569		-11
Safety Salary		205,096		204,886		-210

Average Member Contribution Rates:	Total Rate (%)	Estimated Annual Amount	Total Rate (%)	Estimated Annual Amount	Total Rate (%)	Estimated Annual Amount
General Tier 1	10.17	\$798	9.85	\$771	-0.32	-\$27
General Tier 2	8.14	42,723	7.83	41,003	-0.31	-1,720
General Tier 3	15.50	235	14.43	218	-1.07	-17
General Tier 4	9.30	48,241	9.03	46,742	-0.27	-1,499
Safety Tier 1	3.00	12	3.00	12	0.00	0
Safety Tier 2	16.88	16,973	16.49	16,573	-0.39	-400
Safety Tier 2C	14.44	413	14.27	407	-0.17	-6
Safety Tier 2D	16.82	3,100	16.76	3,068	-0.06	-32
Safety Tier 4 ²	17.28	14,319	17.97	14,885	0.69	566
All Categories Combined	10.08	126,814	9.85	123,679	-0.23	-3,135

Funded Status:					
Actuarial Accrued Liability		\$11,415,120		\$11,329,659	-\$85,461
Valuation Value of Assets (VVA)		\$9,923,019		\$9,923,019	\$0
Funded Percentage		86.9%		87.6%	0.7%
Unfunded Actuarial Accrued Liability (UAAL) based on VVA		\$1,492,101		\$1,406,640	-\$85,461

¹ The increase in the employer normal cost rate for Safety Tiers 2C and 2D is mainly due to change in demographic assumptions (in particular the increase in the number of expected disabilities). That increase has been mitigated to some extent by a reduction in the UAAL rate.

² The increase in the Safety Tier 4 employee contribution rate is mainly due to the increase in the number of expected disabilities. The increase in the total normal cost is equally shared by the employer and the member.

Appendix A: Current Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of administrative and investment expenses. Expected administrative and investment expenses represent about 0.95% of the Market Value of Assets.
Employee Contribution Crediting Rate:	7.00%, compounded semi-annually.
Cost of Living Adjustment:	Retiree COLA increases are subject to a 2.75% maximum change per year for General Tier 1, General Tier 3, and Safety Tier 1, and 2% maximum change per year for General Tier 2, General Tier 4, Safety Tier 2, Safety Tier 2C, Safety Tier 2D, and Safety Tier 4. (For General Tier 1, General Tier 3, and Safety Tier 1 members with a sufficient COLA bank, withdrawals from the bank can be made to increase the retiree COLA up to 3% per year.)
Payroll Growth:	Inflation of 2.75% per year plus real “across the board” salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes:

- Inflation at 2.75%, plus
- “Across the board” salary increases of 0.50% per year, plus
- The following merit and promotion increases:

Years of Service	Rate (%)	
	General	Safety
Less than 1	5.10	8.00
1 – 2	5.10	8.00
2 – 3	4.50	8.00
3 – 4	2.90	4.90
4 – 5	2.10	3.70
5 – 6	1.60	2.10
6 – 7	1.50	1.30
7 – 8	1.50	1.20
8 – 9	1.00	0.90
9 – 10	0.90	0.90
10 – 11	0.70	0.80
11 & Over	0.40	0.80

Additional Cashout Assumptions:

Additional pay elements are expected to be received during a member’s final average earnings period. The percentages, added to the final average salary, are:

	Service Retirement	Disability Retirement
General Tier 1	7.5%	6.5%
General Tier 2	3.0%	1.4%
General Tier 3	7.5%	6.5%
General Tier 4	N/A	N/A
Safety Tier 1	7.5%	6.4%
Safety Tier 2	2.5%	1.9%
Safety Tier 2C	2.5%	1.9%
Safety Tier 2D	2.5%	1.9%
Safety Tier 4	N/A	N/A

Demographic Assumptions

Post-Retirement Mortality Rates:

For the Statutory Retirement Plan Benefits:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Tables (separate tables for males and females) with rates decreased 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Beneficiary

- **All Beneficiaries:** Pub-2010 General Contingent Survivor Amount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

For the Discretionary SRBR OPEB Benefits:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Headcount-Weighted Mortality Tables (separate tables for males and females) with rates decreased 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Beneficiary

- **All Beneficiaries:** Pub-2010 General Contingent Survivor Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Pre-Retirement Mortality Rates:

For the Statutory Retirement Plan Benefits:

- **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.01
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.04	0.02
35	0.04	0.02	0.04	0.03
40	0.06	0.03	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.13	0.08	0.10	0.08
55	0.19	0.11	0.15	0.11
60	0.28	0.17	0.23	0.14
65	0.41	0.27	0.35	0.20

Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

All pre-retirement deaths are assumed to be non-service-connected.

For the Discretionary SRBR OPEB Benefits:

- **General Members:** Pub-2010 General Employee Headcount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.02
25	0.03	0.01	0.03	0.02
30	0.04	0.02	0.04	0.02
35	0.05	0.02	0.04	0.03
40	0.06	0.04	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.14	0.08	0.11	0.08
55	0.20	0.12	0.15	0.11
60	0.29	0.18	0.24	0.16
65	0.42	0.28	0.38	0.22

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 75% male and 25% female.

Disability Incidence Rates:

Age	Rate (%)	
	General	Safety
20	0.00	0.00
25	0.01	0.03
30	0.03	0.26
35	0.07	0.64
40	0.09	1.22
45	0.16	1.50
50	0.26	2.10
55	0.33	2.65
60	0.38	3.80
65	0.46	0.00

65% of General disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected disabilities.

100% of Safety disabilities are assumed to be service connected disabilities.

Termination Rates:

Years of Service	Rate (%)	
	General	Safety
Less than 1	12.00	4.00
1 – 2	9.00	4.00
2 – 3	8.00	4.00
3 – 4	6.00	3.50
4 – 5	6.00	3.00
5 – 6	6.00	2.00
6 – 7	5.25	1.80
7 – 8	4.25	1.70
8 – 9	3.75	1.60
9 – 16	3.50	1.50
16 – 17	3.40	1.40
17 – 18	3.30	1.30
18 – 19	3.20	1.20
19 – 20	3.10	1.10
20 or more	3.00	1.00

For members with less than five years of service, 55% of all terminated members are assumed to choose a refund of contributions and the other 45% are assumed to choose a deferred vested benefit. For members with five or more years of service, 30% of all terminated members are assumed to choose a refund of contributions and the other 70% are assumed to choose a deferred vested benefit.

No termination is assumed after a member is eligible for retirement.

Retirement Rates:

Age	Rate (%)				
	General				
	Tier 2			Tier 3	Tier 4
	Tier 1	Less than 30 Years of Service	30 or More Years of Service		
50	2.0	2.0	4.0	10.0	0.0
51	4.0	2.0	4.0	10.0	0.0
52	4.0	2.0	4.0	10.0	4.0
53	5.0	2.0	4.0	10.0	2.0
54	5.0	2.0	4.0	10.0	2.0
55	6.0	2.0	4.0	12.0	5.0
56	10.0	2.5	4.5	14.0	2.5
57	12.0	4.0	5.0	16.0	3.5
58	12.0	4.0	5.0	18.0	3.5
59	14.0	4.5	8.0	20.0	4.5
60	20.0	8.0	8.5	20.0	5.0
61	20.0	9.0	13.5	20.0	5.0
62	35.0	15.0	22.5	30.0	18.0
63	30.0	15.0	22.5	25.0	15.0
64	30.0	18.0	27.0	25.0	17.0
65	30.0	25.0	27.5	50.0	25.0
66	30.0	30.0	33.0	50.0	30.0
67	30.0	30.0	33.0	50.0	30.0
68	30.0	30.0	33.0	50.0	30.0
69	35.0	35.0	38.5	50.0	35.0
70	40.0	40.0	40.0	65.0	25.0
71	40.0	40.0	40.0	65.0	25.0
72	40.0	40.0	40.0	65.0	25.0
73	40.0	40.0	40.0	65.0	25.0
74	40.0	40.0	40.0	65.0	25.0
75 & Over	100.0	100.0	100.0	100.0	100.0

The retirement rates only apply to members who are eligible to retire at the age shown.

**Retirement Rates
(continued):**

Age	Rate (%)				
	Safety				
	Tier 2, 2D				
	Tier 1	Less than 30 Years of Service	30 or More Years of Service	Tier 2C	Tier 4
49	0.0	12.0	18.0	0.0	0.0
50	35.0	12.0	18.0	4.0	4.0
51	30.0	10.0	24.0	2.0	2.0
52	25.0	10.0	24.0	2.0	2.0
53	35.0	10.0	25.0	3.0	3.0
54	45.0	12.0	27.0	6.0	6.0
55	45.0	12.0	29.0	10.0	10.0
56	45.0	14.0	32.0	12.0	12.0
57	45.0	16.0	32.0	20.0	20.0
58	45.0	18.0	30.0	10.0	10.0
59	45.0	18.0	30.0	15.0	15.0
60	45.0	25.0	30.0	60.0	60.0
61	45.0	25.0	30.0	60.0	60.0
62	45.0	25.0	30.0	60.0	60.0
63	45.0	25.0	30.0	60.0	60.0
64	45.0	30.0	30.0	60.0	60.0
65 & Over	100.0	100.0	100.0	100.0	100.0

The retirement rates only apply to members who are eligible to retire at the age shown.

Safety Tiers 1 and 2C retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Retirement Age and Benefit for Deferred Vested Members:	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p style="padding-left: 40px;">General Retirement Age: 61</p> <p style="padding-left: 40px;">Safety Retirement Age: 55</p> <p>Current and future deferred vested non-reciprocal members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit.</p> <p>25% of future General and 50% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocal members, 3.65% and 4.05% compensation increases are assumed per annum for General and Safety members, respectively.</p>
Future Benefit Accruals:	1.0 year of service per year of employment, plus 0.003 years of additional service for General members and 0.007 years of additional service for Safety members, to anticipate conversion of unused sick leave for each year of employment.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male. If not provided, salary is assumed to be equal to the average salary of the membership group.
Inclusion of Deferred Vested Members:	All deferred vested members are included in the valuation.
Data Adjustment:	Data as of November 30 has been adjusted to December 31 by adding one month of age and, for active members, one month of service.
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married:	For all active and inactive members, 70% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.
Age and Gender of Spouse:	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.

Retiree Health Assumptions

Retiree Medical Coverage Election:	Rate	
	Under Age 65	80%
	Age 65 & Over	90%
	50% of eligible retirees under age 65 without medical coverage are assumed to elect medical coverage upon reaching age 65.	
Age and Gender of Spouse:	For future retirees, male members are assumed to have a female spouse who is 3 years younger than the member, and female members are assumed to have a male spouse who is 1 year older than the member.	
Spousal Coverage	Of the future retirees who elect to continue their medical coverage at retirement, 40% males and 20% females were assumed to have an eligible spouse who also opts for health coverage at that time.	

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Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of administrative and investment expenses. Expected administrative and investment expenses represent about 0.30% of the Actuarial Value of Assets.
Employee Contribution Crediting Rate:	7.00%, compounded semi-annually.
Cost of Living Adjustment:	Retiree COLA increases are subject to a 2.75% maximum change per year for General Tier 1, General Tier 3, and Safety Tier 1, and 2% maximum change per year for General Tier 2, General Tier 4, Safety Tier 2, Safety Tier 2C, Safety Tier 2D, and Safety Tier 4. (For General Tier 1, General Tier 3, and Safety Tier 1 members with a sufficient COLA bank, withdrawals from the bank can be made to increase the retiree COLA up to 3% per year.)
Payroll Growth:	Inflation of 2.50% per year plus real “across the board” salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.50% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.50% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes:

- Inflation at 2.50%, plus
- “Across the board” salary increases of 0.50% per year, plus
- The following merit and promotion increases:

Years of Service	Rate (%)	
	General	Safety
Less than 1	5.00	8.40
1 – 2	5.00	8.40
2 – 3	4.40	8.40
3 – 4	3.00	5.40
4 – 5	2.10	4.00
5 – 6	1.60	2.50
6 – 7	1.50	1.80
7 – 8	1.50	1.60
8 – 9	1.20	1.20
9 – 10	1.00	1.20
10 – 11	0.85	1.00
11 & Over	0.45	1.00

Additional Cashout Assumptions:

Additional pay elements are expected to be received during a member’s final average earnings period. The percentages, added to the final average salary, are:

	Service Retirement	Disability Retirement
General Tier 1	5.0%	4.0%
General Tier 2	2.7%	1.0%
General Tier 3	5.0%	4.0%
General Tier 4	N/A	N/A
Safety Tier 1	6.0%	5.0%
Safety Tier 2	2.3%	2.2%
Safety Tier 2C	2.3%	2.2%
Safety Tier 2D	2.3%	2.2%
Safety Tier 4	N/A	N/A

Demographic Assumptions

Post-Retirement Mortality Rates:

For the Statutory Retirement Plan Benefits:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Tables (separate tables for males and females) with rates decreased 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Beneficiary

- **Beneficiaries not Currently in Pay Status:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Beneficiaries Currently in Pay Status:** Pub-2010 General Contingent Survivor Amount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For the Discretionary SRBR OPEB Benefits:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Headcount-Weighted Mortality Tables (separate tables for males and females) with rates decreased 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Post-Retirement Mortality Rates: (continued)

For the Discretionary SRBR OPEB Benefits: (continued)

Beneficiary

- **Beneficiaries not Currently in Pay Status:** Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Beneficiaries Currently in Pay Status:** Pub-2010 General Contingent Survivor Headcount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Pre-Retirement Mortality Rates:

For the Statutory Retirement Plan Benefits:

- **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.01
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.04	0.02
35	0.04	0.02	0.04	0.03
40	0.06	0.03	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.13	0.08	0.10	0.08
55	0.19	0.11	0.15	0.11
60	0.28	0.17	0.23	0.14
65	0.41	0.27	0.35	0.20

Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

All pre-retirement deaths are assumed to be non-service-connected.

For the Discretionary SRBR OPEB Benefits:

- **General Members:** Pub-2010 General Employee Headcount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety Members:** Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

Pre-Retirement Mortality Rates: (continued)

For the Discretionary SRBR OPEB Benefits: (continued)

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.02
25	0.03	0.01	0.03	0.02
30	0.04	0.02	0.04	0.02
35	0.05	0.02	0.04	0.03
40	0.06	0.04	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.14	0.08	0.11	0.08
55	0.20	0.12	0.15	0.11
60	0.29	0.18	0.24	0.16
65	0.42	0.28	0.38	0.22

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Tables (separate tables for males and females) with rates increased by 5% for males, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 75% male and 25% female.

Disability Incidence Rates:

Age	Rate (%)	
	General	Safety
20	0.00	0.00
25	0.01	0.03
30	0.02	0.38
35	0.05	0.96
40	0.08	1.50
45	0.13	1.70
50	0.21	2.33
55	0.31	3.62
60	0.35	4.44
65	0.44	0.00
70	0.62	0.00

70% of General disabilities are assumed to be service connected disabilities. The other 30% are assumed to be non-service connected disabilities.

100% of Safety disabilities are assumed to be service connected disabilities.

Termination Rates:

Years of Service	Rate (%)	
	General	Safety
Less than 1	12.25	5.20
1 – 2	9.25	4.20
2 – 3	8.00	4.20
3 – 4	6.25	4.00
4 – 5	6.25	4.00
5 – 6	6.25	4.00
6 – 7	5.75	4.00
7 – 8	5.00	2.40
8 – 9	4.00	2.00
9 – 10	4.00	2.00
10 – 11	4.00	2.00
11 – 12	4.00	2.00
12 – 13	3.25	2.00
13 – 14	3.25	2.00
14 – 15	3.25	2.00
15 – 16	3.25	1.50
16 – 17	3.00	1.40
17 – 18	3.00	1.30
18 – 19	3.00	1.20
19 – 20	2.75	1.10
20 or more	2.75	1.00

For members with less than five years of service, 55% of all terminated members are assumed to choose a refund of contributions and the other 45% are assumed to choose a deferred vested benefit. For members with five or more years of service, 25% of all terminated members are assumed to choose a refund of contributions and the other 75% are assumed to choose a deferred vested benefit.

No termination is assumed after a member is eligible for retirement.

Retirement Rates:

		Rate (%)				
		General				
Age	Tier 1	Tier 2		Tier 3	Tier 4	
		Less than 30 Years of Service	30 or More Years of Service		Less than 30 Years of Service	30 or More Years of Service
50	2.0	1.5	3.0	10.0	0.0	0.0
51	4.0	1.5	3.0	10.0	0.0	0.0
52	4.0	2.0	3.0	10.0	3.0	3.0
53	5.0	2.0	3.0	10.0	2.0	2.0
54	5.0	2.5	3.0	10.0	2.0	2.0
55	6.0	3.0	5.0	12.0	2.0	5.0
56	10.0	3.5	5.0	14.0	2.0	2.5
57	14.0	4.0	5.0	16.0	2.0	3.5
58	14.0	4.5	7.0	18.0	4.0	4.0
59	14.0	5.0	10.0	20.0	4.0	4.5
60	25.0	7.5	12.0	20.0	4.0	5.0
61	25.0	9.5	12.0	20.0	4.0	5.0
62	30.0	15.0	23.0	30.0	12.0	18.0
63	26.0	15.0	25.0	25.0	12.0	15.0
64	26.0	17.0	28.0	25.0	12.0	17.0
65	26.0	27.0	35.0	50.0	23.0	25.0
66	26.0	27.0	35.0	50.0	23.0	30.0
67	26.0	27.0	35.0	50.0	23.0	30.0
68	26.0	30.0	35.0	50.0	23.0	30.0
69	31.0	30.0	35.0	50.0	20.0	30.0
70	36.0	30.0	30.0	60.0	20.0	25.0
71	36.0	30.0	30.0	60.0	20.0	25.0
72	36.0	30.0	30.0	60.0	20.0	25.0
73	36.0	30.0	30.0	60.0	20.0	25.0
74	36.0	30.0	30.0	60.0	20.0	25.0
75 & Over	100.0	100.0	100.0	100.0	100.0	100.0

The retirement rates only apply to members who are eligible to retire at the age shown.

**Retirement Rates
(continued):**

		Rate (%)				
		Safety				
Age	Tier 1	Tier 2, 2D		Tier 2C	Tier 4	
		Less than 30 Years of Service	30 or More Years of Service		Less than 30 Years of Service	30 or More Years of Service
45	0.0	2.0	0.0	0.0	0.0	0.0
46	0.0	2.0	0.0	0.0	0.0	0.0
47	0.0	2.0	0.0	0.0	0.0	0.0
48	0.0	4.0	0.0	0.0	0.0	0.0
49	0.0	10.0	18.0	0.0	0.0	0.0
50	35.0	14.0	18.0	4.0	4.0	4.0
51	30.0	10.0	24.0	2.0	2.0	2.0
52	25.0	10.0	24.0	2.0	2.0	2.0
53	35.0	10.0	25.0	3.0	3.0	3.0
54	45.0	11.0	27.0	6.0	6.0	6.0
55	45.0	11.0	29.0	10.0	10.0	10.0
56	45.0	12.0	32.0	12.0	12.0	12.0
57	45.0	12.0	32.0	20.0	20.0	20.0
58	45.0	14.0	37.0	10.0	10.0	10.0
59	45.0	14.0	37.0	15.0	15.0	15.0
60	45.0	30.0	37.0	40.0	40.0	60.0
61	45.0	30.0	37.0	40.0	40.0	60.0
62	45.0	30.0	37.0	40.0	40.0	60.0
63	45.0	30.0	37.0	40.0	40.0	60.0
64	45.0	30.0	37.0	40.0	40.0	60.0
65 & Over	100.0	100.0	100.0	100.0	100.0	100.0

The retirement rates only apply to members who are eligible to retire at the age shown.

Safety Tiers 1 and 2C retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Retirement Age and Benefit for Deferred Vested Members:	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p>General Non-Reciprocal Retirement Age: 62 General Reciprocal Retirement Age: 61 Safety Non-Reciprocal Retirement Age: 56 Safety Reciprocal Retirement Age: 55</p> <p>Current and future deferred vested non-reciprocal members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit.</p> <p>20% of future General and 45% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocal members, 3.45% and 4.00% compensation increases are assumed per annum for General and Safety members, respectively.</p>
Future Benefit Accruals:	1.0 year of service per year of employment, plus 0.003 years of additional service for General members and 0.006 years of additional service for Safety members, to anticipate conversion of unused sick leave for each year of employment.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male. If not provided, salary is assumed to be equal to the average salary of the membership group.
Inclusion of Deferred Vested Members:	All deferred vested members are included in the valuation.
Data Adjustment:	Data as of November 30 has been adjusted to December 31 by adding one month of age and, for active members, one month of service.
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married:	For all active and inactive members, 70% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.
Age and Gender of Spouse:	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.

Retiree Health Assumptions

Retiree Medical Coverage Election:	Rate	
	Under Age 65	75%
	Age 65 & Over	90%
	60% of eligible retirees under age 65 without medical coverage are assumed to elect medical coverage upon reaching age 65.	
Age and Gender of Spouse:	For future retirees, male members are assumed to have a female spouse who is 3 years younger than the member, and female members are assumed to have a male spouse who is 1 year older than the member.	
Spousal Coverage	Of the future retirees who elect to continue their medical coverage at retirement, 35% males and 15% females were assumed to have an eligible spouse who also opts for health coverage at that time.	

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