SUBMITTAL TO THE BOARD OF SUPERVISORS
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

ITEM: 3.10
(ID # 21220)
MEETING DATE:
Tuesday, February 28, 2023

FROM : EXECUTIVE OFFICE:

SUBJECT: EXECUTIVE OFFICE: Pension Advisory Review Committee (PARC) 2023 Annual Report, All Districts. [$0]

RECOMMENDED MOTION: That the Board of Supervisors:

1. Receive and file the PARC 2023 Annual Report.

2. Direct staff and PARC to report back with any additional updates or recommendations on the County's pension plans, Other Post-Employment Benefits (OPEB), or any other item as noted in Board Policy B-25 including pension debt reduction strategies.

3. Direct staff to review the annual CalPERS unfunded liability pre-payment for FY 23/24 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing, or, with the FY 23/24 budget.

ACTION:

Don Kent, Director of Finance 2/15/2023

MINUTES OF THE BOARD OF SUPERVISORS

On motion of Supervisor Perez, seconded by Supervisor Gutierrez and duly carried by unanimous vote, IT WAS ORDERED that the above matter is approved as recommended.

Ayes:	Jeffries, Spiegel, Washington, Perez and Gutierrez
Nays:	None
Absent:	None
Date:	February 28, 2023
xc:	E.O.

Kimberly Rector
Clerk of the Board
By: Deputy

SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

FINANCIAL DATA	Current Fiscal Year:	Next Fiscal Year:	Total Cost:	Ongoing Cost
COST	$ 0	$ 0	$ 0	$ 0
NET COUNTY COST	$ 0	$ 0	$ 0	$ 0
SOURCE OF FUNDS: N/A			Budget Adjustment:	No
			For Fiscal Year:	22/23

C.E.O. RECOMMENDATION: Approve

BACKGROUND:

Summary

Established in 2003 to guide policy decisions about the County's defined benefit pension plans and make recommendations to the Board, the PARC is a Brown Act committee which consists of the County Executive Office (Chair), Treasurer-Tax Collector, Director of Human Resources, Auditor-Controller, and a local safety member department representative (the Undersheriff).

Board Policy B-25, Pension Management and Other Post-Employment Benefits (OPEB), requires the PARC to prepare an annual public report regarding the status of the County's defined benefit pension plans with CalPERS, OPEB, the Temporary and Part-Time Employees' Retirement Plan and the Section 115 Pension Trusts.

Key components of the report include updated funded status and projected cost increases or decreases. In addition, the PARC reviews the annual CalPERS unfunded liability pre-payment for which the County receives a discount if it pays a lump sum at the beginning of the fiscal year. Also included are other noteworthy items in the Executive Summary as shown below.

Highlights - for the reporting period ended June 30, 2021, from the prior year there was a:

- 10.2% combined *increase* in CalPERS funded status from 76.4% to 86.6%
- $14.5 million *additional investment* in the Section 115 Pension Trust from Series 2020 POBs savings (1)
- $68.1 million *net estimated gain* on Series 2020 POBs (2)
- $1.19 billion combined *decrease* in CalPERS unfunded actuarial accrued liability (UAAL)
- $2.24 billion combined *increase* in the CalPERS market value of assets (MVA)

The report also addresses other areas including status on the:

- Series 2005 A and Series 2020 Pension Obligation Bonds (POBs)
    - Combined POB proceeds total net estimated gain of $256 million ($114 million YoY *decrease*) (2)
- Section 115 Trusts (3)
    - $62.3 million in combined Pension Trust balances ($10.9 million YoY *increase*)
    - $76.4 million OPEB Trust balance ($2.7 million YoY *increase*)
- Other Post-Employment Benefits (OPEB) (Attachment 4) (3)
    - 58.2% funded status (11% YoY *increase*)
- Part-time and Temporary Employees' Retirement Plan (Attachment 5) (4)
    - 81.6% funded status (0.1% YoY *increase*)
- Special District Plans found in the latter portion of the report

(1) Savings attributable to the issuance of Series 2020 POBs for the period ended 6/30/22.
(2) Projected as of the next POBs interest payment due date, 2/15/23. Source: Attachment 1, Slide #89 & #92. County of Riverside - CalPERS Miscellaneous and Safety Plans. Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc. Year-to-year performance will vary based on CalPERS' investment return.
(3) Actual, as of June 30, 2022.
(4) Actual, as of July 1, 2022.

FY 23/24 Year-over-Year Increase - The projected year-over-year employer contribution rate increase as a percentage of payroll, which includes CalPERS' rates and pension obligation bond (POB) debt service is 0.20% for the Miscellaneous Plan, and, 1.00% for Safety.

Annual Pre-Payment - For FY 23/24, the County will again participate in the early payment discount offered by CalPERS (approximately 3.2%) on the unfunded liability portion due for the fiscal year, thereby reducing the total amount owed by potentially over $4 million. This is in lieu of periodic payments that would have otherwise coincided with payroll disbursements.

Summary - Over the next five years, the Miscellaneous and Safety pension plan contribution rates are projected to increase by a total of 1.8%, and 5.4% respectively (see discussion on pages 5-6 in the report). Based upon several factors, the long-term pension outlook remains favorable, with increases projected to peak early in the next decade. The funded status is now anticipated to be more than 80% within ten years, which has suffered a setback due to the negative investment returns experienced in FY 21/22.

Projections will be tempered by year-to-year financial market performance impacting investment returns, especially given the current backdrop of the U.S economy and with the U.S. Federal Reserve determined to tamp down forty plus year highs in inflation.

Impact on Residents and Businesses

Pension and related costs have budgetary impacts across all departments, and as a result, have impacts on the costs of services that are provided to citizens and residents of the County. Since the PARC's inception, recommendations adopted by the Board over time have resulted in a substantial amount of savings that likely would not have otherwise materialized.

ATTACHMENTS:

1. Pension Advisory Review Committee 2023 Annual Report
2. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.
3. CalPERS - Miscellaneous Plan - County of Riverside Annual Valuation Report as of June 30, 2021
4. CalPERS - Safety Plan - County of Riverside Annual Valuation Report as of June 30, 2021
5. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2022 - AON
6. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2022 – AON

SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

Michael Ambolo

Michael Ambolo, Chief Finance Officer 2/15/2023

Pension Advisory Review Committee

2023

Annual Report

February 28, 2023

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In accordance with Board of Supervisors Policy B-25, the Pension Advisory Review Committee (PARC) presents this annual report to provide a comprehensive status of the County's defined benefit pension plans (CalPERS Miscellaneous and Safety, as well as the Part-time and Temporary Employees' Retirement Plan - TAP), its associated investment trust accounts held outside the pension plans (Section 115 Pension Trusts and TAP), and, the County's Other Post Employment Obligations (OPEB). Independent analysis has been provided by Foster & Foster, Inc. (see Attachment 1), AON and Fieldman, Rolapp & Associates. Included are the most recent annual valuation reports from CalPERS (Attachments 2 & 3) as well as AON (Attachments 4 & 5).

In summary, despite the past year's financial market reversals experienced by most long-term investors, the County's retirement plans are projected to remain on a solid footing as measured by funding status, and the long-term trends to remain intact for that key indicator of pension plan health. In addition, even in the face of annual cost increases, prior pension reform measures of the past decade are expected to keep those costs under control and bend the cost curve downward in the coming years.

Highlights – for the reporting period ended June 30, 2021, from the prior year there was a:

- **10.2% combined *increase* in CalPERS funded status from 76.4% to 86.6%.**
- **$14.5 million *additional investment* in the Section 115 Pension Trust from Series 2020 POBs savings** (1)
- **$68.1 million *net estimated gain* on Series 2020 POBs** (2)
- **$1.19 billion combined *decrease* in CalPERS unfunded actuarial accrued liability (UAAL)**
- **$2.24 billion combined *increase* in the CalPERS market value of assets (MVA)**

This report also addresses other areas including status on the:

- Series 2005 A and Series 2020 Pension Obligation Bonds (POBs)
  - **Combined POB proceeds total net estimated gain of $256 million ($114 million YoY decrease)** (2)
- Section 115 Trusts (3)
  - **$62.3 million in combined Pension Trust balances ($10.9 million YoY increase)**
  - **$76.4 million OPEB Trust balance ($2.7 million YoY increase)**
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  - **58.2% funded status (11% YoY increase)**
- Part-time and Temporary Employees' Retirement Plan (Attachment 5) (4)
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(3) Actual, as of June 30, 2022.
(4) Actual, as of July 1, 2022.

FY 23/24 Year-over-Year Increase – The projected year-over-year employer contribution rate increase as a percentage of payroll for the Miscellaneous and Safety Plans, which includes CalPERS' rates and POB debt service (see table on page 5) is:

- **Miscellaneous Plan 0.20%**
- **Safety Plan 1.00%**

Annual Pre-payment – For FY 23/24, CalPERS will offer an early payment discount of approximately 3.2% on the unfunded liability portion due for the fiscal year, **thereby reducing the total amount owed by potentially over $4 million**. This is in lieu of periodic payments that coincide with payroll disbursements.

In order to fund the initial payment, the County typically includes a substantial portion of the pre-payment amount as part of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing. The other alternative would be to borrow internally by drawing down General Fund cash. The TRAN financing typically carries a lower cost. A final recommendation regarding the pre-payment will be made in conjunction with the FY 23/24 TRANs.

Recent news of interest:

- **November 15, 2022 – CalPERS announces net investment return of -7.5% for the 2021-22 fiscal year**
- **November 3, 2022 - Moody's Investors Service upgrades County of Riverside Series 2005 A and Series 2020 Pension Obligation Bonds from A1 to Aa2.**
- **July 20, 2022 – CalPERS announces preliminary net investment return of -6.1% for the 2021-22 fiscal year.**

Summary - **Over the next five years, the Miscellaneous and Safety pension plan contribution rates are projected to increase by a total of 1.8%, and 5.4% respectively (see discussion on pages 5-6). Based upon several factors, the long-term pension outlook remains favorable, with increases projected to peak early in the next decade. The funded status is now anticipated to be more than 80% within ten years, which has suffered a setback due to the negative investment returns experienced in FY 21/22. Projections will be tempered by year-to-year financial market performance impacting investment returns, especially given the current backdrop of the U.S economy and with the U.S. Federal Reserve determined to tamp down forty plus year highs in inflation.**

Staff and the PARC will continue to look for strategic options for managing its long-term costs of the County's pensions and related liabilities.

RECOMMENDATIONS

1. Receive and file the 2023 PARC Annual Report.
2. Direct staff and PARC to report back with any additional updates or recommendations on the County's pension plans, Other Post-Employment Benefits (OPEB), or any other item as noted in Board Policy B-25 including pension debt reduction strategies.
3. Direct staff to review the annual CalPERS unfunded liability pre-payment for FY 23/24 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing, or, with the FY 23/24 budget.

STATUS OF THE COUNTY'S MISCELLANEOUS AND SAFETY PLANS - COMBINED

For the annual valuation report ended June 30, 2021, the $2.24 billion increase in MVA, $1.19 billion decrease in UAAL, and, corresponding 10.2% increase in funded status to 86.6% (1) with CalPERS was primarily due to a combination of the deposit of the 2020 POB proceeds, and CalPERS' investment performance. There is an offset to the corresponding debt owed to bondholders as shown in the net Funded Status, albeit at a substantially lower interest cost.

		Actual	Projected	
For the valuation report ended June 30 ($ in billions)	2020	**2021**	2022	2023
Total actuarial accrued liability (AAL)	$13.03	**$14.08**	$14.82	$15.59
Total market value of assets (MVA)	$9.96	**$12.20**	$11.41	$12.16
Total unfunded actuarial accrued liability (UAAL)	$3.08	**$1.88**	$3.41	$3.43
Funded Status – gross	76.4%	**86.6%(1)**	77.0%	78.0%
Funded Status – net	69.2%	**80.4%(2)(3)**	71.5%(3)	73.2%

(1) Does not include POB liability. Miscellaneous Plan is 85.6%, Safety Plan is 88.9%.
(2) Includes POB liability. Miscellaneous Plan is 80.3%, Safety Plan is 80.5%.
(3) Amounts exclude Section 115 Pension Trust balances of $51.5 million at 6/30/2021, and, $62.4 million at 6/30/22. If included, the net funded status would be 80.7% and 71.9% at 6/30/21 and 6/30/22, respectively.

The CalPERS annual valuation reports have a one-year lag. **For the period ending June 30, 2022, the County's independent actuary, Foster & Foster, Inc. rolled forward the report with actual investment performance data as published by CalPERS in July 2022 and is projecting a substantial decrease in MVA, increase in UAAL and decrease in funded status as a result of the -6.1% preliminary net investment return earned by CalPERS.** For the period ending June 30, 2023, the projection is based on CalPERS' 7% assumed rate of return. This will be further updated after the close of the fiscal year when the next report is produced.

For comparison, an analysis of the average gross funded ratio of all other counties that participate in CalPERS was performed for the period ended June 30, 2021. The research shows the average of thirty-three other counties in the Miscellaneous Plan was 77.8%, vs. the County at 85.6% (+7.8%), while seventeen other counties in the Safety Plan was 76.7%, vs. the County at 88.9% (+12.2%).

CALPERS INVESTMENT RETURNS

The primary driver of the rate formula is CalPERS' investment performance. For a given benefit level, actuarial and demographic assumptions impact the rate, but far less than performance. Since the County's benefit levels have been essentially frozen since the adoption of PEPRA in 2012, variation in funding levels and employer rate have been primarily attributable to investment returns. Current projections assume no deviation from the current three benefit levels.

Poor investment performance following the 2008-2009 financial crisis significantly increased the County's unfunded liability, driving up the required payments. Likewise, strong investment performance such as CalPERS' 21.3% return for the period ended June 30, 2021 (the highest level in over twenty years – see table below) had a substantial positive impact on the County's MVA, UAAL and funded status.

For the fiscal year ending June 30, 2022, CalPERS' final net investment return of -7.5% will show up in next years' CalPERS annual valuation reports, and the 2024 PARC Annual Report. The investment loss attributable to FY 21/22 will cancel out any gains from the prior year. Per CalPERS, there will be a five-year phase-in of the FY 20/21 investment gain, as well as the FY 21/22 investment loss.

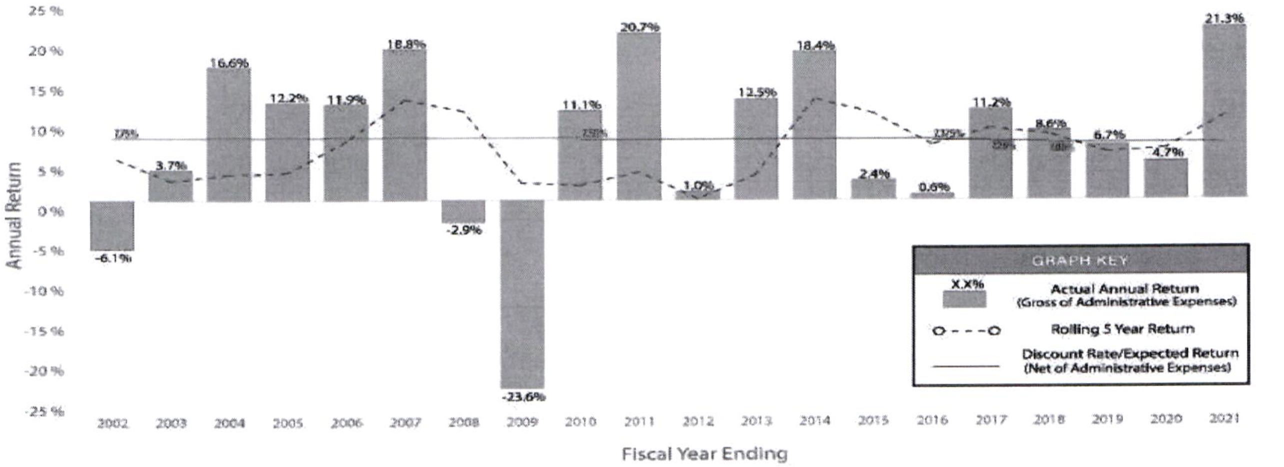
The table on the next page provides annual returns from the most recent CalPERS Annual Valuation Report as of June 30, 2021.

History of CalPERS Compound Annual Rates of Return

1 year	5 year	10 year	20 year	30 year
21.3%	10.3%	8.5%	6.9%	8.4%

The graph below illustrates the 20-year historical annual returns each fiscal year ending June 30.

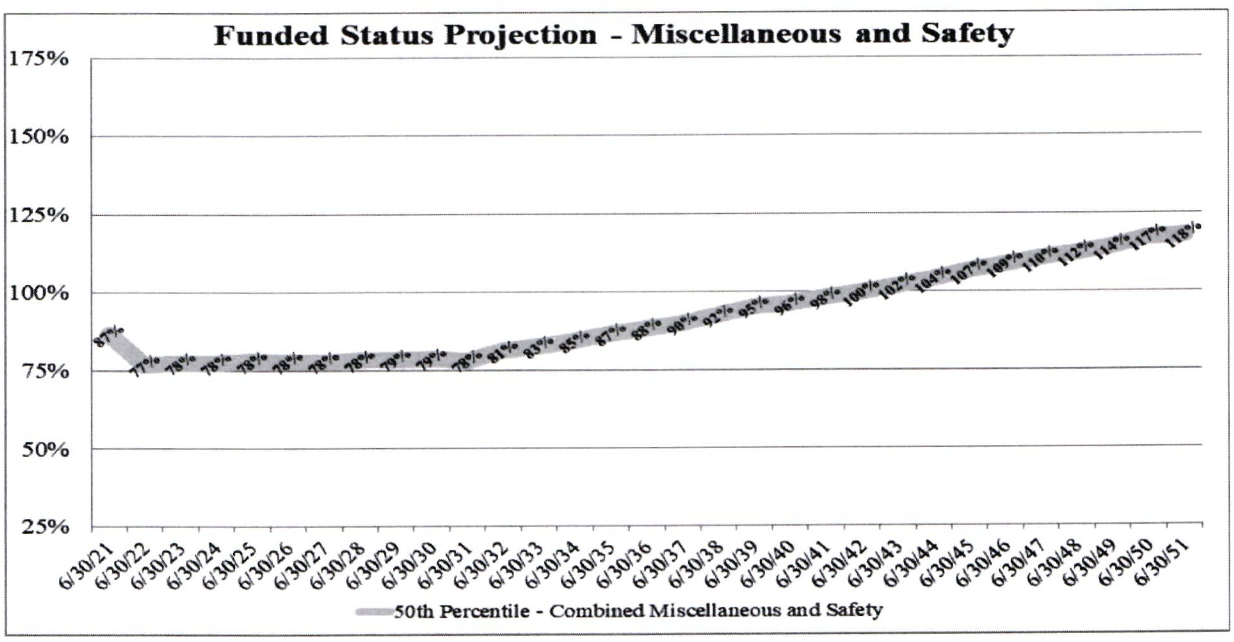
History of Investment Returns (2002 - 2021)



Source: CalPERS Annual Valuation Report as of June 30, 2021.

FUNDED STATUS

While recent investment underperformance will cause a reduction in the combined funded status in the near term, **the chart below suggests a return to 80% within the next decade while maintaining a strong funded position until that point.** The trajectory is the same on a net basis as POB debt service declines every single year through final maturity in 2038. Based upon these updated projections, the Plans would reach 100% funding in 2042.



Source: Attachment 1, Slide #83. County of Riverside - CalPERS Miscellaneous and Safety Plans.
Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.
50th percentile assumes CalPERS earns 7% through 6/30/23, 6.80% beginning 7/1/23 and gradually declining to 6% within twenty years.

EMPLOYER CONTRIBUTION RATE OUTLOOK

The FY 23/24 employer contribution rate as a percentage of payroll for the Miscellaneous Plan is 28.20% (a 0.20% increase from prior year), **while the Safety Plan is 48.2%** (a 1.00% increase from prior year) as shown in the table below. The decline in the rate of growth from prior years is primarily due to the payoff of certain amortization bases (separate payment schedules) from the proceeds of the Series 2020 POBs, reducing the unfunded liability portion of the contribution rate. **Going forward, note the significant projected increase in rates (particularly the Safety Plan) vs. the prior PARC Report for the period FY 23/24 – FY 32/33 which is attributable to the -6.1% preliminary investment return earned by CalPERS in FY 21/22.**

Graphical representation of these rates for both plans follow on pages 7 - 11.

	Miscellaneous Plan			Safety Plan		
FY	Rate [1]	Change from prior FY (+/-)	Difference from 2022 PARC Report projection	Rate [2]	Change from prior FY (+/-)	Difference from 2022 PARC Report projection
17/18	19.40%[3]	0.30%	N/A	30.30%[3]	1.50%	N/A
18/19	21.20%[3]	1.80%	N/A	33.70%[3]	3.40%	N/A
19/20	23.90%[3]	2.70%	N/A	39.70%[3]	6.00%	N/A
20/21	26.30%[3]	2.40%	0.00%	43.40%[3]	3.70%	0.00%
21/22	27.60%[3]	1.30%	0.00%	46.20%[3]	2.80%	0.00%
22/23	28.00%[3]	0.40%	-1.00%	47.20%[3]	1.00%	-1.30%
23/24	**28.20%[3]**	**0.20%**	**0.10%**	**48.20%[3]**	**1.00%**	**1.10%**
24/25	28.40%	0.20%	1.70%	49.10%	0.90%	4.10%
25/26	27.90%	-0.50%	2.90%	49.10%	0.00%	6.10%
26/27	28.90%	1.00%	4.20%	51.00%	1.90%	8.60%
27/28	29.80%	0.90%	5.70%	52.60%	1.60%	11.00%
28/29	32.20%	2.40%	7.20%	56.70%	4.10%	13.40%
29/30	32.90%	0.70%	7.10%	58.20%	1.50%	13.60%
30/31	33.50%	0.60%	6.70%	59.10%	0.90%	13.00%
31/32	33.50%	0.00%	6.20%	59.90%	0.80%	12.00%
32/33	34.00%	0.50%	6.00%	60.10%	0.20%	11.10%
33/34	33.90%	-0.10%	N/A	60.00%	-0.10%	N/A

(1) Includes Miscellaneous Plan POBs debt service which ranges from 1.4% to 5.1% of the total rate from FY 22/23 to FY 33/34.
(2) Includes Safety Plan POBs debt service which ranges from 4.9% to 10.9% of the total rate from FY 22/23 to FY 33/34.
(3) Actual rates shown for FY 17/18 through FY 23/24.

EMPLOYER CONTRIBUTION RATE OUTLOOK (continued)

For the Miscellaneous and Safety plans, the following pages show a comparison of the most recent valuation report, 2021 vs. prior year 2020 for:

- projected employer contribution rates expressed as a percentage with the three components that comprise the total amount (POBs debt service, normal cost and unfunded liability), over the next decade
- projected employer contribution rates with a longer-term view of thirty years
- projected employer contributions expressed in dollars over the next decade

In most instances of comparisons vs. the prior year, there is substantial change in the trajectory of projected contributions. The negative investment return earned by CalPERS in FY 21/22 is having an adverse impact. As shown on page 12, for the period of FY 22/23 through FY 32/33, the cumulative Miscellaneous and Safety payments are projected to increase by $152 million.

The projections of CalPERS rates going forward are based upon Foster & Foster's model which incorporates the expected return, a less than expected return, and an above average return. **In all of the 2021 contribution rate charts, 50th percentile (bold green line) assumes CalPERS earns 7% through 6/30/23, 6.80% (which is the new discount rate) beginning 7/1/23, and gradually declines to 6% within twenty years, a conservative projection given current trends. All include both 2005 and 2020 POB proceeds invested with CalPERS, as well as the POBs associated debt service. Note, that even with very poor investment returns (represented in the 25th percentile on pages 7 & 10) the projected rates exhibit a long-term decline which begins in the mid 2030's.** These long-term projections reflect the increasing impact of the changes made to the benefit formulas in the last decade, as more of the employee population becomes subject to Tier III Public Employees' Pension Reform Act (PEPRA) as well as the unfunded liability being paid down.

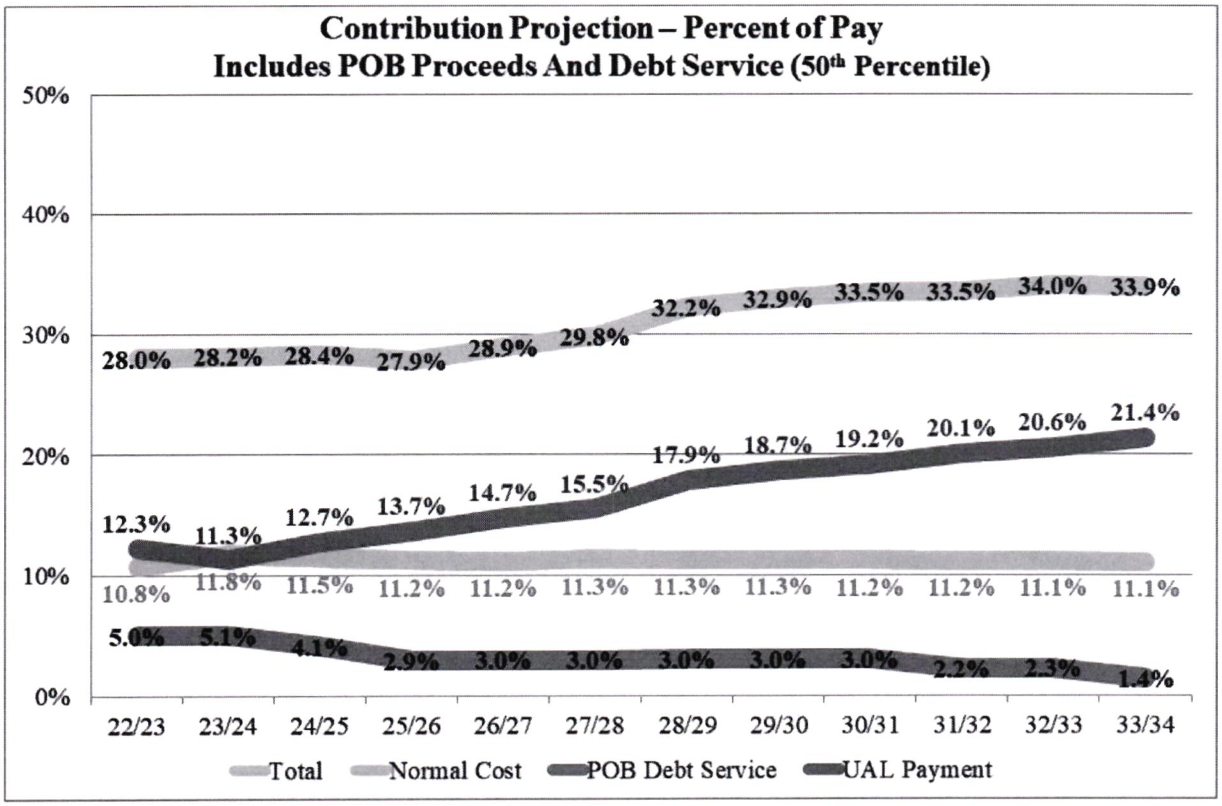
In analyzing the trends, it is helpful to focus on the three components of the rate: debt service on the POBs, the normal cost, and the UAAL payment. The POB debt service is derived from a fixed schedule and shows declines over the period with final maturities of 2035 and 2038 reflected in the thirty-year projection. Debt service of both series of bonds is also incorporated in the charts on pages 8 & 11. The normal cost is relatively constant with modest declines reflecting the transition to a greater number of lower benefit Tier III employees. Currently, the UAAL reflects scheduled payments to amortize net losses (which are a combination of investment gains and losses), and any demographic changes which resulted in a gain or loss. At the end of each year, CalPERS "trues up" its actual versus projected performance, and books gains or losses which are then amortized over time. In the following pages, year over year comparisons of the rate components for both the Miscellaneous and Safety Plans are included. The charts make it plain to see that the vast majority of year over year increase is caused by the higher payment necessary to amortize the UAAL.

Miscellaneous Rates

Short-term - Over the decade the contribution rate is projected to average 31.2% with a low of 27.9% in 2025, and a peak of 34% in 2032 (as shown on page 7).

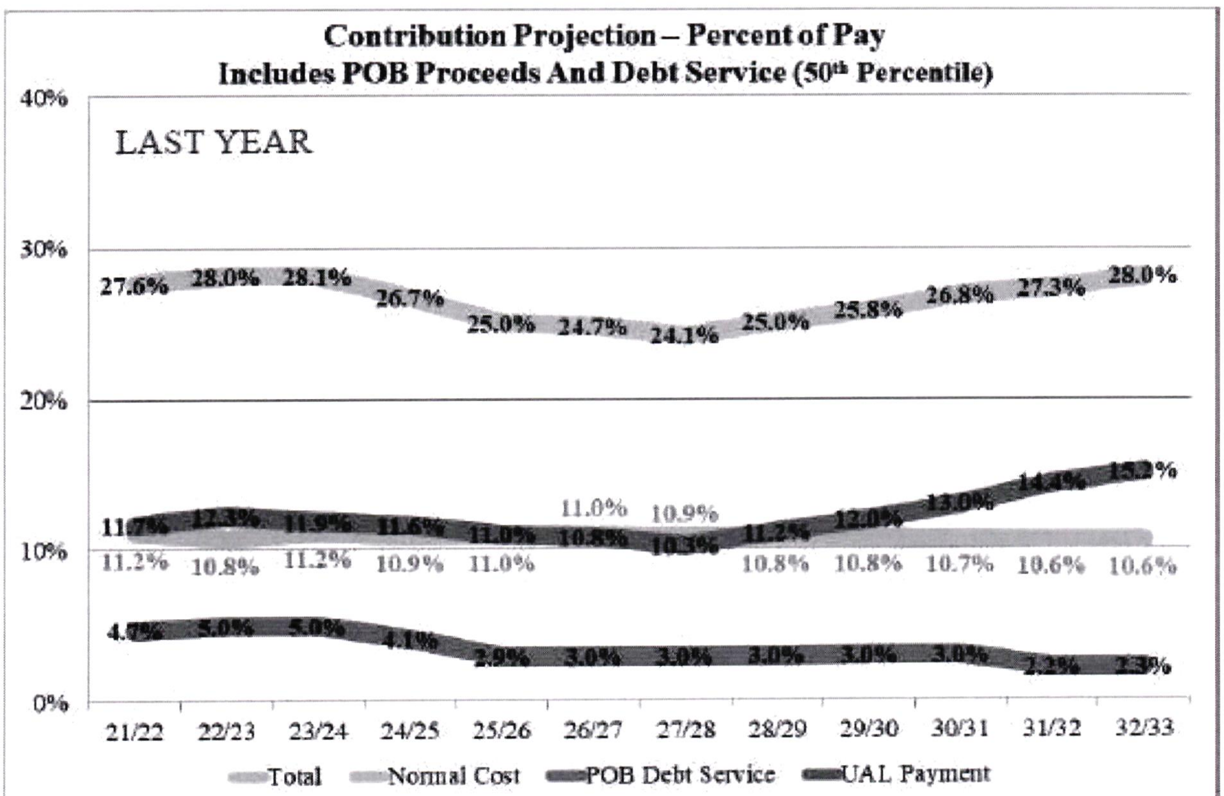
Long-term - In looking at the long-term forecast as shown on page 8, there is a substantial drop in rates beginning eleven years out under all three return scenarios. Even under the 25th percentile (poor performance scenario), rates peak at approximately 43.6% in 2032 and then decline thereafter to reach approximately 15.2% in 2052. This is due to three factors. The first is the final repayments of POBs in 2035 and 2038. The second is the amortization (paydown) of the exiting UAAL schedules over the next thirty years. In the poor performance scenario, the old UAAL is replaced by a new UAAL to reflect future CalPERS investment underperformance. The third is the ultimate retirement of the higher cost Tier I employees and their replacement with much lower cost Tier III employees. For the expected return scenario (50th percentile), the rate will rise modestly until 2032 at which point, they begin a rapid decline until stabilizing in 2042. At that point, the rate is comprised of only the normal cost of approximately 10% since all of the POBs have been retired, and the UAAL has been fully amortized.

Miscellaneous Plan – 2021



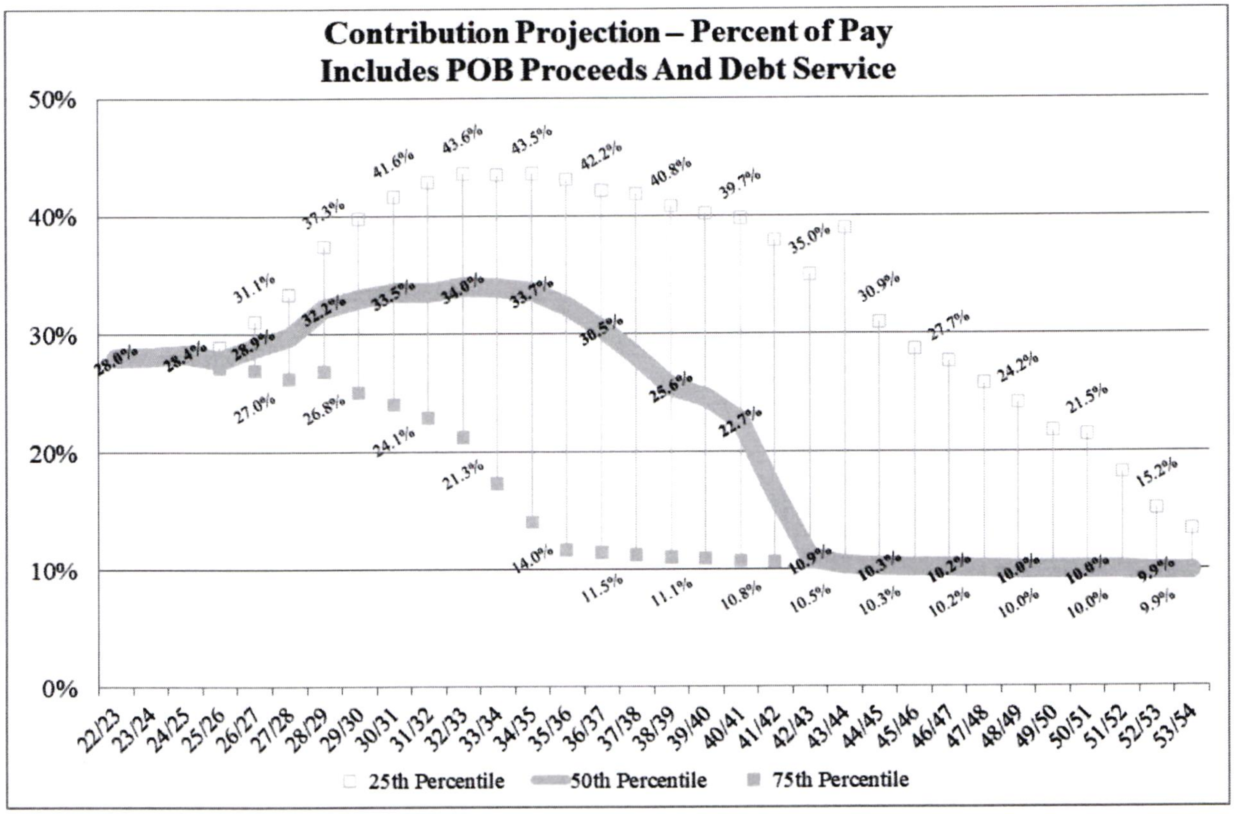
Source: Attachment 1, Slide #41. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

Miscellaneous Plan – 2020



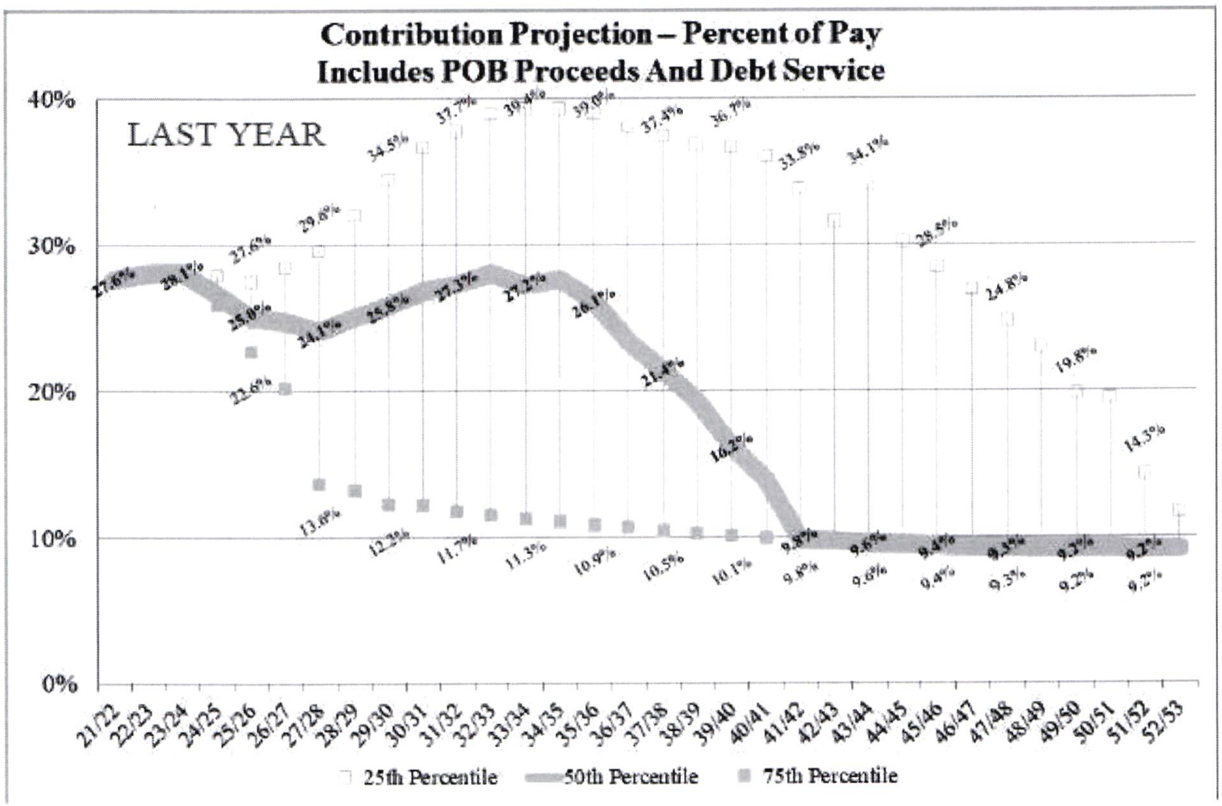
Source: Attachment 1, Slide #42. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Foster & Foster, Inc.

Miscellaneous Plan – 2021



Source: Attachment 1, Slide #39. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

Miscellaneous Plan – 2020



Source: Attachment 1, Slide #40. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Foster & Foster, Inc.

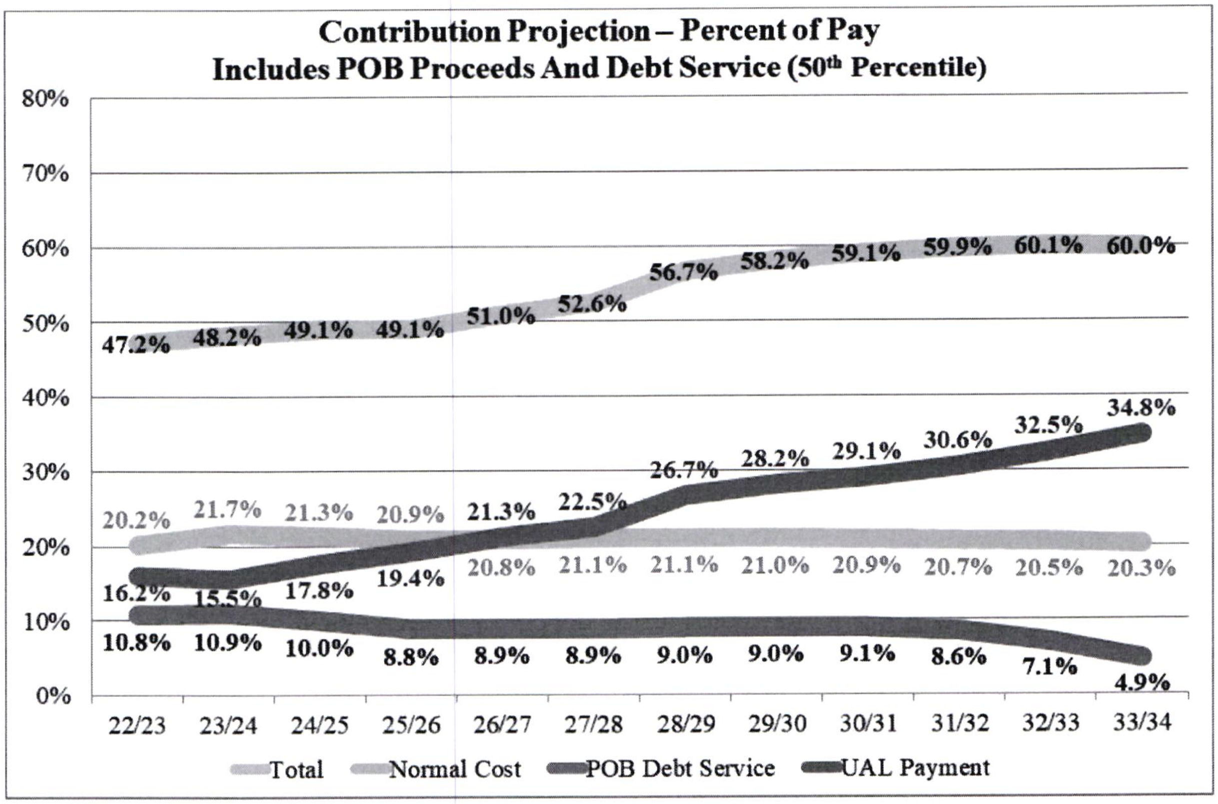
Safety Rates

Short-term – As shown on page 10, over the next decade, Safety rates exhibit a very similar pattern to Miscellaneous rates. **While averaging 54.9%, Safety rates are not projected to dip slightly like that of Miscellaneous due to a combination of factors including earlier applicable retirement ages and other demographics. In comparing the year-over-year projections, as seen in the two charts which follow, the major difference is in the UAL payment. Instead of peaking at 21.6% in 2032 (as shown in the red line - bottom chart), the UAAL peaks at 34.8%.** It is important to note here that a greater share of the Safety Plan costs are borne as a Net County Cost.

Long-term - As shown on page 11, longer term Safety rates show the same downward trend as the Miscellaneous Plan under all performance scenarios, although coming from a higher peak. As is the case with Miscellaneous, even in the poor performance (25th percentile) scenario, after rates peak in 2032, they begin a steady decline returning to the current rate of approximately 43% in 2037 and continuing to fall thereafter.

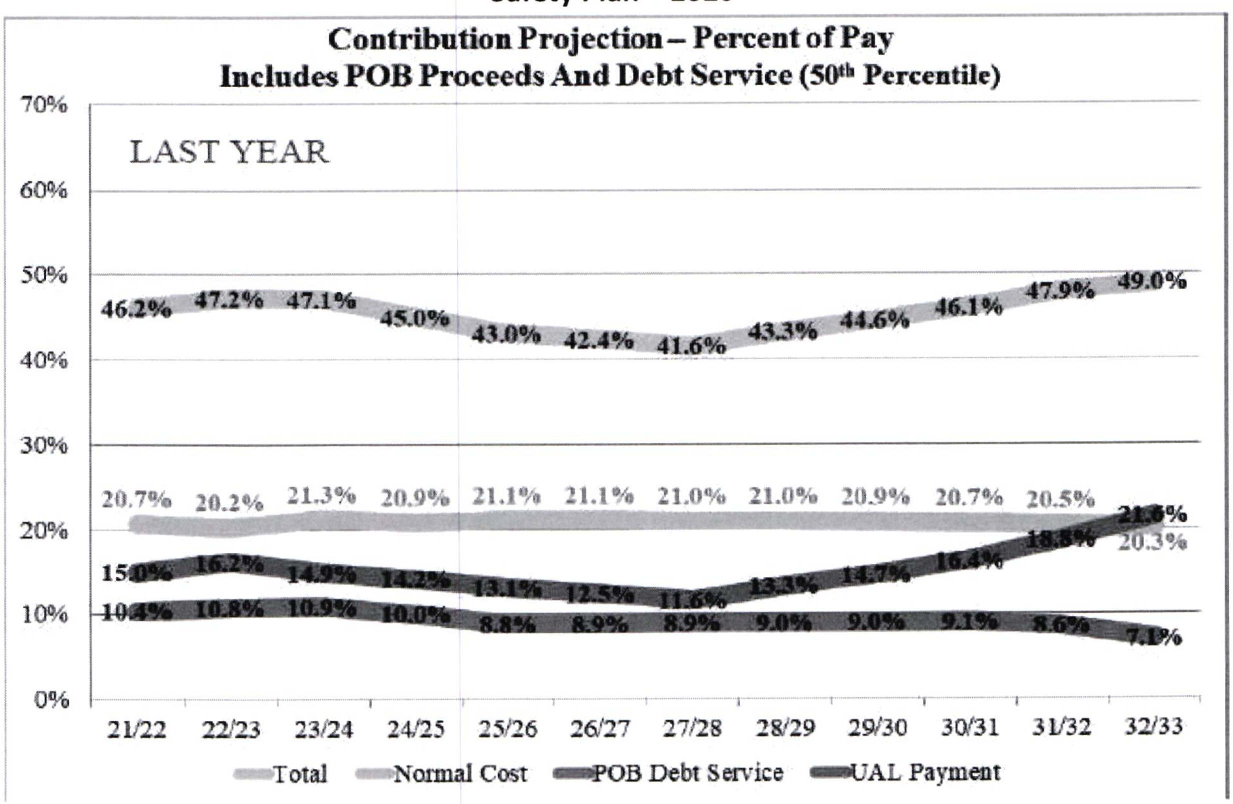
Under the expected performance (50th percentile) **rates peak at 60.1% in 2032 and fall steadily to under 20% (less than one-third of the current rate) in 2042**, due to the same factors discussed above regarding the Miscellaneous Plan.

Safety Plan – 2021



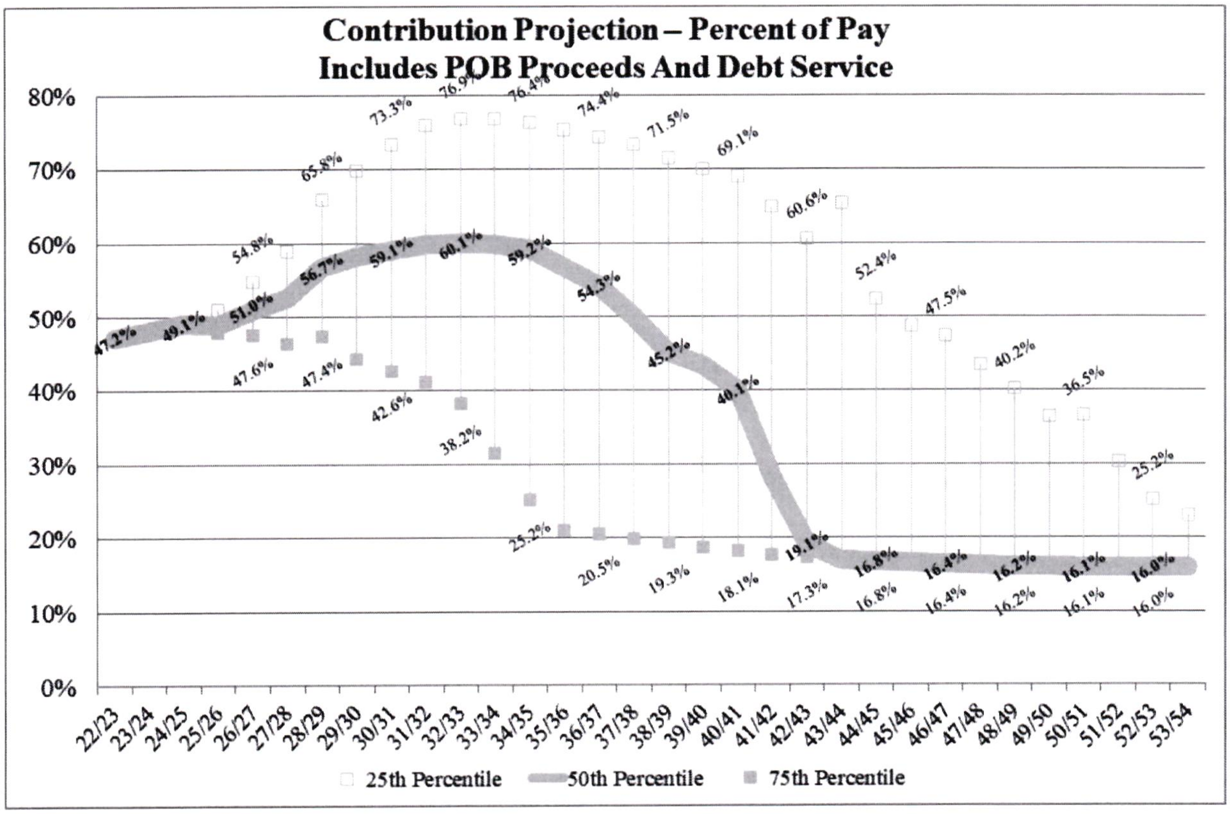
Source: Attachment 1, Slide #73. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

Safety Plan – 2020



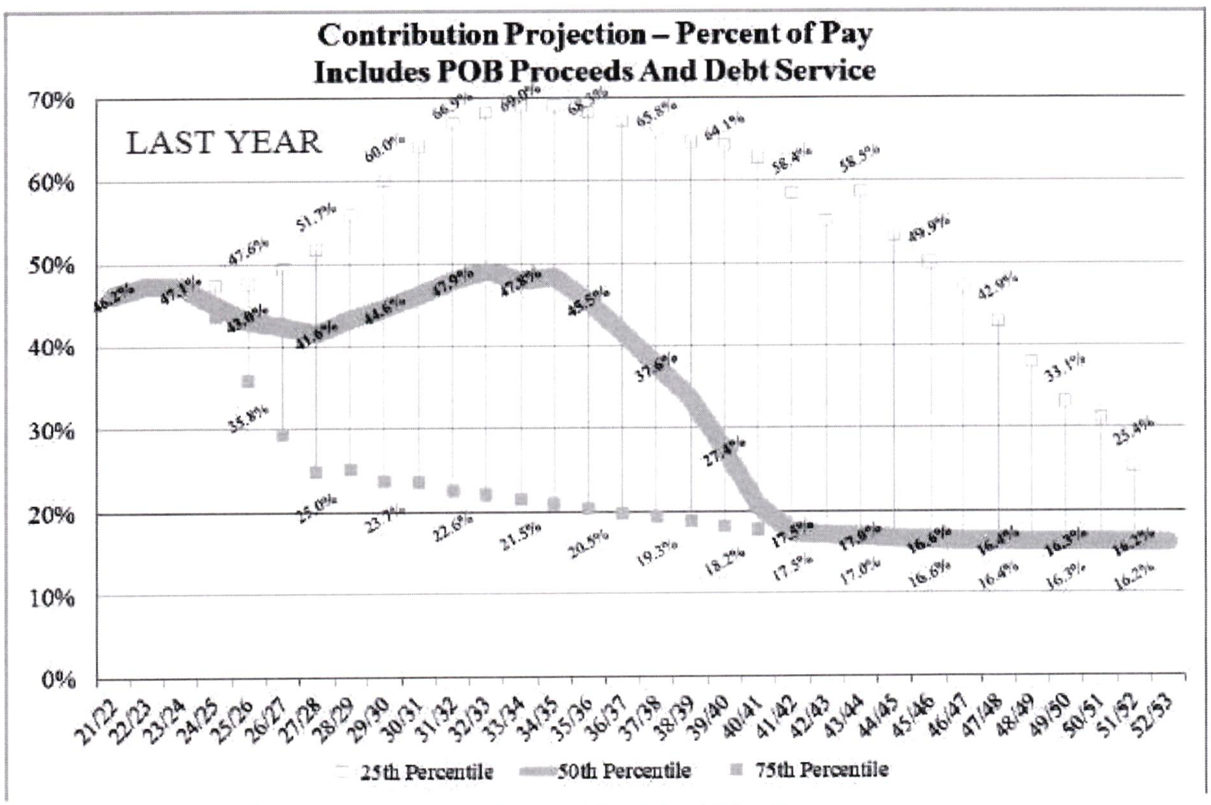
Source: Attachment 1, Slide #74. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Foster & Foster, Inc.

Safety Plan – 2021



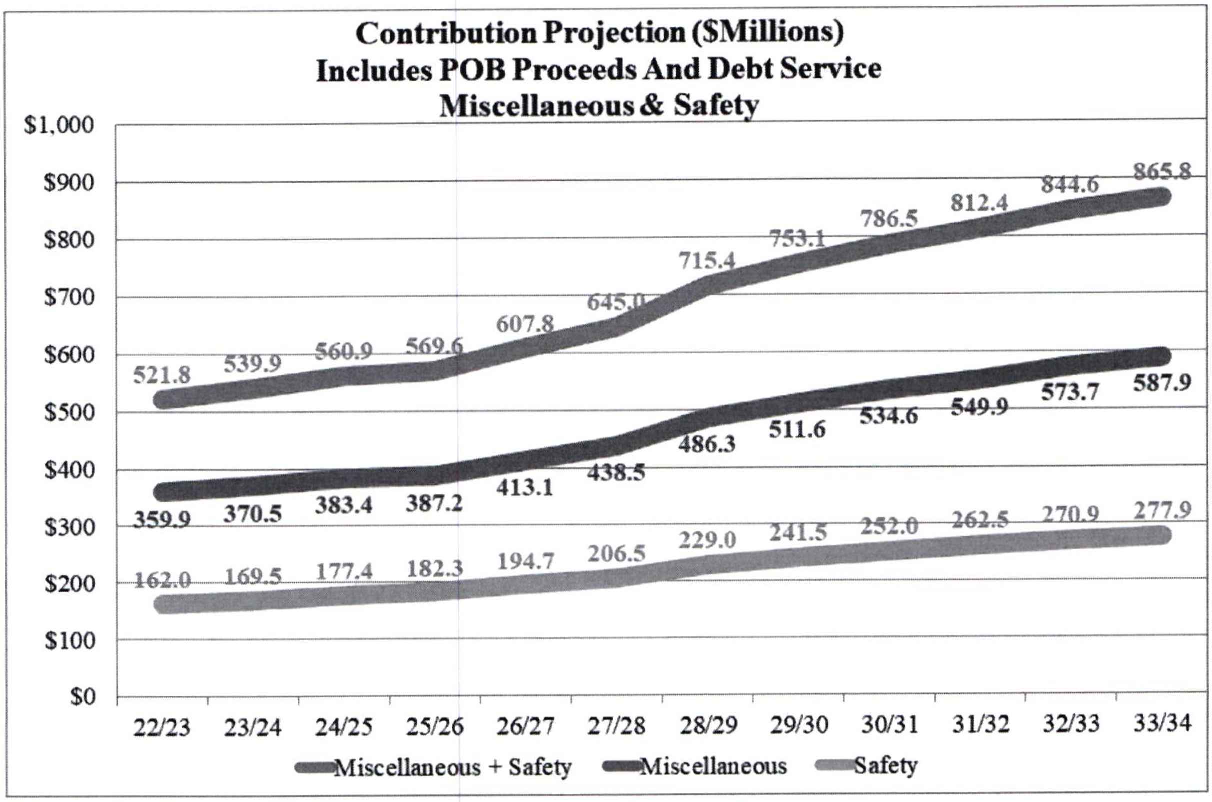
Source: Attachment 1, Slide #71. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

Safety Plan – 2020



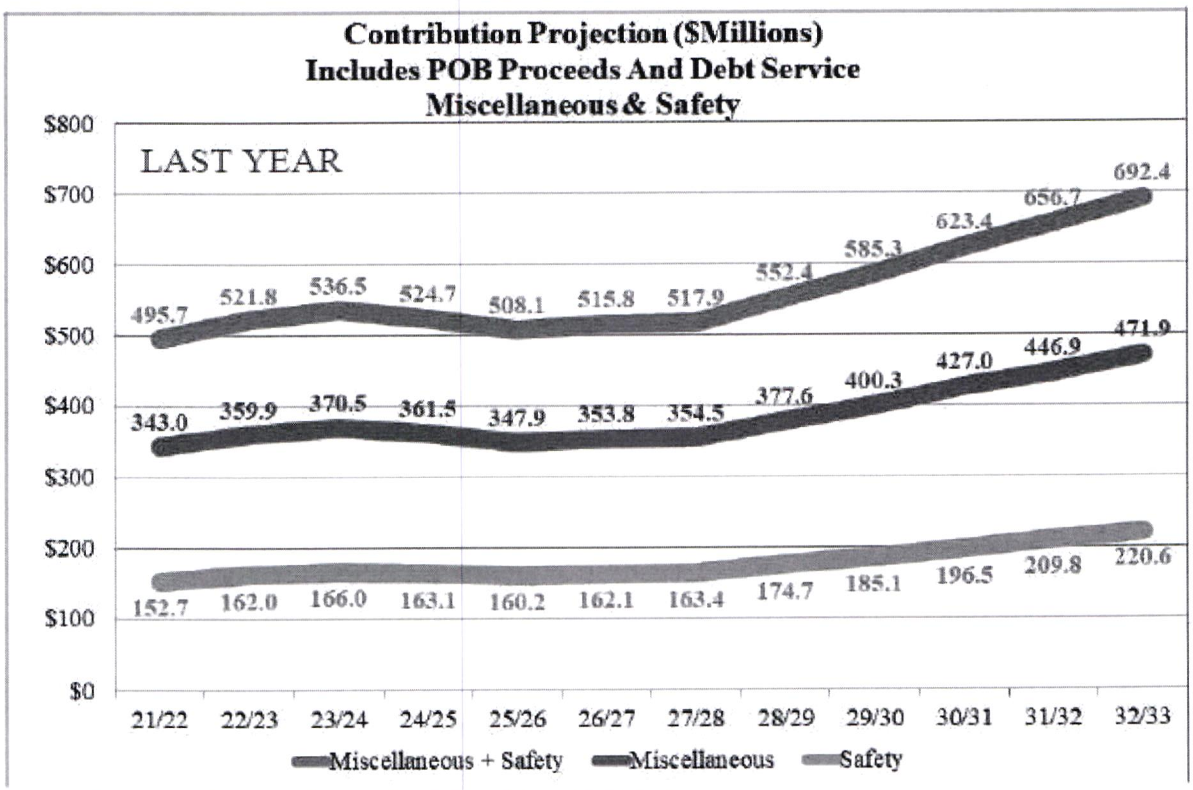
Source: Attachment 1, Slide #72. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Foster & Foster, Inc.

Combined – 2021



Source: Attachment 1, Slide #79. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

Combined – 2020



Source: Attachment 1, Slide #80. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Foster & Foster, Inc.

PENSION OBLIGATION BONDS (POBs)

Series 2005 A – In February 2005, the County issued its Series 2005 A POBs in the principal amount of $400 million to lock in an all-in borrowing cost of 4.91%, refinancing its prior unfunded liability, which was then carrying a 7.5% rate (a spread of 2.59%). At the same time, the County converted its repayment schedule from a rolling thirty-year amortization to a fixed amortization of thirty and twenty-five years for the Miscellaneous and Safety Plans. This further reduced interest cost as a result of paying down the debt faster. Upon deposit of the bond proceeds with CalPERS, the County's rate on that portion of its liability was reduced and replaced by the lower amount of the bond's debt service.

The POBs still maintain a relatively low break-even rate of 4.91% versus CalPERS' current rate of 7%, (a spread of 2.09%). Even if CalPERS were to earn a rate slightly below the POBs rate for the remaining term to maturity of 2035, the County can still expect to show net estimated gains.

Foster & Foster's analysis is projecting that as of February 15, 2023 (2) there will be $187.5 million in net estimated gains as a result of the sale of the bonds, with an outstanding balance owed of $126.9 million (3).

Series 2020 – In April 2020, the efforts to reduce interest cost on a portion of the unfunded liability continued with the Board of Supervisors authorizing a second POB issuance in the amount of $720 million at an all-in borrowing cost of 3.53%. The bond proceeds ($716 million, net of the cost of issuance) were used to refund up to approximately 20% of the total unfunded liability, split between the Miscellaneous and Safety Plans.

The County prepaid $371.5 million to CalPERS for deposit to the Miscellaneous Plan, and, $344.2 million for the Safety Plan which reflected a discount for prepayment of the selected bases. These bond proceeds served as a one-time additional discretionary payment into the plans. To be clear, the $716 million that was owed to CalPERS is now owed to bondholders, albeit at a much-reduced rate.

This series of POBs has an even lower break-even rate of 3.53% vs. CalPERS' interest cost on the unfunded liability of 7.0% (a spread of 3.47%). To capture the savings (payment reductions) of nearly $231 million through the eighteen-year life of the POBs to 2038, per Board direction, a dedicated Section 115 Pension Trust account was established and is now being funded with those savings.

Foster & Foster's analysis is projecting that as of February 15, 2023 (2) there will be $68.1 million in net estimated gains (3) as a result of the sale of the bonds, with an outstanding balance owed of $621.7 million.

Shown in the table below are net estimated gains on both series of POBs which includes the next interest payments.

Status of POBs ($ in millions)	**Projected**		
Estimated gains through 2/15/23	**Series 2005A**	**Series 2020**	**Total**
CalPERS investment earnings on POB proceeds (1)	**$469.1**	**$134.3**	**$603.4**
less POB interest payments (2)	**$278.5**	**$62.1**	**$340.6**
less Cost of issuance	**$3.1**	**$4.1**	**$7.2**
Net estimated gains(3)	**$187.5**	**$68.1**	**$255.6**

(1) Accumulated earnings since issuance based on actual CalPERS investment return for each year.

(2) Includes POB interest payments to date.

(3) Source: Attachment 1, Slide #89 and #92. County of Riverside - CalPERS Miscellaneous and Safety Plans - Independent Actuarial Report - 6/30/21 Valuation, Foster & Foster, Inc.

SECTION 115 PENSION TRUSTS

The first Section 115 Pension Trust was established in 2016 to help the County independently mitigate CalPERS' contribution rate volatility and act as a buffer in the future for budgeting purposes as funds accumulate.

Excess funds from the Liability Management Fund (LMF) and the Other Post-Employment Benefits (OPEB) Trust were placed in the Section 115 Pension Trust to fund the initial deposit. Additionally, funds collected as a result of the difference between CalPERS' multi-year projected payroll, based on actuarial assumptions, and, the County's actual payroll, are restricted and invested in the County Treasurer's Pooled Investment Fund (TPIF). Funds are then dollar-cost averaged from the TPIF and placed into the Trust.

The second Section 115 Pension Trust, as mentioned above, was established with the 2020 POBs. The Trusts are administered by Public Agency Retirement Services (PARS), with HighMark Capital Management serving as investment manager. The current investment strategy is Moderate Index PLUS (Active) which has an approximate 46% equity/48% fixed income allocation mix.

Unlike assets in the CalPERS defined benefit plans, funds in the Trust can be managed in a manner consistent with a risk profile of the County's choosing in a combination of equity investments, fixed income and cash.

Status of 2016 Section 115 Pension Trust

For the investment report period ended 6/30	2020	2021	**2022**
Account balance ($ in millions)	$29.92	$41.82	**$39.2**
Total accumulated investment earnings to date	$3.80	$10.80	**$4.9**
Annual rate of return	4.48%	19.93%	**-11.68%**
Annualized rate of return since inception (1)	6.20%	9.00%	**5.03%**

(1) Inception date November 2016.

Status of 2020 Section 115 Pension Trust

For the investment report period ended 6/30	2021	**2022**
Account balance ($ in millions)	$13.95	**$23.1**
Total accumulated investment earnings to date	$0.84	**-$2.0**
Annual rate of return	N/A	**-11.47%**
Annualized rate of return since inception (1)	14.39%	**0.72%**

(1) Inception date October 2020.

Over time these assets will become more significant as they accumulate and cannot be used for any other purposes except for making additional discretionary payments directly to CalPERS to pay down a portion of the unfunded liability, or for reimbursing the County for CalPERS contributions. **Within five years there will be more than $130 million in contributions made to the 2016 and 2020 Trust accounts combined, and within ten years, more than $200 million.**

These Trusts have the potential to provide two significant benefits to the County. The first is the accumulation of assets to pay down the liability with CalPERS. The second is to serve as a "rate stabilization fund" in the event of a dramatic increase in CalPERS rates. Should the long-term projections come to fruition with employer rates peaking in the next decade, the County could accumulate a much larger balance by capturing a portion of the decline and deposit additional funds into the Trusts. This could allow for faster amortization of the County's unfunded liability. On the other hand, should CalPERS' long-term performance come close to projections, full funding could be reached within twenty years.

A downside to full funding is that under current rules the County would be required to make its full required payment, albeit at a fraction of the current rate. In such a case, funds in the 115 Trusts could be drawn upon to make a portion of the required payment, mitigating the impact of excess funding.

OTHER POST-EMPLOYMENT BENEFITS (OPEB)

Background – OPEB are benefits other than pensions provided to retired employees. In the County's case, this is a monthly contribution to retirees for health care. The Governmental Accounting Standards Board (GASB) Statement No. 45, released in 2004, substantially modified the reporting requirements for OPEB provided by state and local governments.

In summary, GASB 45 dictated that the present value of these benefits should be quantified and reported in the Supplementary Information section of County's Annual Comprehensive Financial Report (ACFR). This reporting requirement did not trigger a funding requirement. Per GASB 45, the County's liability is comprised of two components; the present value of the amount payable for retirees and the amount attributable to the "implicit subsidy." The implicit subsidy is defined as the difference between the true cost of coverage for the retiree medical plan and the actual rate paid. Such a difference arises if retirees and active employees are in the same rate class.

The County's Response – The initial calculation of the County's retirement health liability was $390 million as of January 1, 2005. Upon the recommendation of PARC, the County took two steps to reduce this liability over time. The first step was to establish an OPEB Trust in 2007 which reduced the actual and nominal liability. The second step was to virtually eliminate the implicit subsidy by revamping the County's healthcare rate structure to separate pre-Medicare retirees from active employees.

GASB 75 – In June 2015, GASB released Statement No. 75, which was initially effective for the fiscal year ending June 30, 2018. GASB 75 addresses accounting and financial reporting issues by government employers, previously covered by GASB 45. Per GASB 75, employers are now required to disclose the total OPEB liability on the balance sheet (Statement of Net Position) alongside its other long-term liabilities (i.e., bond debt, lease obligations, pension liabilities, etc.). This change now highlights the liability.

The Move to CalPERS Health Plans – In 2019 the County embarked upon a multi-year process to restructure its health care offerings with an eye towards controlling costs and providing a fuller range of plan options for employees and retirees alike. The OPEB impacts of the move to CalPERS include a return of the implicit subsidy which did not exist under the County's own rate structure as an increase of the actual benefit paid to certain retirees, and a greater number of retirees now purchasing their insurance through the County since the offerings are more attractive.

Under CalPERS health plans, retirees receive benefits prior to age 65 by paying premiums that are developed by blending active and retiree costs. Since retirees are older and generally cost more than actives, the premium paid by the retiree is less than the "true cost" of coverage for retirees. For example, under the Blue Shield Access Plus, the estimated "true cost" for an age 60 retiree is $1,085.29 per month, while the required premium is only $738.29 per month in 2023. Subsidization can also occur for post 65 benefits due to demographic differences between the County retirees and the CalPERS population used to develop premiums. This implicit subsidy is considered an employer obligation under the Actuarial Standards of Practice (ASOP) No. 6 requirements and is included in the OPEB actuarial valuation.

Based on the AON - County of Riverside Actuarial Valuation Report Postretirement Benefits Plan as of June 30, 2022 (Attachment 4, page ii), the value of that benefit (subsidy) to employees is $148 million (actuarial accrued liability, or AAL). Nevertheless, inclusion of implicit subsidy in the total net OPEB liability without any offset is specifically required.

An additional financial implication of transferring to the CalPERS health plans is the requirement under the Public Employees' Medical and Hospital Care Act (PEMHCA) to provide a minimum monthly contribution for retiree health premiums, currently $151 (which increases annually with medical CPI).

This requirement has an effect of increasing the monthly benefit and the cost to the County for those employees whose negotiated or non-represented benefit is less than $151. The monthly amount is either $151 or $256 and is based on the employee's representation at the time of retirement.

This increase in the monthly cost to provide the benefit is currently paid by departments on a pay-as-you-go basis and increases the OPEB liability. In addition to the PEMHCA effect, the County is expecting higher participation rates in its plans by retirees which will increase the expected and actual payout for those enrolled in a health plan. To the extent retirees have better options, such as paid spousal coverage from another employer, they receive no monthly benefit from the County and no liability is recorded.

In contrast to the CalPERS defined benefit pension plan liability, there is no direct connection between the implicit subsidy portion of the OPEB liability and the County's cost of providing the retiree healthcare benefit, thus the County does not directly pay for the implicit subsidy. It is for this reason that many employers have chosen not to fund this portion of their liability since it is not owed to retirees unlike the monthly benefit payment. Recognizing this, the Board adopted Policy B-25, Section III (A) Other Post-Employment Benefits (OPEB) which states, "the County seeks to maintain a minimum funding level of 80% in its OPEB plan, excluding any implicit subsidy liability." There could be some advantages to taking steps to funding a portion of the implicit subsidy in the future; staff and PARC will monitor the issue and bring any recommendations to the Board.

Status of OPEB ($ in millions)

For the annual valuation report period ended 6/30	2020	2021	**2022**
AAL - excluding implicit subsidy (1)	$139	$144	**$148**
Smoothed value of plan assets (MVA) (2)	$53	$68	**$86**
Total unfunded actuarial accrued liability (UAAL)	$86	$76	**$61**
Funded Status (3)	38.20%	47.20%	**58.20%**
Market value of plan assets	$53	$73	**$76**
Annual net rate of return	5.48%	19.60%	**-14.58%**
Annualized net rate of return inception to date (4)	6.31%	7.53%	**4.87%**

(1) Total AAL is the retiree health care liability comprised of the retiree benefit amount and implicit subsidy. Implicit subsidy is the difference between the true cost of coverage for the retiree medical plan and the actual rate paid.
(2) Asset smoothing recognizes market gains and losses gradually overs several years.
(3) Funded status is calculated by dividing the smoothed value of plan assets by AAL (excluding implicit subsidy). Source of (1) and (2) above: Attachment #4, page iv. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2022 – AON.
(4) Inception date November 2007.

County staff requested a review from AON of a multi-year plan to achieve an 80% funded status for the retiree benefit portion of the OPEB liability. **The current actuarial schedule projects 80%, excluding implicit subsidy, would be reached in 2026 if approximately $16.1 million were to be charged to departments for FY 23/24. Due to recent market volatility, at its November 9, 2022 meeting, PARC unanimously approved the recommendation of implementing the strategy to stay on target with the current year's contribution amount of $16.9 million, which was approximately 1.1% of payroll.**

PART-TIME AND TEMPORARY EMPLOYEES' RETIREMENT PLAN

Background – The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan (TAP), April 1, 1999, to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under Omnibus Budget Reconciliation Act of 1990 (OBRA '90). The Plan is an IRS Section 401(a) defined benefit plan. The Plan actuary calculates the minimum recommended employer contribution rate through preparation of an actuarial valuation report. Participants are required to contribute 3.75% of their compensation to the Plan.

As of September 1, 2010, the investments have been managed in a balanced account strategy with an expected rate of return of 6%. Although the Plan experienced a return of -17.45%, the funded status increased by 0.1% due to the strategy of maintaining the employer contribution rate of 5.58% from the prior year.

Status of Part-time and Temporary Employees' Retirement Plan ($ in millions)

For the annual valuation report period ended 7/1	2020	2021	**2022**
Total actuarial accrued liability (AAL)	$58.5	$64.9	**$68.9**
Smoothed value of plan assets (MVA) (1)	$45.4	$52.9	**$56.2**
Total unfunded actuarial accrued liability (UAAL)	$13.1	$12.0	**$12.6**
Funded Status (2)	77.7%	81.5%	**81.6%**
Market value of plan assets	$45.4	$61.4	**$51.0**
Annual net rate of return	3.72%	30.81%	**-17.45%**
Annualized net rate of return inception to date (3)	6.02%	8.11%	**5.66%**

(1) Asset smoothing recognizes market gains and losses gradually overs several years.
(2) Source: Attachment #5, page iii. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2022 – AON
(3) Inception date September 2010.

Although AON projects an 85.1% funded status by June 30, 2023, at its November 9, 2022 meeting, PARC unanimously approved the recommendation to continue to stay on target with the current year employer rate of approximately 5.58% as a percentage of payroll for FY 23/24, the same as FY 22/23 due to recent market volatility.

SPECIAL DISTRICT PLANS

The County's Regional Park and Open-Space District and Waste Resources Management District participate in what CalPERS refers to as the Risk Pool, designed to accommodate smaller employers whose size is not enough to develop individual actuarial assumptions with participation occurring if a rate plan has less than 100 active members on any valuation date. The process involves combining assets and liabilities across employers to produce large, risk sharing pools that reduce or eliminate large fluctuations in an employer's retirement contribution rate caused by unexpected demographic events.

Although the desired 80% minimum funded status for the Special Districts are not specifically mentioned in Board Policy B-25, as is the case with the County's defined benefit pension plans, it is a prudent target (see below additional information for each District). Similar to the County's Miscellaneous and Safety Plans, additional discretionary payments would be required to increase the funded status, thereby having budgetary impacts on the Districts (Parks and Flood), as well as the Department of Waste Resources, that may, or may not be feasible at this time.

Highlights – for the CalPERS actuarial valuation report period ended June 30, 2021:

- ✓ **Riverside County Regional Park and Open-Space District**
  - 81.3% funded status Tier I (9.4% YoY increase)
  - 108.8% funded status Tier II (12.2% YoY increase)
  - 109.2% funded status Tier III (12.5% YoY increase)

- ✓ **Riverside County Flood Control and Water Conservation District**
  - 81.0% funded status (15.1% YoY increase)

- ✓ **Riverside County Waste Resources Management District**
  - 79.4% funded status (10.9% YoY increase)

The Riverside County Regional Park and Open-Space District has three rate plans. As of the annual valuation report(s) for June 30, 2021, the funded status of Tier I was 81.3%, Tier II was 108.8%, and Tier III was 109.2% (see tables below for additional details).

Status of Tier I ($ in millions)

For the annual valuation report ended 6/30	2019	2020	**2021**
Total actuarial accrued liability (AAL)	$46.9	$48.2	**$50.6**
Total market value of assets (MVA)	$34.5	$34.6	**$41.1**
Total unfunded accrued liability (UAAL)	$12.4	$13.6	**$9.5**
Funded Status	73.5%	71.9%	**81.3%**

Status of Tier II

For the annual valuation report ended 6/30	2019	2020	**2021**
Total actuarial accrued liability (AAL)	$398,743	$459,277	**$561,086**
Total market value of assets (MVA)	$358,502	$443,835	**$610,455**
Total unfunded accrued liability (UAAL)	$40,241	$15,442	**($49,369)**
Funded Status	89.9%	96.6%	**108.8%**

Status of Tier III

For the annual valuation report ended 6/30	2019	2020	2021
Total actuarial accrued liability (AAL)	$1.40(*)	$1.85(*)	**$2.47(*)**
Total market value of assets (MVA)	$1.30(*)	$1.78(*)	**$2.69(*)**
Total unfunded accrued liability (UAAL)	$0.14(*)	$60,525	**($226,517)**
Funded Status	90.0%	96.7%	**109.2%**

*$ in millions.

The District will continue making the annual UAAL prepayment for Tier I, thereby receiving an early payment discount from CalPERS.

The Riverside County Flood Control and Water Conservation District's annual valuation report for June 30, 2021, shows a funded status of 81% (see table below for additional details).

Status of Riverside County Flood Control and Water Conservation District ($ in millions)

For the annual valuation report ended 6/30	2019	2020	**2021**
Total actuarial accrued liability (AAL)	$213.9	$220.7	**$233.7**
Total market value of assets (MVA)	$136.3	$145.4	**$189.3**
Total unfunded accrued liability (UAAL)	$77.6	$75.3	**$44.4**
Funded Status	63.7%	65.9%	**81.0%**

The District developed a long-term plan that included making additional discretionary payments to CalPERS in an effort to bring the funded status at or above 80% by fiscal year 2025. The District accomplished this goal in fiscal year 2021. Currently, the funded status increased by 15.1%, from 65.9% to 81%, as reflected in the June 30, 2021 valuation report. To achieve this funded status, the District made an additional discretionary payment of $12.6 million in FY 20/21 and intends to continue making additional discretionary payments based on its ongoing assessments of its fiscal outlook for future years. The District will also continue making the annual UAAL prepayment option, thereby receiving an early payment discount from CalPERS.

The Riverside County Waste Resources Management District was dissolved in 1998, with the exception of existing employees at that time electing to maintain their District status. All new hires or transfers are designated as County employees; no new District employees have been added since 1998. The District's annual valuation report for June 30, 2021, shows a funded status of 79.4% (see table below for additional details).

Status of Riverside County Waste Resources Management District ($ in millions)

For the annual valuation report ended 6/30	2019	2020	**2021**
Total actuarial accrued liability (AAL)	$53.4	$54.5	**$56.4**
Total market value of assets (MVA)	$37.5	$37.3	**$44.7**
Total unfunded accrued liability (UAAL)	$15.9	$17.2	**$11.6**
Funded Status	70.1%	68.5%	**79.4%**

The District has developed a long-term plan that includes making additional discretionary payments to CalPERS in an effort to bring the funded status at or above 80% by fiscal year 2025, assuming all other factors remain constant.

An additional discretionary payment of $3.3 million was paid in FY 20/21. The funded status as of June 30, 2021 is 79.4% (an increase of 10.9% from the June 30, 2020 valuation report). The District intends to continue making additional discretionary payments based on its ongoing assessment of its fiscal outlook for future years. The District will also continue making the annual UAAL prepayment option, thereby receiving an early payment discount from CalPERS.

MANAGEMENT OF PENSION AND OTHER LIABILITIES

County's Response - Several steps have been taken to address the management of its liabilities over the last two decades:

✓ In 2003 the Pension Advisory Review Committee (PARC) was formed to guide policy decisions regarding retirement benefits.

✓ In 2004 PARC first recommended taking advantage of CalPERS' early payment discount in lieu of periodic payments.

✓ In 2005 the County issued $400 million in POBs reducing the all-in true interest cost to 4.91%, increased its funding status and created the Liability Management Fund (LMF), whereby some of the excess savings has been sent to CalPERS to reduce the unfunded liability. The current practice has been to send a portion of the savings to the Section 115 Pension Trust, and that will continue.

✓ In 2007 in an effort to reduce its OPEB liability over time, the County established its Section 115 OPEB Trust with the California Public Employers' Retirement Benefit Trust (CERBT) with CalPERS.

✓ In 2012, the County took the lead in initiating pension reform with its bargaining units in advance of any action by the state. As a result of collective bargaining, employees agreed to pay their own member contributions eliminating the Employer Paid Member Contribution (EPMC). Additionally, Tier II was implemented with a lower benefit formula, which became effective on August 24, 2012.

County Plan		Retirement Formula	Employee Contribution	Earliest Retirement Age	Number of Actives 6/30/2022	Percentage in each Tier 6/30/2022	PEPRA Comp. Limits (1)	Final Comp. Period	Effective Date
Tier I	**Misc**	3% at 60	8%	50	**6,677**	**39%**	N/A	12 mos.	7/11/2002
	Safety	3% at 50	9%	50	**1,895**	**55%**	N/A	12 mos.	6/28/2001
Tier II	**Misc**	2% at 60	7%	50	630	4%	N/A	36 mos.	8/24/2012
	Safety	2% at 50	9%	50	165	5%	N/A	36 mos.	8/24/2012
Tier III - PEPRA	**Misc**	2% at 62	7.25%	52	**9,738**	**57%**	$146,042	36 mos.	1/1/2013
	Safety	2.7% at 57	12.50%	50	**1,358**	**40%**	$175,250	36 mos.	1/1/2013

(1) 2023 PEPRA Compensation Limits are indexed annually.

The passage of Assembly Bill 340 on September 12, 2012 created the Public Employees' Pension Reform Act (PEPRA), implementing a new lower retirement benefit formula (Tier III), which became effective January 1, 2013. Since that time, there have not been any significant updates on the pension reform front worthy of note.

In September 2020, however, the Governor signed into law Assembly Bill 2967 which prevents cities and counties from excluding groups of employees from CalPERS defined benefit pension plans when they are offered for other groups, thereby effectively blocking the ability to offer a hybrid style or deferred compensation only plan.

Staff and PARC continue to monitor any developments in this area and will bring any items of significance that would lead to cost reduction to the Board's attention on a timely basis.

✓ In November 2016, the first Section 115 Pension Trust was established to help the County independently mitigate CalPERS' contribution rate increases and act as a buffer in the future for budgeting purposes as funds accumulate.

- ✓ In February 2020 the Board approved agenda Item 3.15, Pension Debt Reduction Strategies. Two actions have occurred since that time, as seen below:

  - ➢ In April 2020 the Board authorized a second POB issuance of $720 million, reducing the all-in true interest cost to 3.53%, vs. the 7% that would have been paid to CalPERS on the unfunded liability portion.

    In connection with the 2020 POB issuance, per Board direction, a second dedicated Section 115 Pension Trust account was established to capture the resulting payment reductions (savings) of nearly $231 million through 2038 - the eighteen-year life of the POBs. For the period ended June 30, 2022, there was an ending account balance of $23.1 million.

  - ➢ In December 2020, the Board of Supervisors approved agenda Item 3.1, amending and restating the agreement for services between the Western Riverside County Regional Conservation Authority (RCA) and the County of Riverside. Effective January 1, 2021, the Riverside County Transportation Commission began to provide the staffing and management agency role for RCA. As a result, a lump sum payment of $3.9 million was received from RCA as a pro-rata share of their unfunded pension liability obligation as well as any amounts owed for OPEB and the Replacement Benefit Plan. The payoff of $2.6 million for the unfunded liability portion was made to CalPERS on January 20, 2021.

- ✓ In November 2022, the PARC approved to maintain the current rates of approximately 1.1% of payroll for OPEB in an effort to achieve a projected funded ratio of 80% by June 30, 2026.

- ✓ In November 2022, the PARC approved to maintain the current rates of approximately 5.58% (for those departments that utilize TAP) for the Part-Time and Temporary Employees' Retirement Plan in an effort to maintain a funded ratio of 80% or greater.

Staff and PARC will continue to look for strategic options for managing its long-term costs of the County's pensions and related liabilities. Within the next five years, the Miscellaneous and Safety pension plan contribution rates are projected to increase by 1.8%, and 5.4% respectively. Based upon several factors, the <u>long-term</u> pension outlook remains favorable, with increases projected to peak early in the next decade. This will be tempered, however, by year-to-year financial market performance. The funded status of the County's Miscellaneous and Safety Plans with CalPERS is projected to be more than 80% within ten years which has suffered a setback due to the negative investment returns experienced in FY 21/22.

ATTACHMENTS

1. County of Riverside - CalPERS Miscellaneous and Safety Plans
   Independent Actuarial Report - 6/30/21 Valuation, Foster and Foster, Inc.
2. CalPERS - Miscellaneous Plan - County of Riverside Annual Valuation Report as of June 30, 2021
3. CalPERS - Safety Plan - County of Riverside Annual Valuation Report as of June 30, 2021
4. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2022 - AON
5. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2022 – AON

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

County of Riverside
CalPERS Miscellaneous & Safety Plans

Independent Actuarial Report – 6/30/21 Valuation

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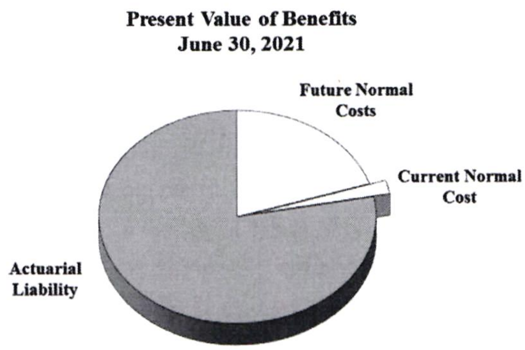
November 9, 2022

Contents

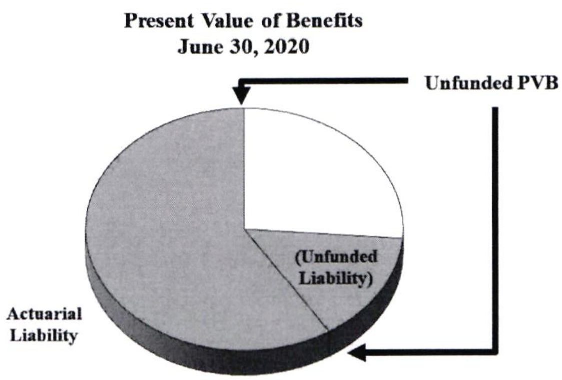
DEFINITIONS

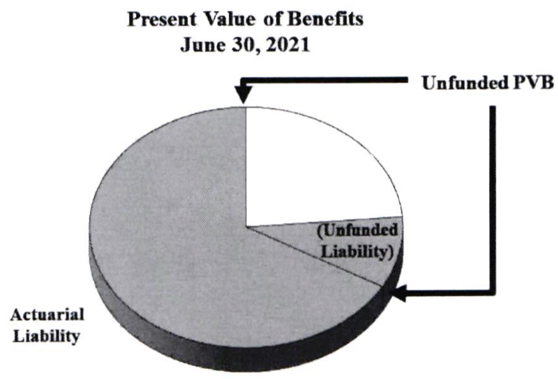


- **PVB - Present Value of all Projected Benefits:**
  - The value now of amounts due to be paid in the future
  - Discounted value (at valuation date - 6/30/21), of all future expected benefit payments based on various (actuarial) assumptions

- **Current Normal Cost (NC):**
  - Portion of PVB allocated to (or "earned" during) current year
  - Value of employee and employer current service benefit
- **Actuarial Liability (AAL):**
  - Discounted value (at valuation date) of benefits earned through valuation date [value of past service benefit]
  - Portion of PVB "earned" at measurement

DEFINITIONS



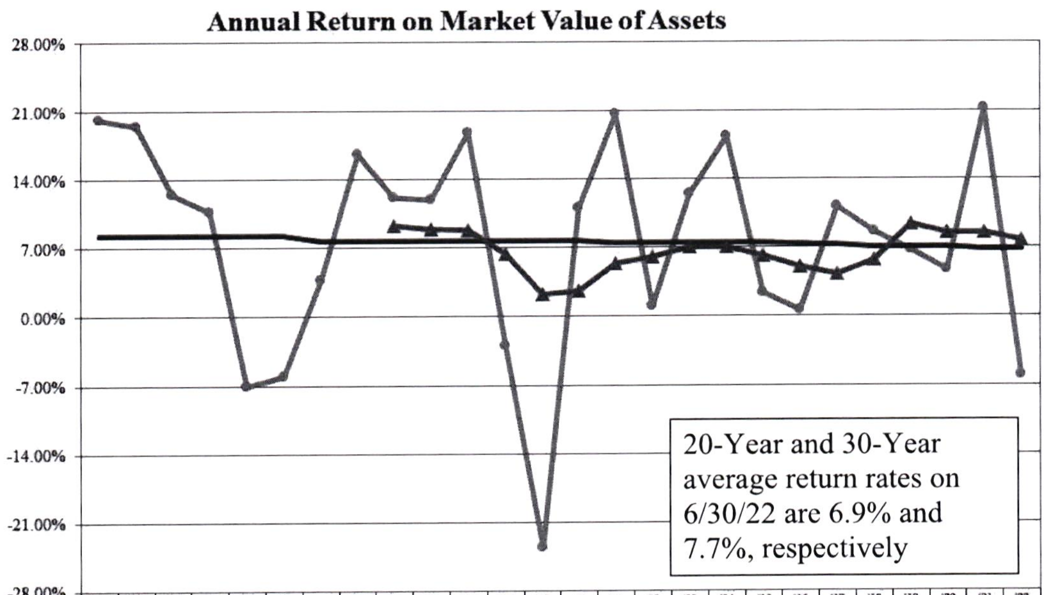


- **Target-** Have money in the bank to cover Actuarial Liability (past service)
- **Unfunded Liability (UAAL or UAL) -** Money short of target at valuation date
  - If all actuarial assumptions were always exactly met, then the plan assets would always equal AAL
  - Any difference is the unfunded (or overfunded) AAL
  - Every year, the actuary calculates the difference between the expected UAAL and Actual UAAL. This is a new layer or amortization base
  - Each new layer gets amortized (paid off) over a period of time as part of the contribution [rate]

HOW WE GOT HERE

- Investment Losses
- CalPERS Contribution Policy
- Enhanced Benefits
- Demographics

HOW WE GOT HERE – INVESTMENT RETURN



	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09
Rate of Return	20.1%	19.5%	12.5%	10.7%	-7.1%	-6.1%	3.7%	16.6%	12.2%	11.9%	18.8%	-2.9%	-23.6%
Discount Rate	8.25%	8.25%	8.25%	8.25%	8.25%	8.25%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%
10-Year Rolling Average									9.3%	9.0%	8.9%	6.4%	2.3%

	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
Rate of Return	11.1%	20.7%	1.0%	12.5%	18.4%	2.4%	0.6%	11.2%	8.6%	6.70%	4.70%	21.30%	-6.10%
Discount Rate	7.75%	7.50%	7.50%	7.50%	7.50%	7.50%	7.375%	7.25%	7.00%	7.00%	7.00%	6.80%	6.80%
10-Year Rolling Average	2.6%	5.4%	6.1%	7.0%	7.1%	6.1%	5.0%	4.3%	5.7%	9.3%	8.5%	8.5%	7.7%

Returns (after 2001) shown are gross returns, unreduced for administrative expenses, from CalPERS valuation reports, when available. The discount rate is based on expected returns net of administrative expenses.

How We Got Here – Old Contribution Policy

- Effective with 2003 valuations:
  - Slow (15 year) recognition of investment losses into funded status
  - Rolling 30 year amortization of all (primarily investment) losses

- Designed to:
  - First smooth rates and
  - Second pay off UAL

- Mitigated contribution volatility

How We Got Here – Enhanced Benefits

- At CalPERS, Enhanced Benefits implemented using all (future & prior) service
- Typically not negotiated with cost sharing
- County of Riverside

	Tier 1	Tier 2	PEPRA
• Miscellaneous	3%@60 FAE1	2%@60 FAE3	2%@62 FAE3
• Safety[1]	3%@50 FAE1	2%@50 FAE3	2.7%@57 FAE3

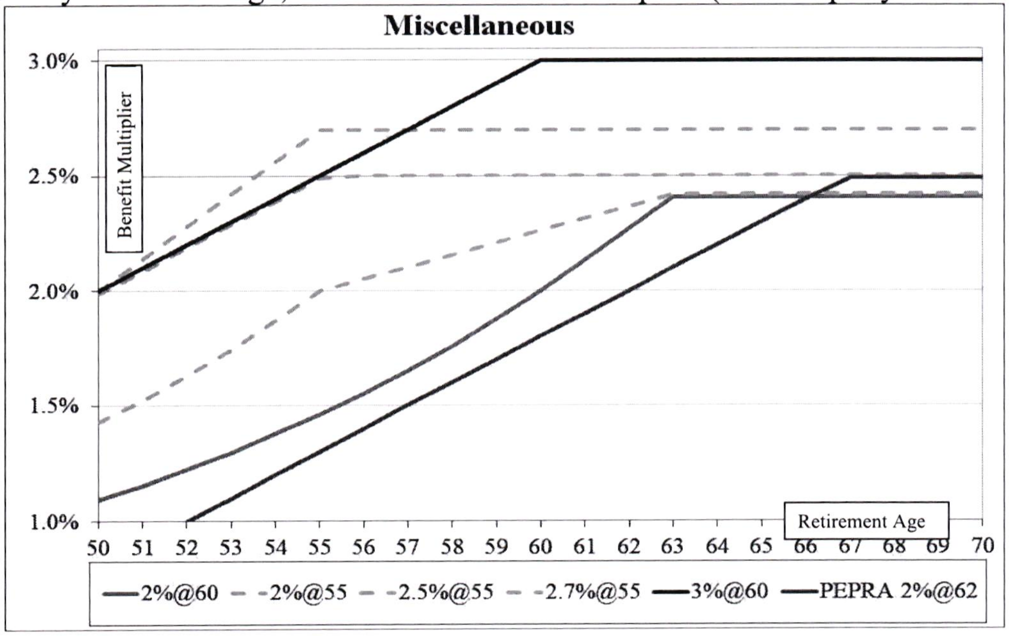
  - Note:
    - ☐ FAE1 is highest one year (typically final) average earnings
    - ☐ FAE3 is highest three years (typically final three) average earnings

- PEPRA tier implemented for new employees hired after 1/1/13
  - Employee pays half of total normal cost
  - 2022 Compensation limit
    - ☐ Social Security participants: $134,974
    - ☐ Non-Social Security participants: $161,969

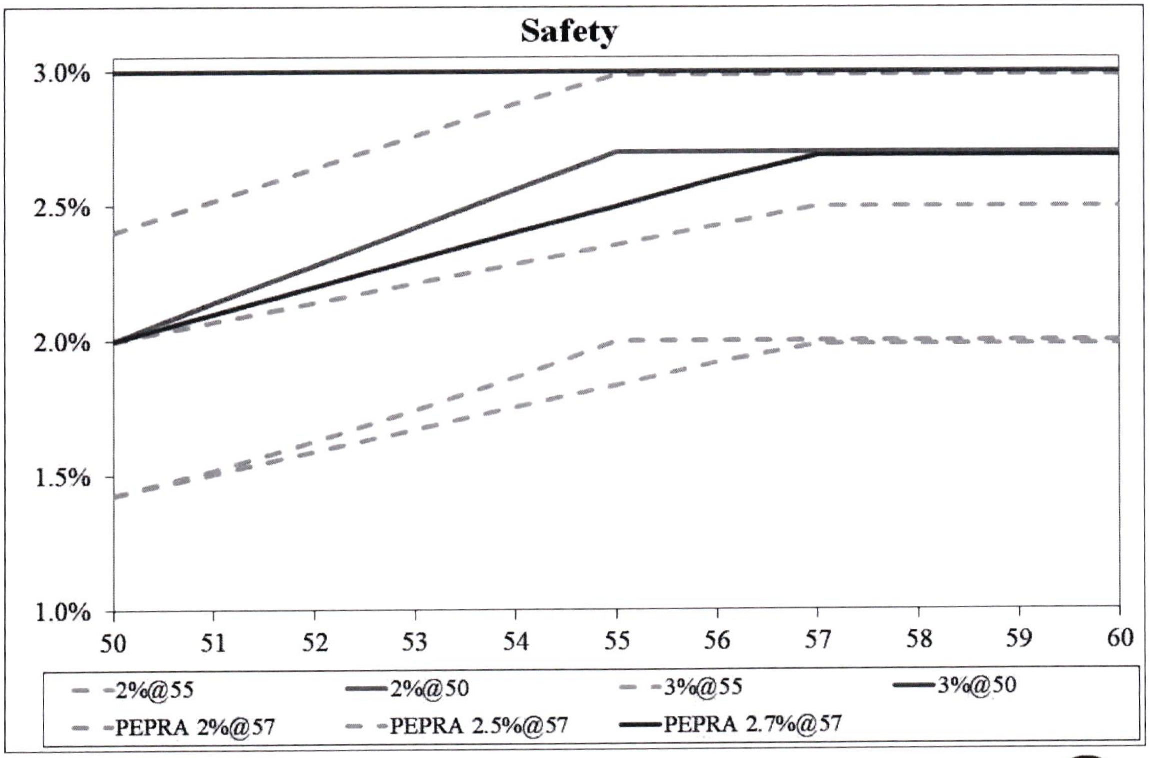
[1] Fire and Peace Officer members are combined in this group.

How We Got Here – Enhanced Benefits

- Available CalPERS Benefit formulas. County's formulas shown in blue (Tier 1), green (Tier 2) and red (PEPRA).
- For any retirement age, chart shows benefit multiplier (% FAE per year of service)



How We Got Here – Enhanced Benefits



How We Got Here – Demographic

- Around the State
  - Large retiree liability compared to actives
    - ☐ State average: 56% for Miscellaneous, 65% for Safety
  - Declining active population and increasing number of retirees
  - Higher percentage of retiree liability increases contribution volatility

- County of Riverside percentage of liability belonging to retirees:
  - Miscellaneous 51%
  - Safety 57%

CalPERS Changes

- April 2013: CalPERS adopted new contribution policy
  - No asset smoothing or rolling amortization
- February 2018: New amortization policy for 2021/22 contributions
  - Fixed dollar (level) 20-year amortization rather than % pay (escalating)
  - 5-year ramp up (not down) for investment gains and losses
- CalPERS Board changed the discount rate to 7%, still phasing in to rates:

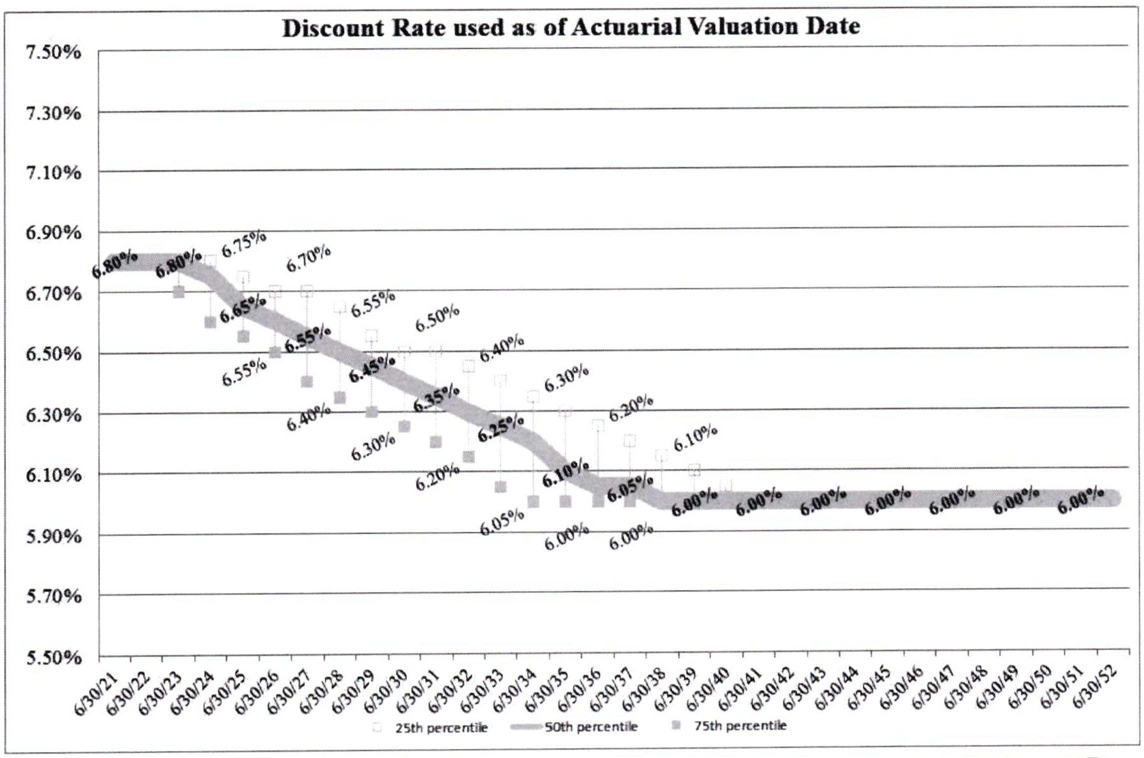
	Rate	Initial Impact	Full Impact
6/30/16 valuation	7.375%	18/19	22/23
6/30/17 valuation	7.25%	19/20	23/24
6/30/18 valuation	7.00%	20/21	24/25

- In the November 2021 meeting, CalPERS Board adopted new
  - Discount rate and investment allocation
    - ☐ Discount rate: 6.8% for 6/30/2021. UAL impact matches investment gain amortization (5-year ramp-up). Initial impact in 23/24 and full impact in 27/28.
    - ☐ Asset allocation has higher investment risk than current portfolio
  - Experience study (Demographic assumptions)

CalPERS Changes

- Risk Mitigation Strategy
  - Move to more conservative investments over time to reduce volatility
    - Only when investment return is better than expected
    - Lower discount rate in concert
    - Essentially use ≈50% of investment gains to pay for cost increases
  - Likely get to 6.0% discount rate over 20+ years
    - Risk mitigation suspended from 6/30/16 to 6/30/18 valuation
    - Did not trigger for 6/30/19 or 6/30/20 valuations
  - First triggered for 6/30/21 valuation – 6.8% discount rate

CalPERS Changes



Capital Market Assumptions

Asset Class	Asset Segment	Near-Term Return (5-year)	Long-Term Return (20-year)	Volatility (20-year)
Growth	Global Equity – Cap Weighted	6.8%	6.8%	17.0%
	Global Equity – Non-Cap Weighted	5.1%	6.1%	13.5%
	Private Equity	8.9%	9.6%	30.1%
Income	Long U.S. Treasuries	0.1%	2.6%	12.4%
	Mortgage-Backed Securities	1.2%	2.8%	3.1%
	Investment Grade Corporates	0.1%	3.9%	8.5%
	Spread Product – High Yield	2.2%	4.7%	9.2%
	Spread Product – Sovereigns	3.2%	4.5%	10.4%
	High Yield Segment	2.2%	4.6%	9.0%
Real Assets	Real Estate	5.3%	5.5%	12.2%
Liquidity	Liquidity	0.3%	1.7%	0.8%
Other	Private Debt	6.8%	5.9%	9.9%
	Emerging Market Debt	2.7%	4.8%	10.3%

Portfolio Target Allocations

	Current Portfolio	New Portfolio
Liquidity	1%	-
Real Assets	13%	15%
Private Debt	-	5%
EM Sov Bonds	1%	5%
High Yield	4%	5%
Investment Grade Corp.	6%	10%
Mtge-backed Securities	7%	5%
Treasury	10%	5%
Private Equity	8%	13%
Global Equity[2]	50%	42%
Leverage	-	(5)%
Total	100%	100%

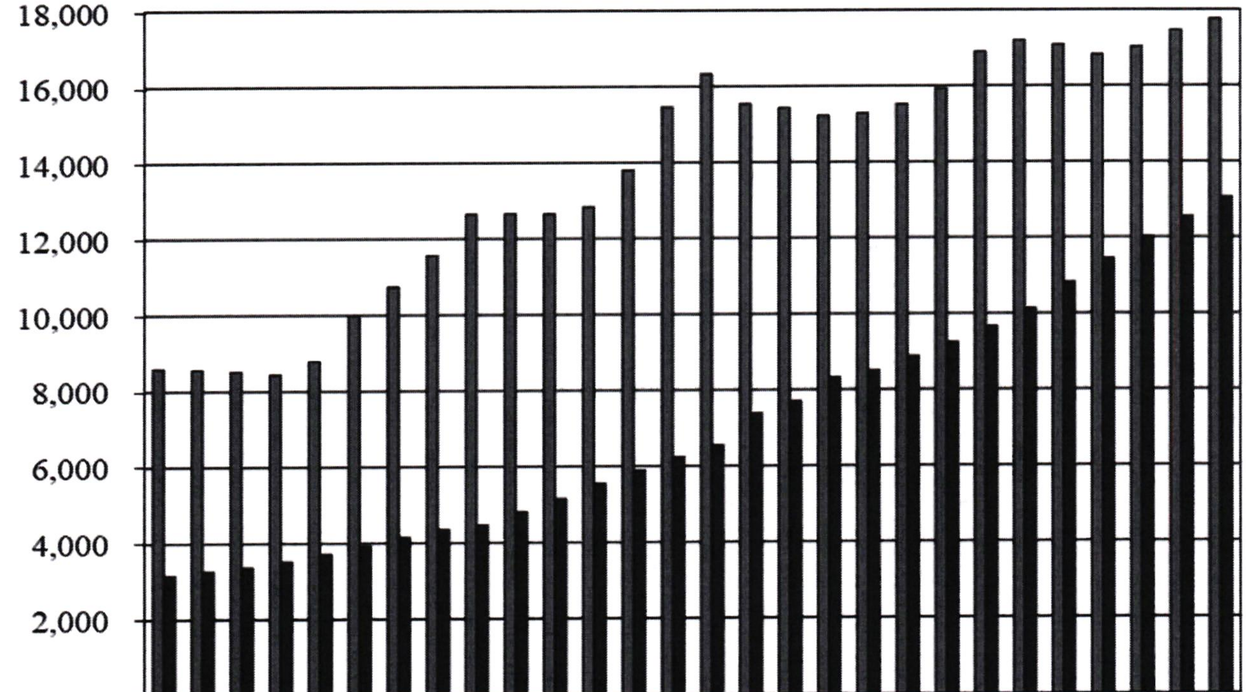
[2] Cap and non-cap weighted combined for this table; actual portfolios have specific allocations for each classification.

Summary of Demographic Information - Miscellaneous

	2001	2011	2020	2021
Actives				
■ Counts	11,562	15,243	17,467	17,762
■ Average				
• Age	43	43	44	44
• County Service	8	8	10	10
• PERSable Wages	$ 40,400	$ 53,300	$ 67,700	$ 68,200
■ Total PERSable Wages	466,900,000	812,400,000	1,182,900,000	1,211,000,000
Inactive Members				
■ Counts				
• Transferred	2,189	3,449	4,066	4,069
• Separated	2,232	6,561	10,518	11,338
• Retired				
☐ Service	3,278	6,923	10,812	11,265
☐ Disability	530	590	687	688
☐ Beneficiaries	548	805	1,058	1,120
☐ Total	4,356	8,318	12,557	13,073
■ Average Annual County Provided Benefit for Service Retirees[3]	$ 10,000	$ 22,100	$ 30,700	$ 31,700

[3] Average County-provided pensions are based on County service & County benefit formula, and are not representative of benefits for long-service employees.

Summary of Demographic Information - Miscellaneous



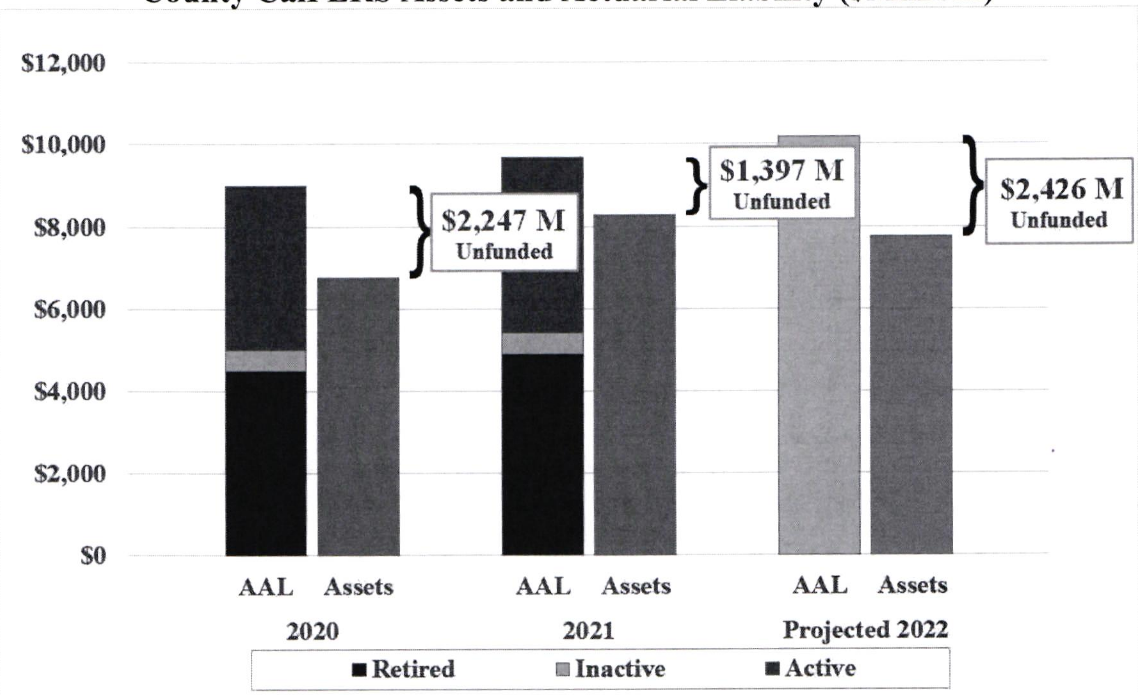
Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Active (000's)	8.6	8.6	8.5	8.4	8.8	10.0	10.7	11.6	12.7	12.7	12.7	12.8	13.8	15.5	16.3	15.6	15.4	15.2	15.3	15.5	15.9	16.9	17.2	17.1	16.8	17.0	17.5	17.8
Receiving Payments (000's)	3.2	3.3	3.4	3.5	3.7	3.9	4.1	4.4	4.5	4.8	5.1	5.5	5.9	6.2	6.6	7.4	7.7	8.3	8.5	8.9	9.2	9.7	10.1	10.8	11.4	12.0	12.6	13.1

Plan Funded Status - Miscellaneous

	June 30, 2020	June 30, 2021
■ **Actuarial Accrued Liability**		
● Active	$ 4,004,800,000	$ 4,234,200,000
● Retiree	4,509,500,000	4,899,000,000
● Inactive	478,400,000	537,300,000
● Total	8,992,700,000	9,670,500,000
■ **Assets**	6,746,100,000	8,273,300,000
■ **Unfunded Liability**	2,246,600,000	1,397,200,000
■ **Funded Ratio**	75.0%	85.6%
■ **Average funded ratio for CalPERS Public Agency Miscellaneous Plans**	72.3%	83.7%

Plan Funded Status - Miscellaneous

County CalPERS Assets and Actuarial Liability ($Millions)



Plan Funded Status - Miscellaneous

Discount Rate Sensitivity

June 30, 2021

	Discount Rate		
	6.80%	**6.30%[4]**	**5.80%**
AAL	$9,670,500,000	$10,382,900,000	$11,095,300,000
Assets	8,273,300,000	8,273,300,000	8,273,300,000
Unfunded Liability	1,397,200,000	2,109,600,000	2,822,000,000
Funded Ratio	85.6%	79.7%	74.6%

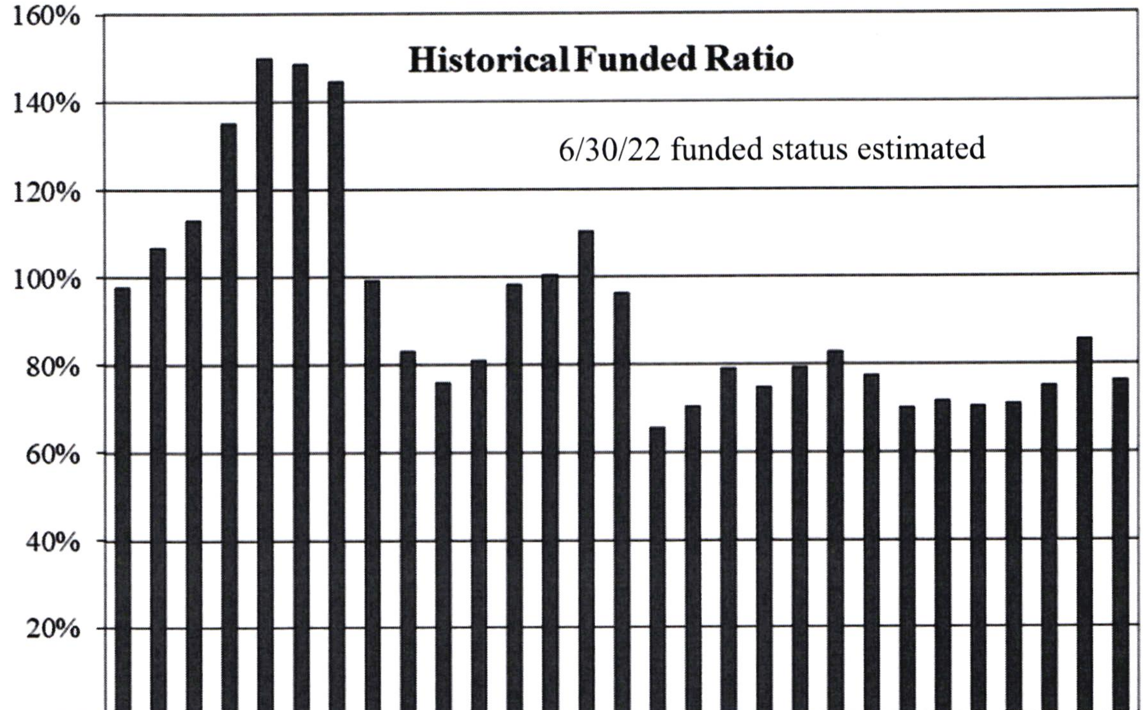
[4] Estimated by Foster & Foster.

Plan Funded Status - Miscellaneous

Unfunded Accrued Liability Changes

■ **Unfunded Accrued Liability on 6/30/20**		$2,246,600,000
■ **Expected 6/30/21 Unfunded Accrued Liability**		2,273,700,000
■ **Changes**		
• Assumption Change (demographics)	76,200,000	
• Discount Rate 7% to 6.8%	244,200,000	
• Asset Loss (Gain) (21.3% return for FY 2021)	(1,067,400,000)	
• Contribution & Experience Loss (Gain)	(129,500,000)	
• Total		(876,500,000)
■ **Unfunded Accrued Liability on 6/30/21**		1,397,200,000
■ **Projected Unfunded Accrued Liability on 6/30/22**		2,425,600,000

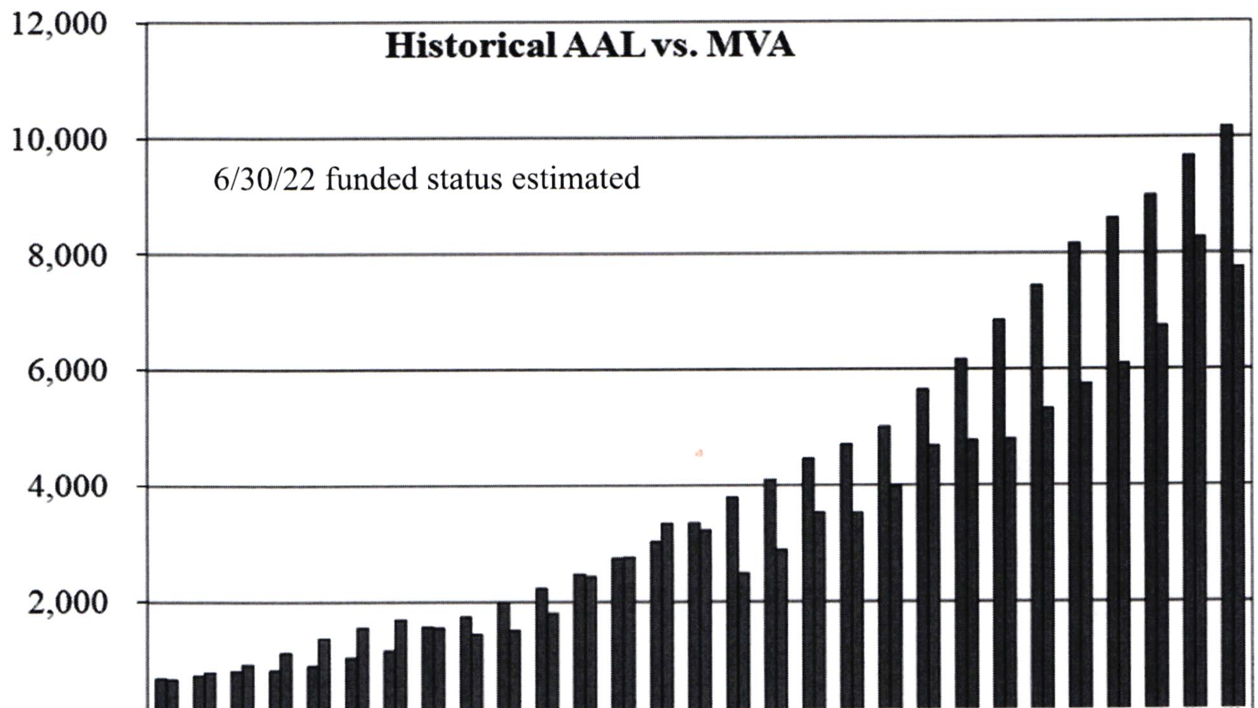
FUNDED RATIO - MISCELLANEOUS



Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08
Funded Ratio - MVA/AAL	98%	107%	113%	135%	150%	149%	144%	99%	83%	76%	81%	98%	100%	110%	96%

Valuation Date	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
Funded Ratio - MVA/AAL	65%	70%	79%	75%	79%	83%	77%	70%	72%	70%	71%	75%	86%	76%

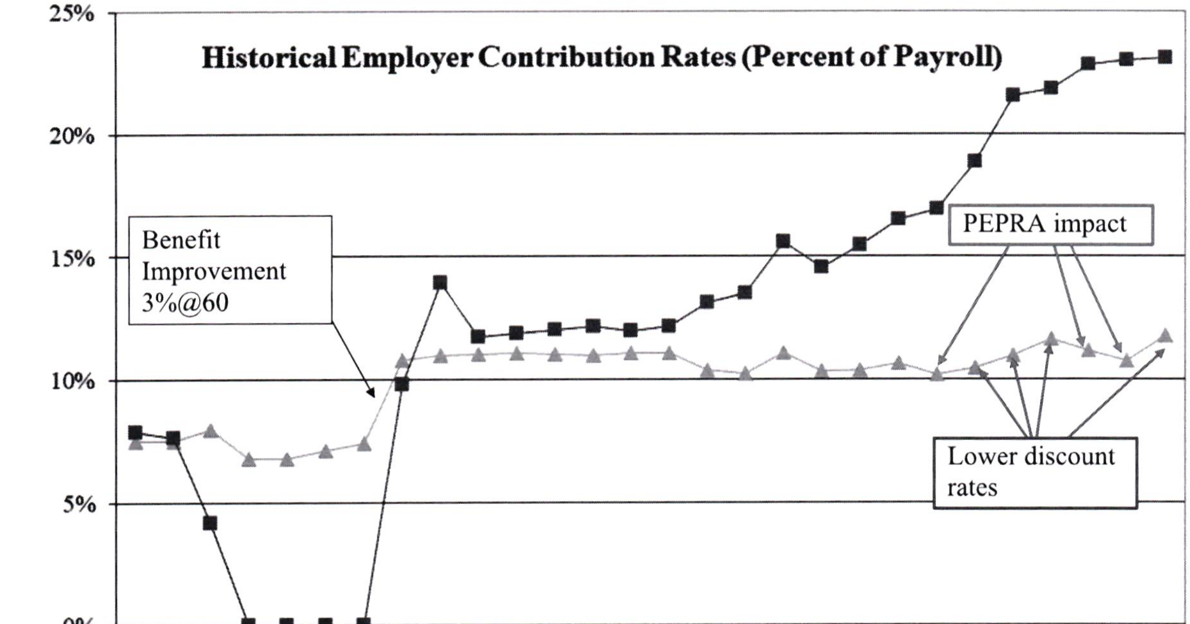
FUNDED STATUS (BILLIONS) - MISCELLANEOUS



Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08
AAL	0.7	0.8	0.8	0.8	0.9	1.1	1.2	1.6	1.8	2.0	2.2	2.5	2.7	3.0	3.4
Assets	0.7	0.8	0.9	1.1	1.4	1.6	1.7	1.6	1.5	1.5	1.8	2.4	2.8	3.3	3.2

Valuation Date	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
AAL	3.8	4.1	4.5	4.7	5.0	5.7	6.2	6.9	7.4	8.2	8.6	9.0	9.7	10.2
Assets	2.5	2.9	3.5	3.5	4.0	4.7	4.8	4.8	5.3	5.7	6.1	6.7	8.3	7.8

CONTRIBUTION RATES - MISCELLANEOUS



	FY 97	FY 98	FY 99	FY 100	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 010
Normal Cost	7.5%	7.5%	8.0%	6.8%	6.8%	7.1%	7.4%	10.8%	11.0%	11.1%	11.1%	11.0%	11.0%	11.1%
Total Rate	7.8%	7.6%	4.2%	0.0%	0.0%	0.0%	0.0%	9.8%	13.9%	11.8%	11.9%	12.1%	12.2%	12.0%

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24
Normal Cost	11.1%	10.4%	10.2%	11.1%	10.3%	10.4%	10.7%	10.2%	10.5%	11.0%	11.7%	11.2%	10.8%	11.8%
Total Rate	12.2%	13.1%	13.5%	15.6%	14.5%	15.4%	16.5%	16.9%	18.9%	21.6%	21.8%	22.9%	23.0%	23.1%

CONTRIBUTION RATES - MISCELLANEOUS

	6/30/20 2022/2023	6/30/21 2023/2024
■ Total Normal Cost	18.3%	19.3%
■ Employee Normal Cost	7.6%	7.6%
■ Employer Normal Cost	10.8%	11.8%
■ Amortization Payments	12.3%	11.3%[5]
■ Total Employer Contribution Rate	23.0%	23.1%

■ 2022/23 Employer Contribution Rate	23.0%
● 6/30/17 Discount Rate & Inflation (5th Year)	0.2%
● 6/30/18 Discount Rate change (4th Year)	0.5%
● 6/30/21 Demog. Assumption change (1st Year, no ramp)	1.4%
● 6/30/21 Risk Mitigation (6.8%) (Normal Cost change)	0.9%
● Other (Gains)/Losses mainly net investment gain	(2.9%)
■ 2023/24 Employer Contribution Rate	23.1%

[5] Equivalent to 11.4% of UAL. One year, 6.8% interest on the UAL is 6.8% of payroll. 2023/24 amortization payment exceeds interest on the UAL, so there is no "negative amortization."

CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- Market Value Investment Return:
  - June 30, 2022 (6.1%)[6]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[7]	25th Percentile	50th Percentile	75th Percentile
Current investment mix – first 10 years, without risk mitigation	**-1.8%**	**6.0%**	**14.7%**
Current investment mix – after 10 years, without risk mitigation	**-0.7%**	**7.5%**	**16.4%**

  - Assumes investment returns will generally be lower over the next 10 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy – Ultimate rate 6.0%
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection
- Impact of Risk Mitigation Policy:
  - Net impact of investment gain and discount rate change amortized over 20 years with 5 year ramp up
  - Same amortization method for all future years

[6] Gross return based on July 2022 CalPERS press release.
[7] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

CONTRIBUTION PROJECTIONS - MISCELLANEOUS

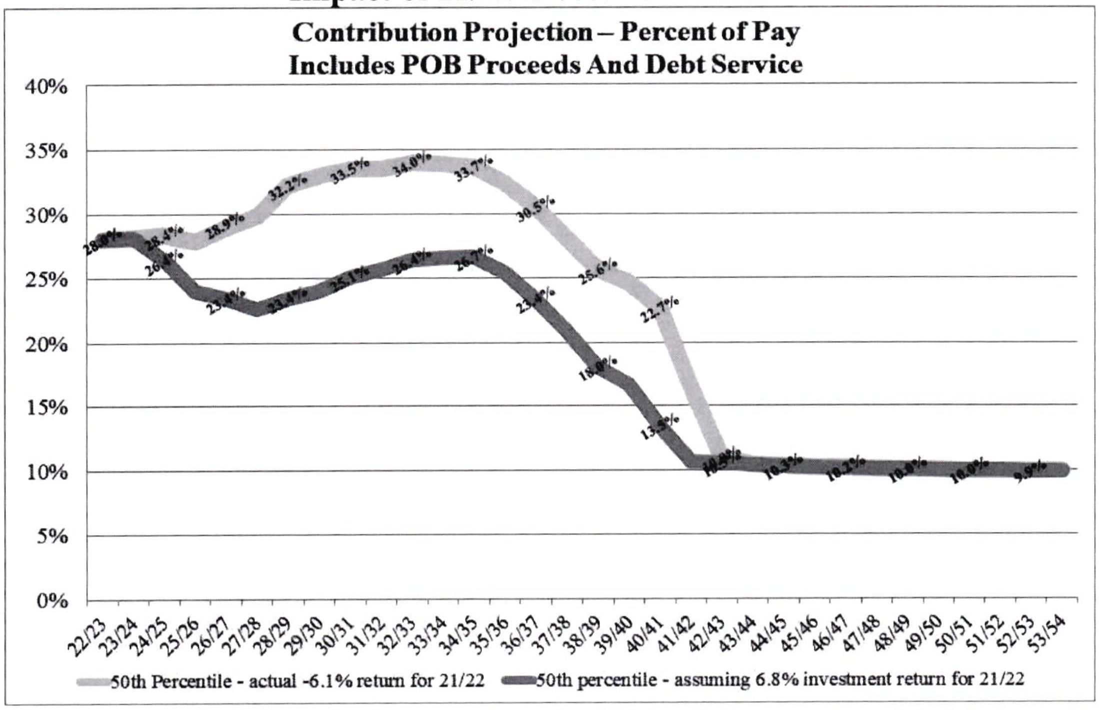
- New hire assumptions:
  - All new hires assumed PEPRA members and none are Classic members

- 6/30/21 employee distribution:

Benefit Tier	Count	% of Total	20/21 Payroll	% of Total
• 3%@60 FAE1	8,073	45.5%	$649,562,500	53.6%
• 2%@60 FAE3	699	3.9%	51,044,200	4.2%
• 2%@62 FAE3 (PEPRA)	8,990	50.6%	510,437,100	42.1%

Contribution Projections - Miscellaneous

Impact of 21/22 Investment Return



Contribution Projections - Miscellaneous

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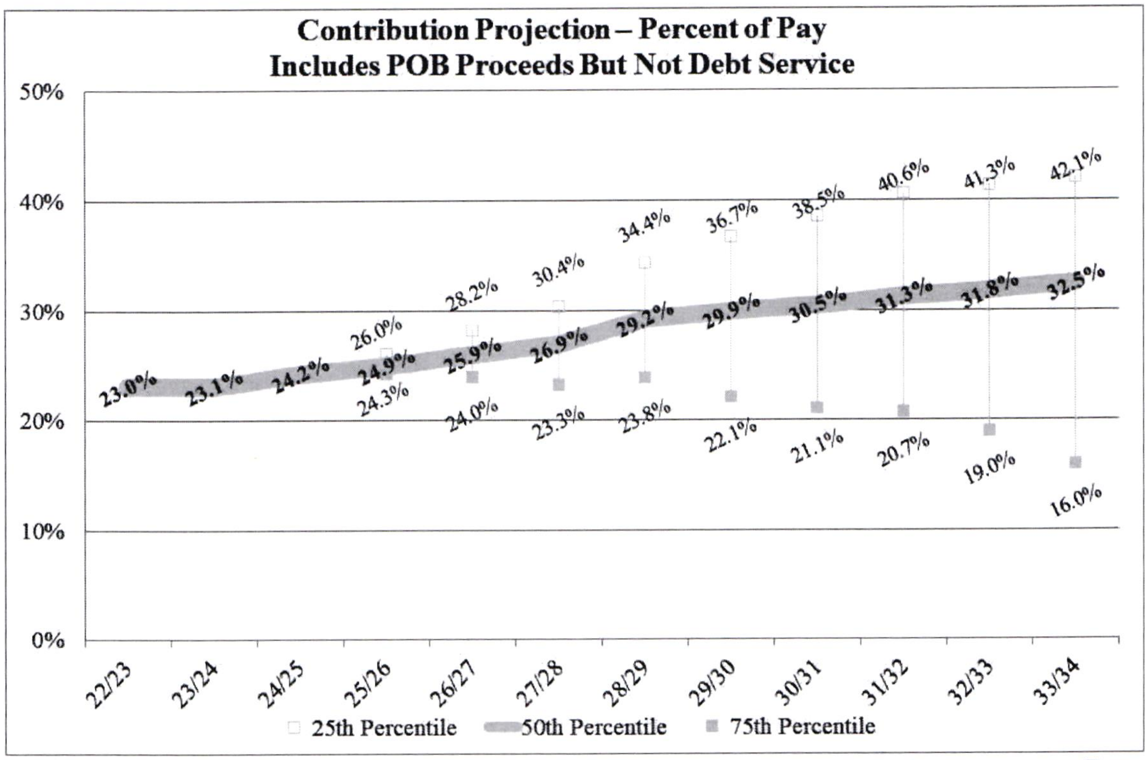
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



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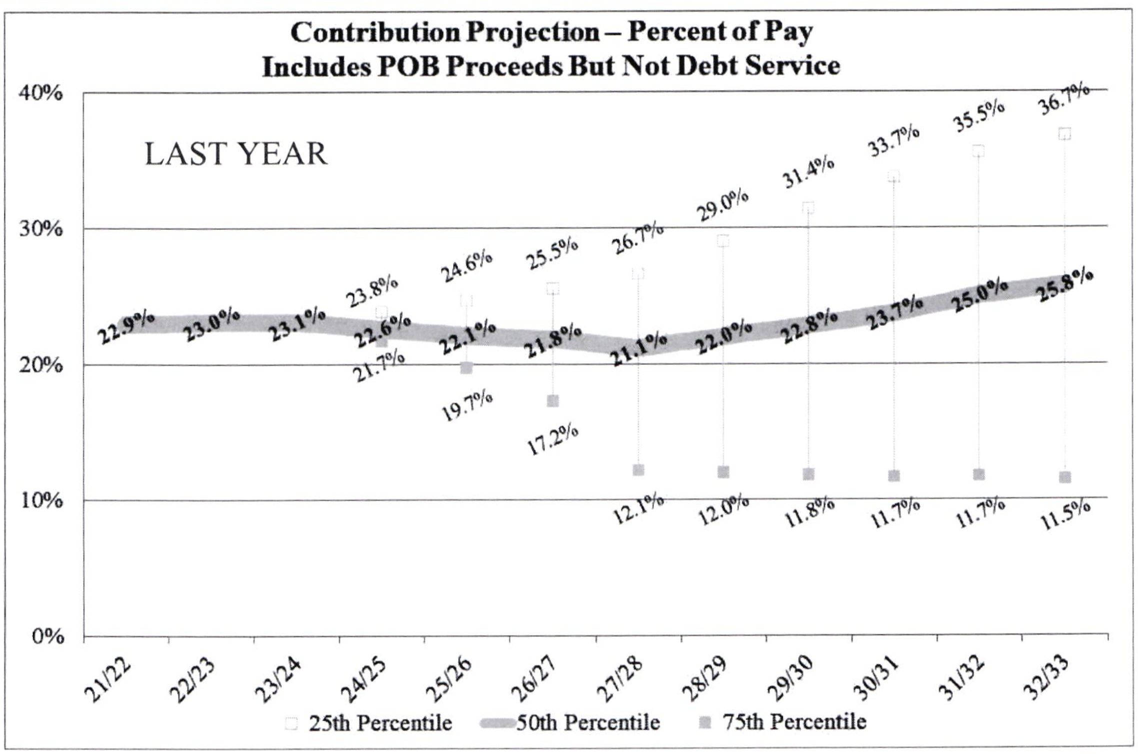

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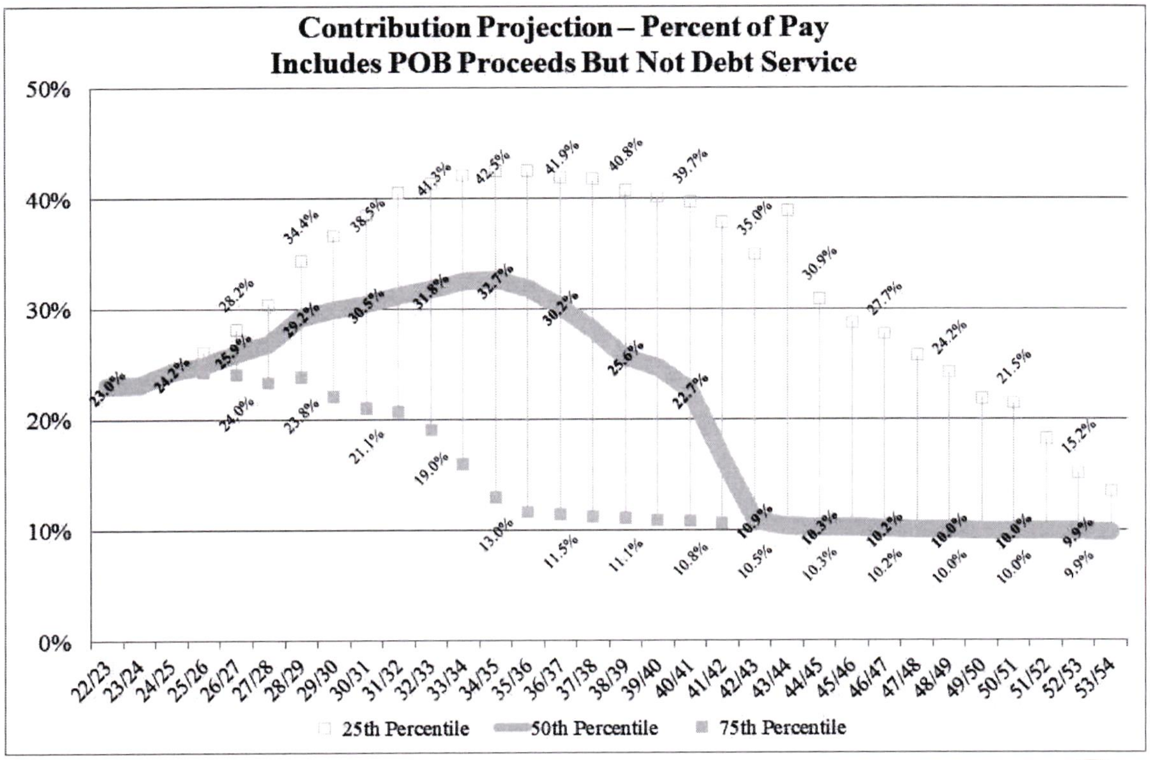

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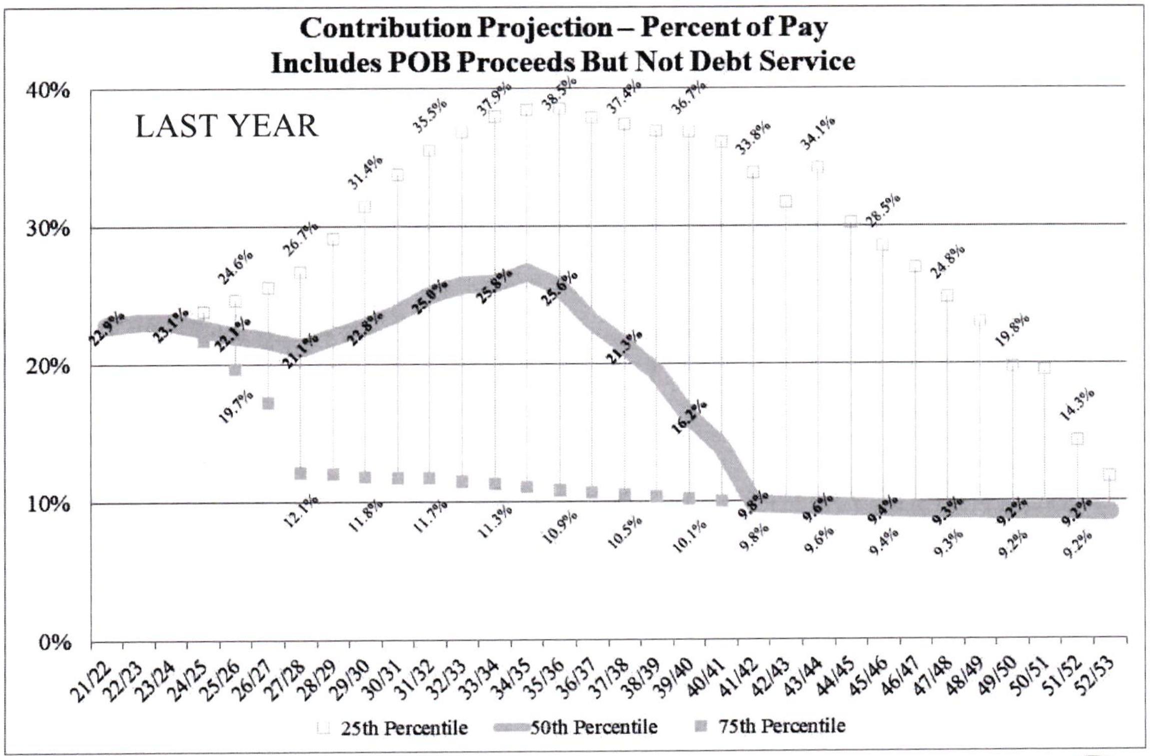

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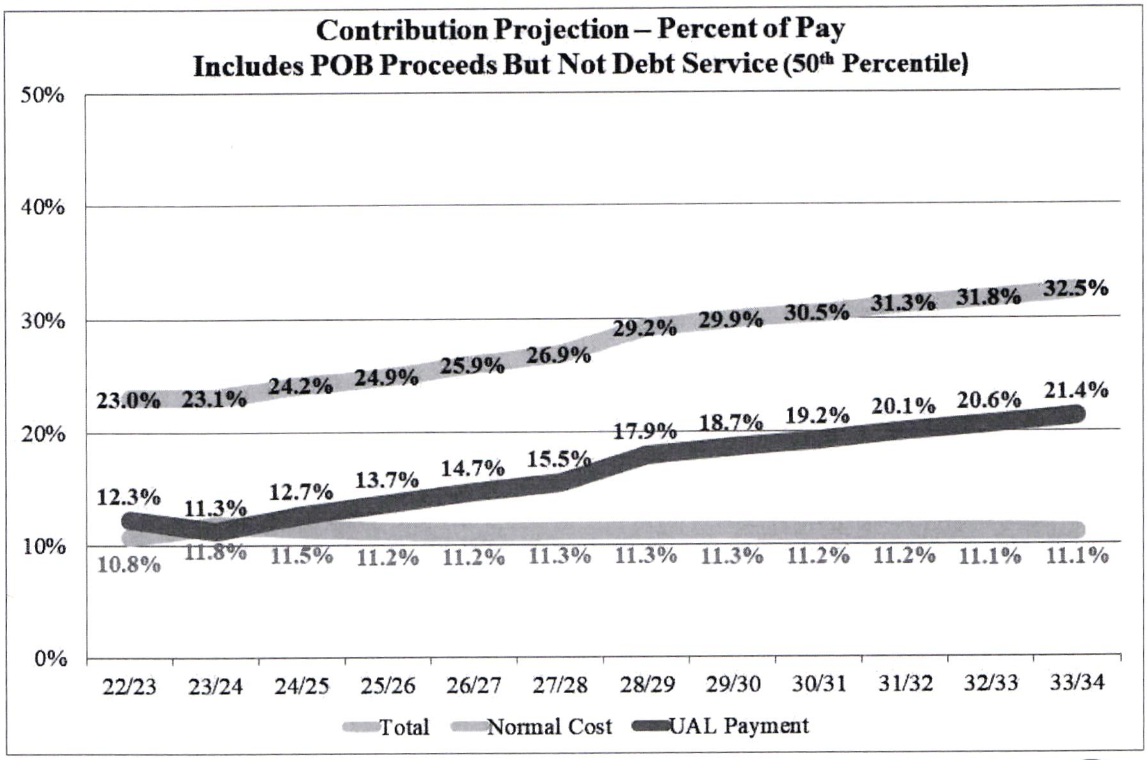

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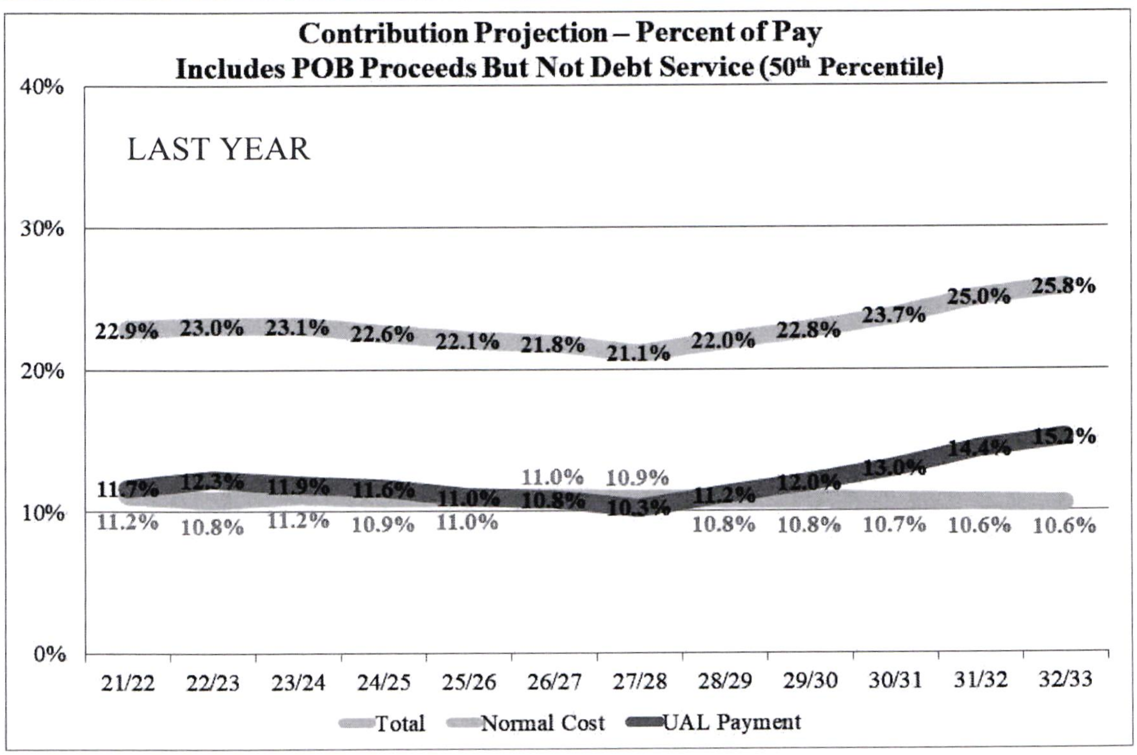

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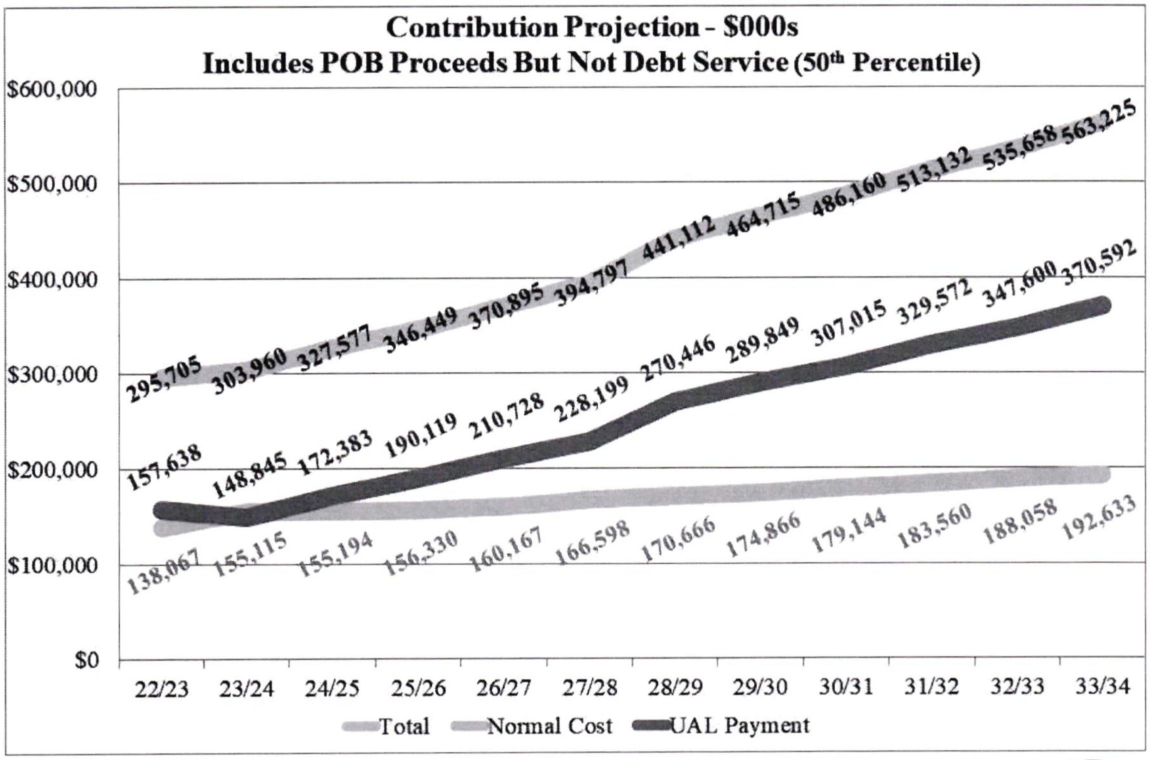

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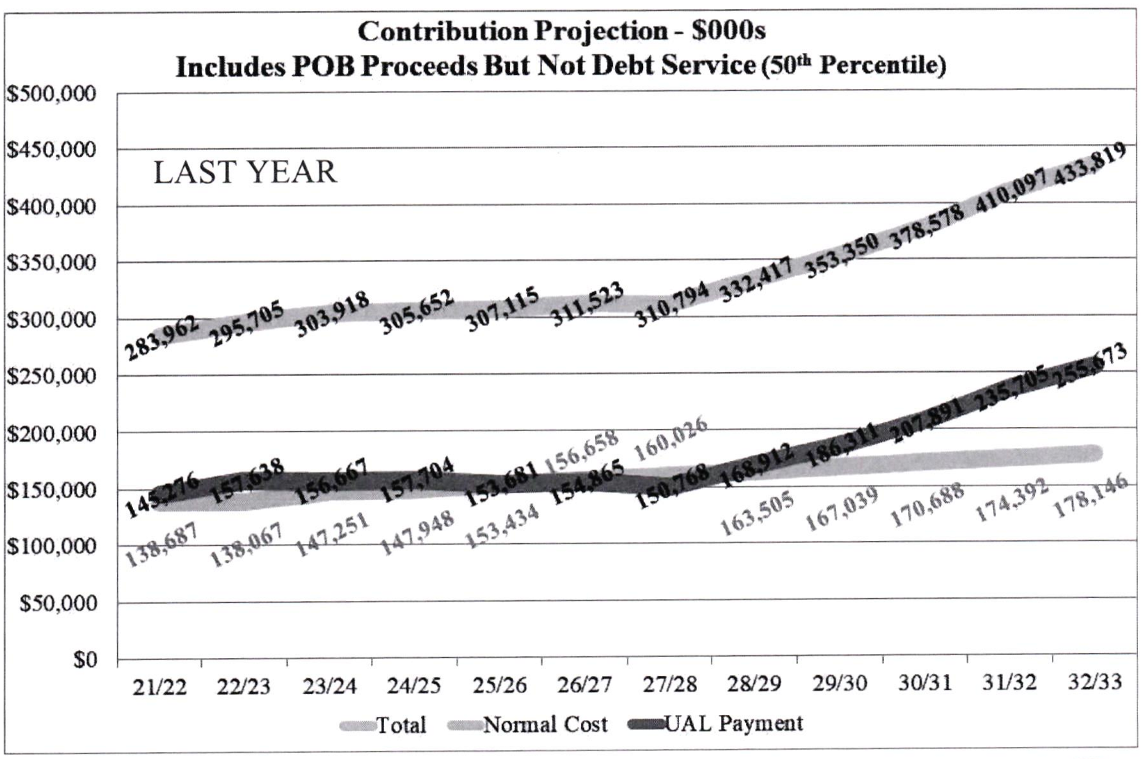

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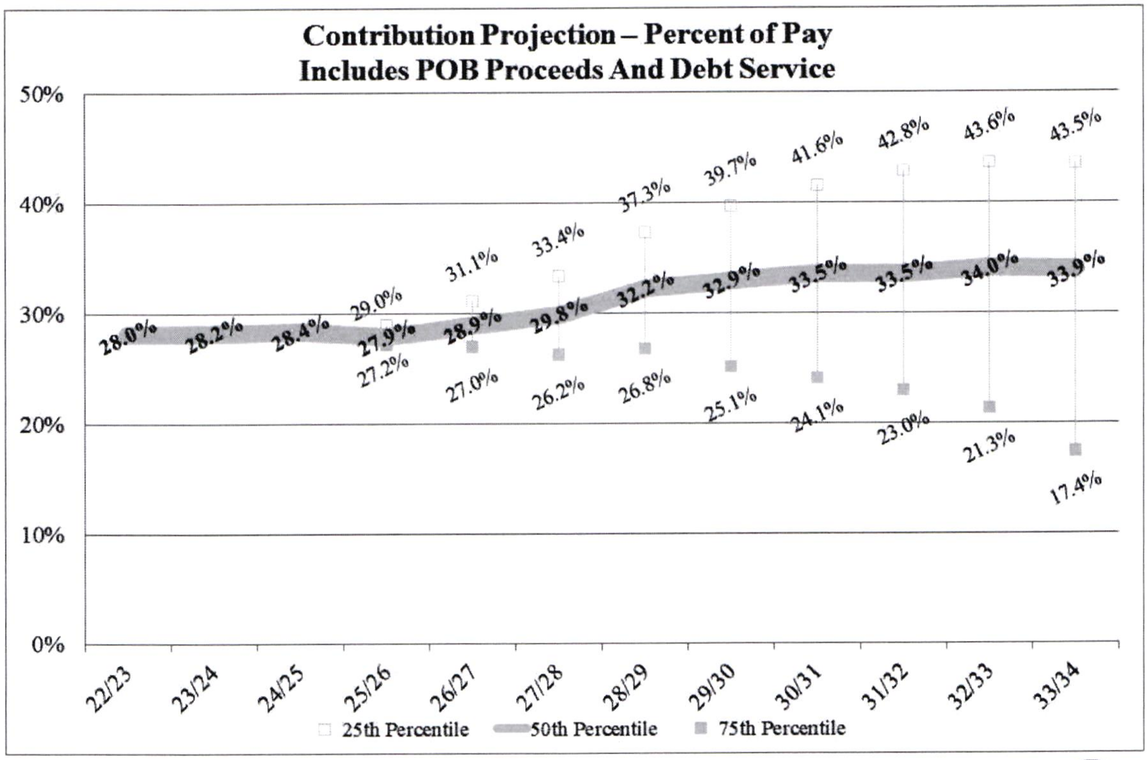
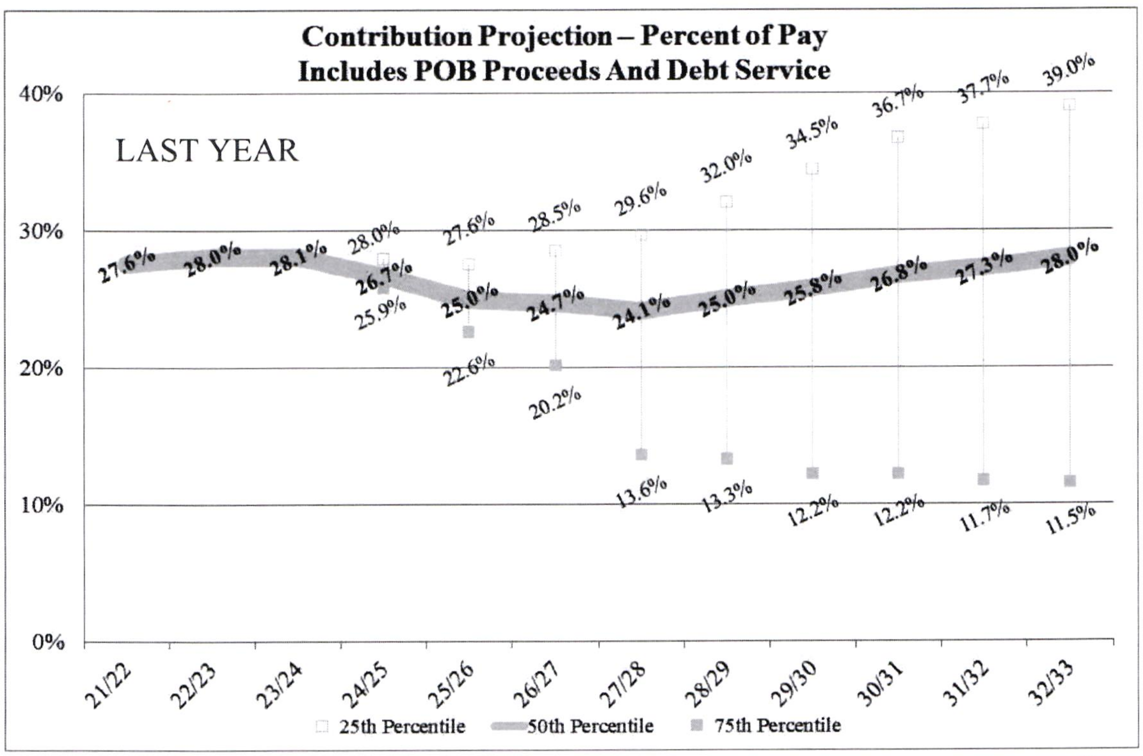
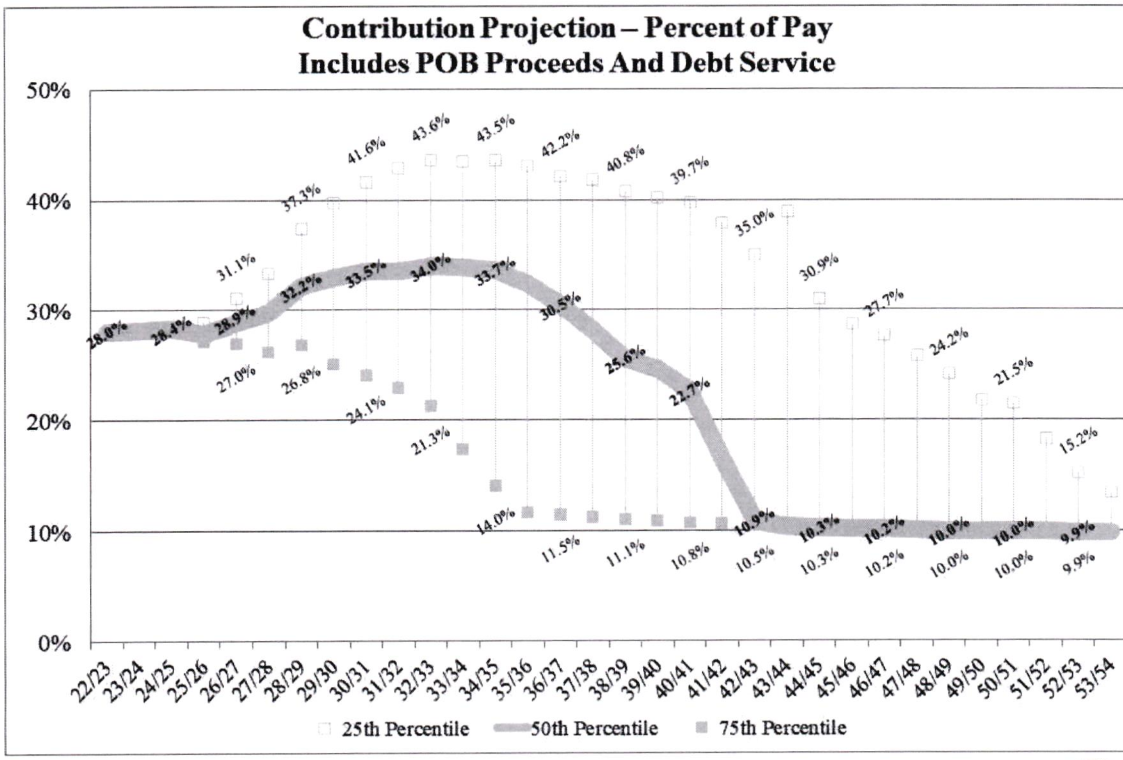


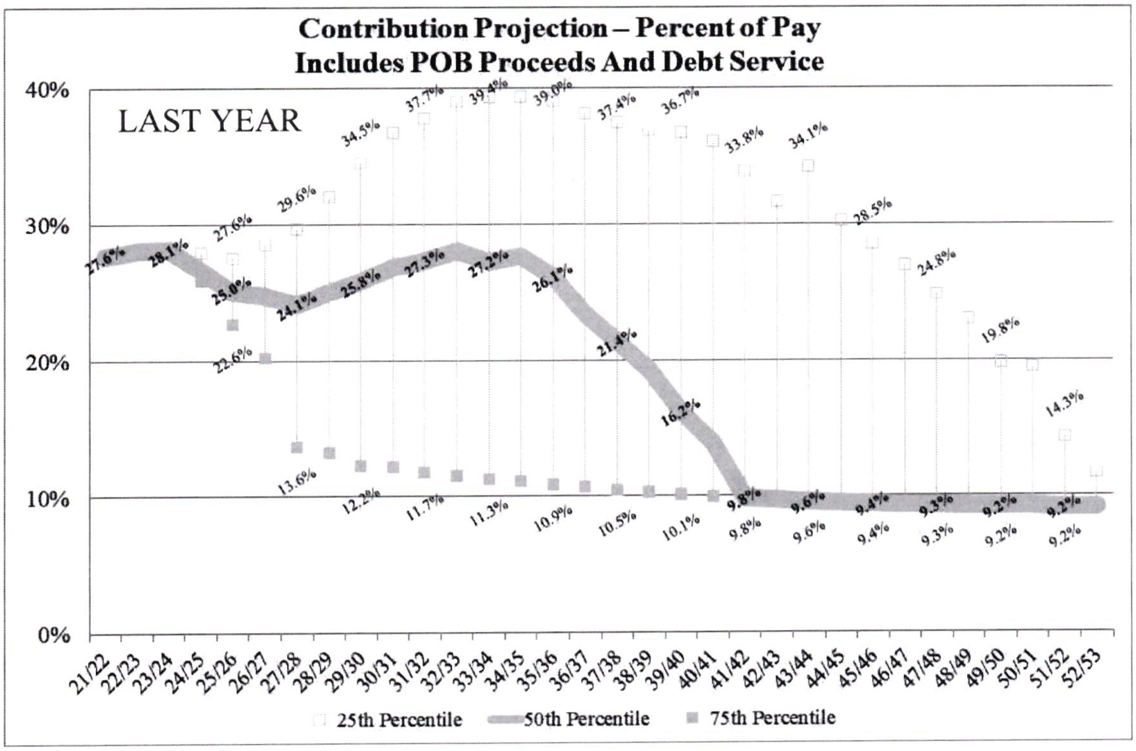
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



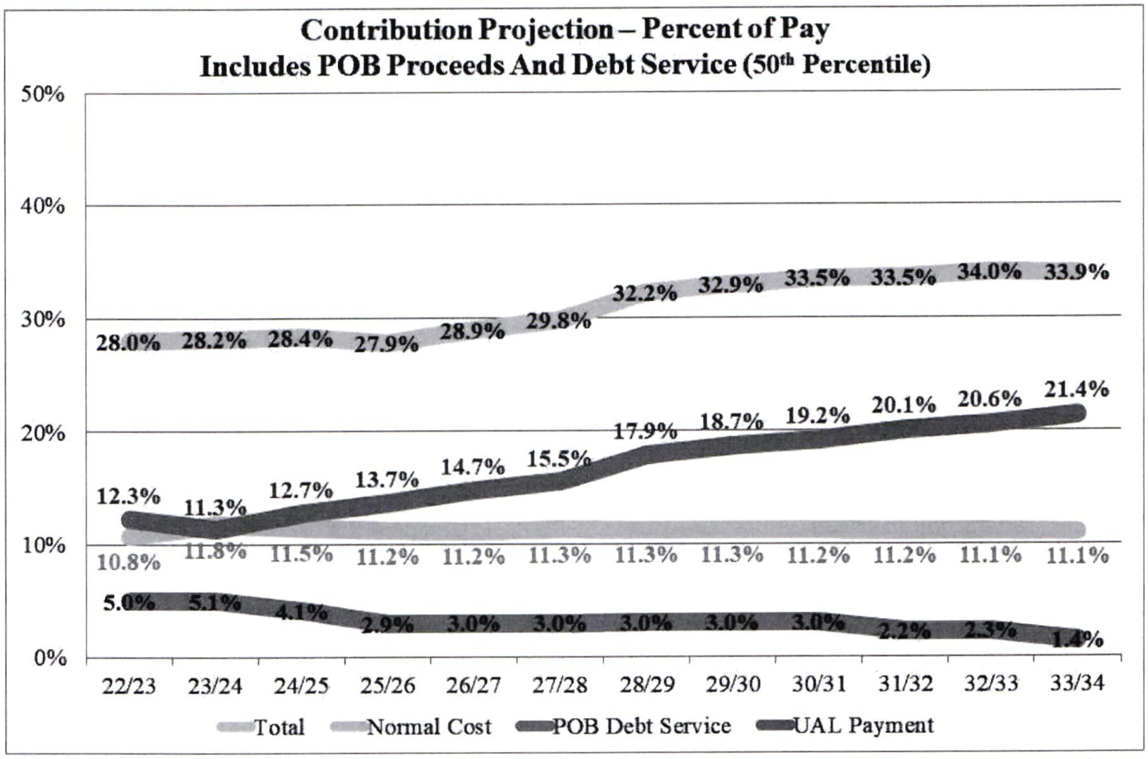
Contribution Projections - Miscellaneous



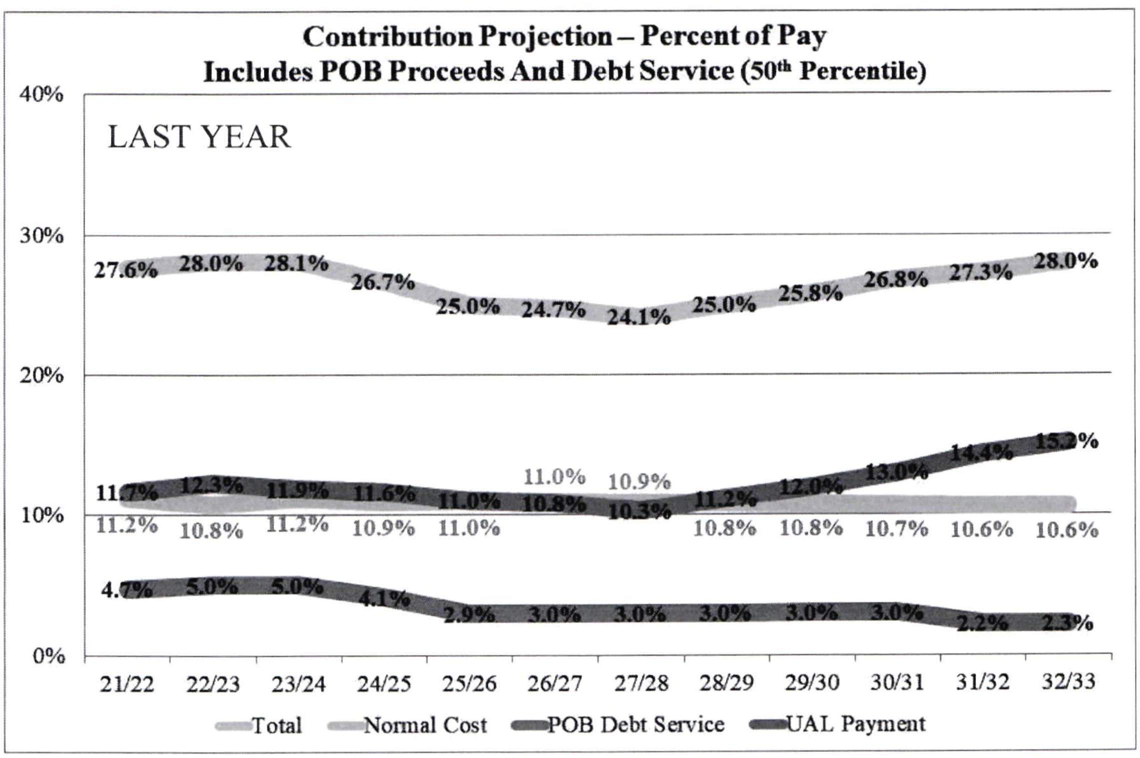
Contribution Projections - Miscellaneous



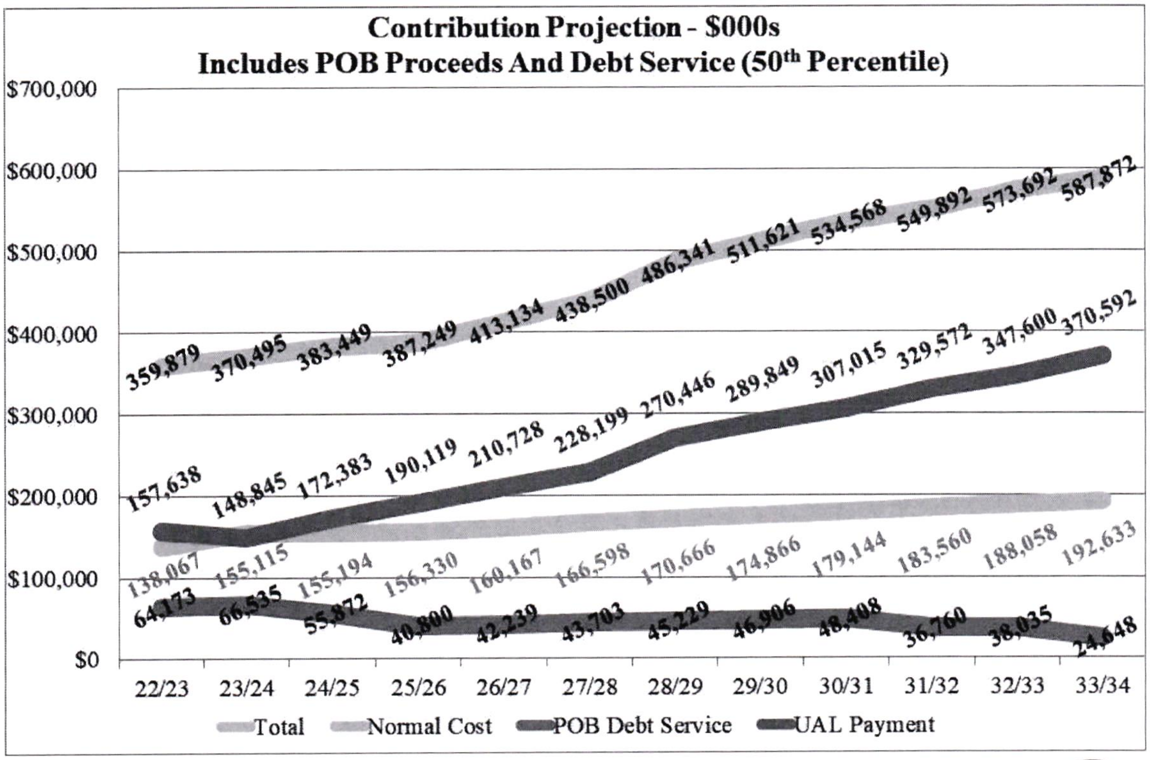
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



CONTRIBUTION PROJECTIONS - MISCELLANEOUS



CONTRIBUTION PROJECTIONS - MISCELLANEOUS



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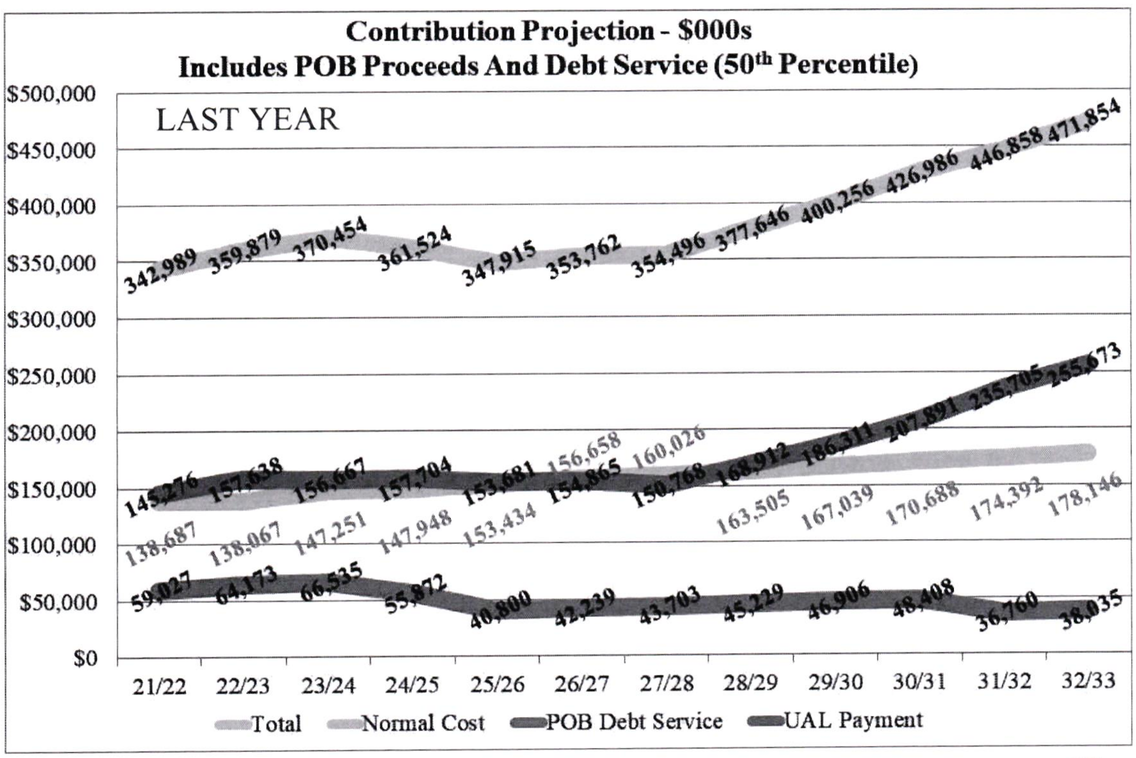
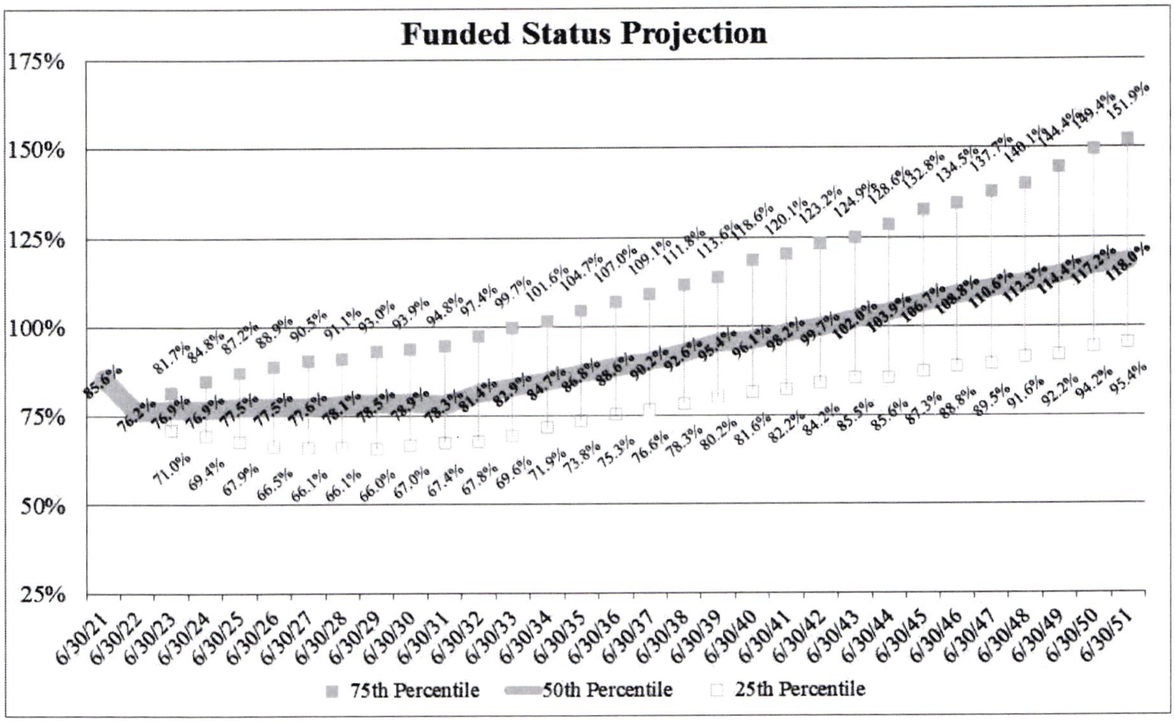
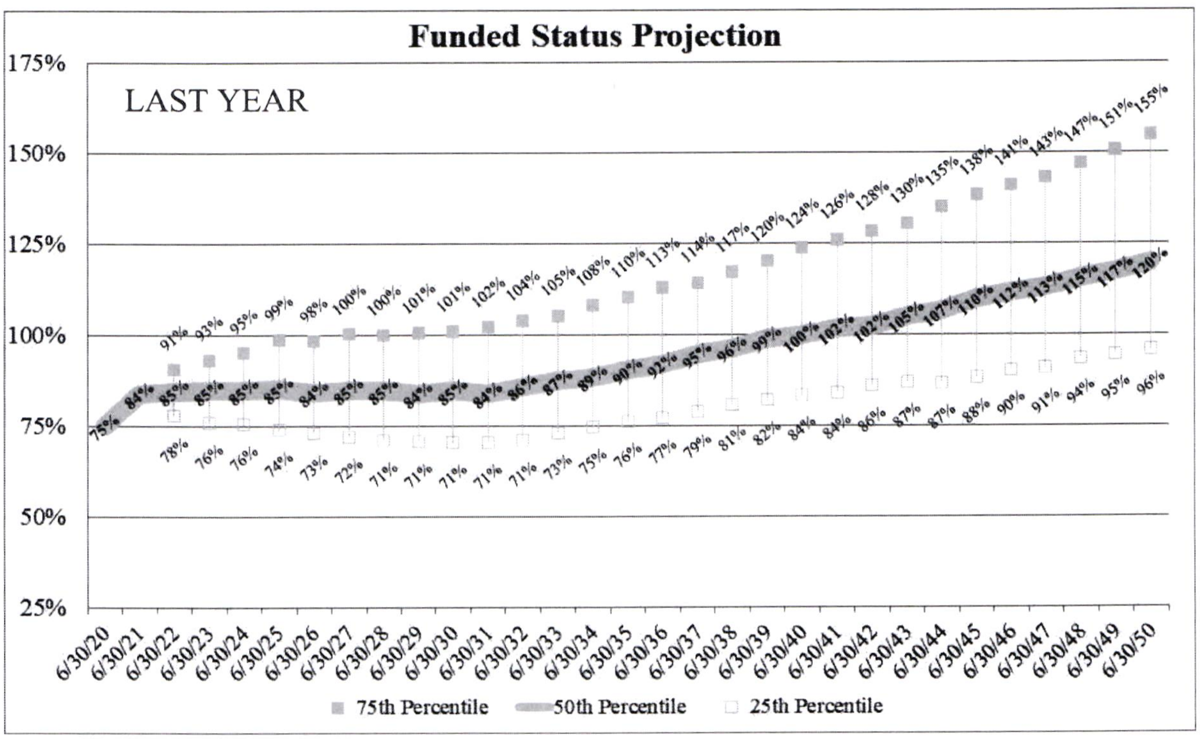


FUNDED STATUS - MISCELLANEOUS



FUNDED STATUS - MISCELLANEOUS

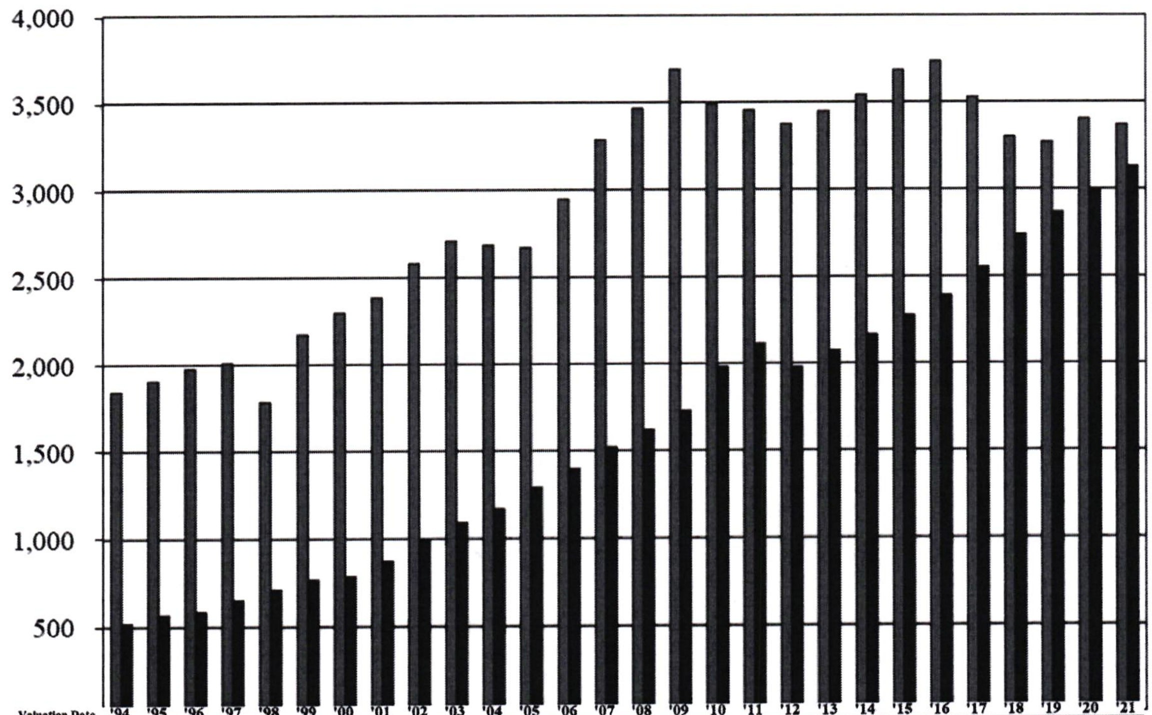


SUMMARY OF DEMOGRAPHIC INFORMATION - SAFETY

	2001	2011	2020	2021
Actives				
■ Counts	2,385	3,455	3,404	3,370
■ Average				
• Age	39	39	40	40
• County Service	9	10	11	12
• PERSable Wages	$ 53,600	$ 79,100	$ 92,900	$ 96,000
■ Total PERSable Wages	127,800,000	273,200,000	316,000,000	351,600,000
Inactive Members				
■ Counts				
• Transferred	444	536	701	689
• Separated	254	513	717	786
• Retired				
☐ Service	353	1,401	2,047	2,153
☐ Disability	417	547	661	669
☐ Beneficiaries	102	164	291	304
☐ Total	872	2,112	2,999	3,126
■ Average Annual County Provided Benefit for Service Retirees[8]	$ 24,700	$ 39,400	$ 62,700	$ 63,900

[8] Average County-provided pensions are based on County service & County benefit formula, and are not representative of benefits for long-service employees.

SUMMARY OF DEMOGRAPHIC INFORMATION - SAFETY



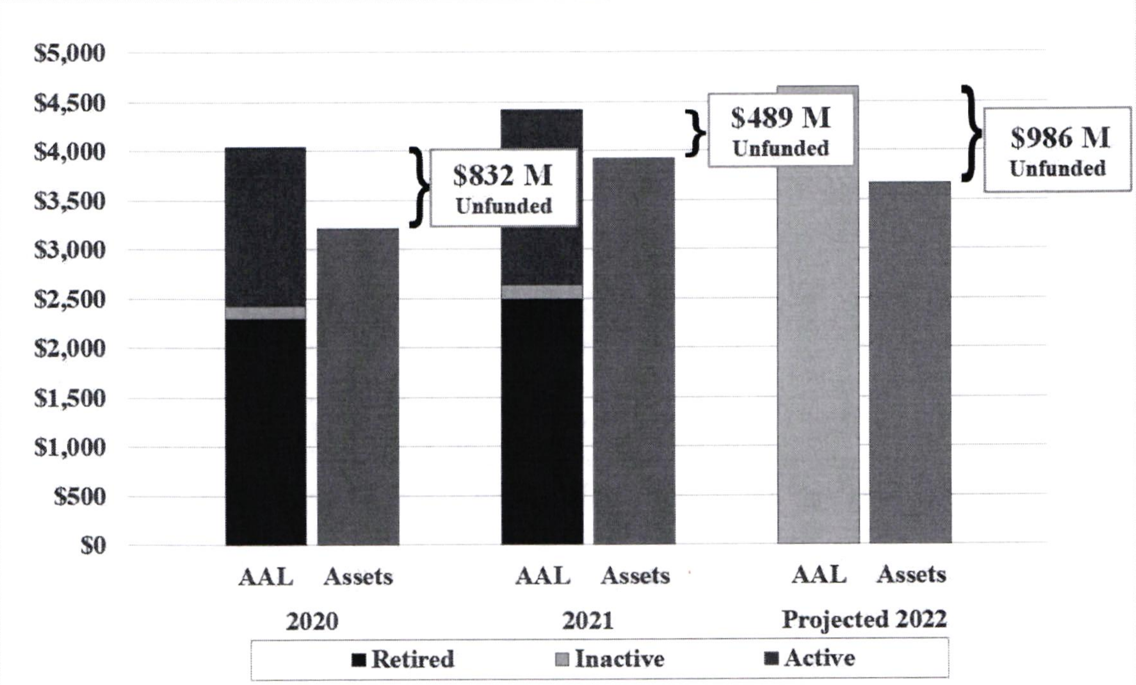
Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Active (000's)	1.8	1.9	2.0	2.0	1.8	2.2	2.3	2.4	2.6	2.7	2.7	2.7	2.9	3.3	3.5	3.7	3.5	3.5	3.4	3.4	3.5	3.7	3.7	3.5	3.3	3.3	3.4	3.4
Receiving Payments (000's)	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	2.0	2.1	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.9	3.0	3.1

PLAN FUNDED STATUS - SAFETY

	June 30, 2020	June 30, 2021
■ **Actuarial Accrued Liability**		
● Active	$ 1,625,000,000	$ 1,779,900,000
● Retiree	2,301,500,000	2,500,700,000
● Inactive	119,400,000	136,300,000
● Total	4,045,900,000	4,416,900,000
■ **Assets**	2,213,700,000	3,928,100,000
■ **Unfunded Liability**	832,200,000	488,800,000
■ **Funded Ratio**	79.4%	88.9%
■ **Average funded ratio for CalPERS Public Agency Safety Plans**	69.2%	80.9%

PLAN FUNDED STATUS - SAFETY

County CalPERS Assets and Actuarial Liability ($Millions)



PLAN FUNDED STATUS - SAFETY

Discount Rate Sensitivity

June 30, 2021

	Discount Rate		
	6.80%	**6.30%**[9]	**5.80%**
AAL	$4,416,900,000	$4,755,400,000	$5,093,900,000
Assets	3,928,100,000	3,928,100,000	3,928,100,000
Unfunded Liability	488,800,000	827,300,000	1,165,800,000
Funded Ratio	88.9%	82.6%	77.1%

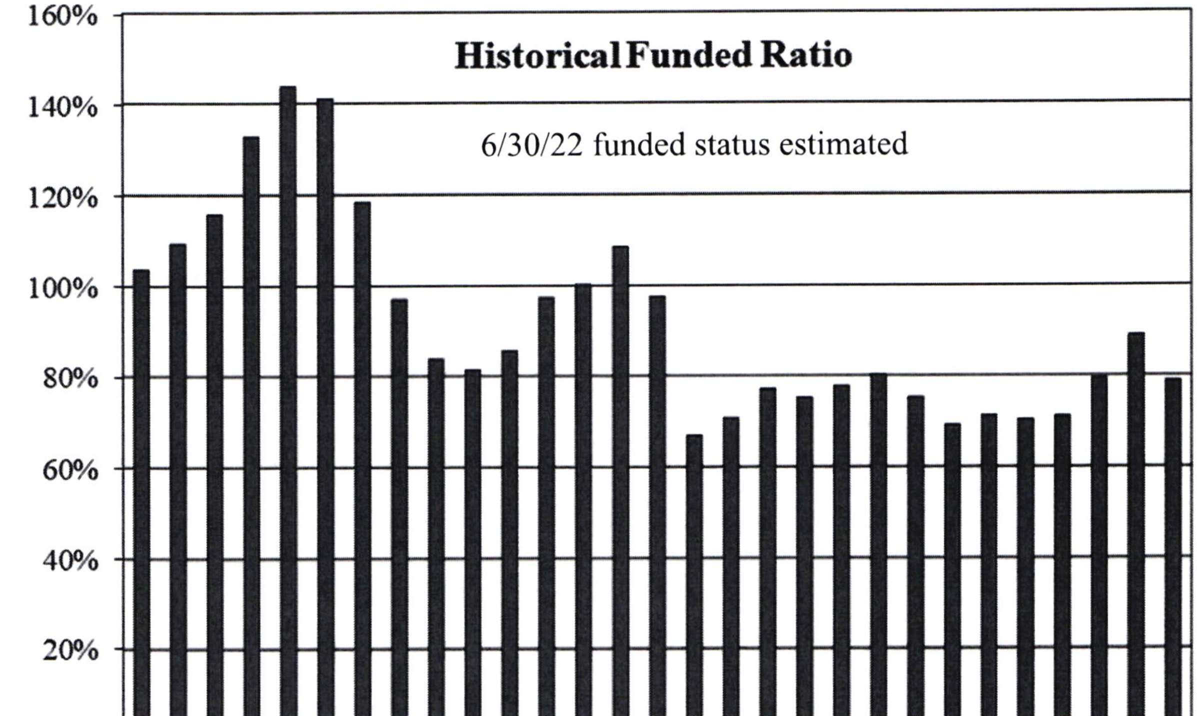
9 Estimated by Foster & Foster.

PLAN FUNDED STATUS - SAFETY

Unfunded Accrued Liability Changes

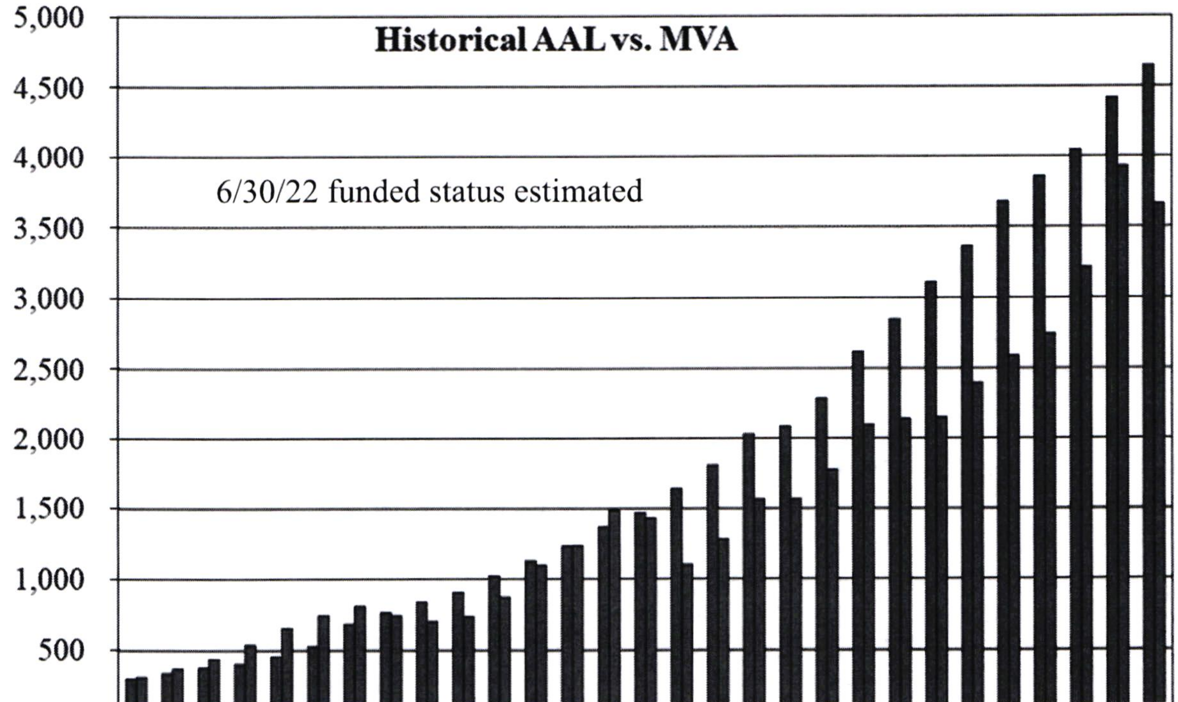
■ **Unfunded Accrued Liability on 6/30/20**		$832,200,000
■ **Expected 6/30/21 Unfunded Accrued Liability**		846,200,000
■ **Changes**		
• Assumption Change (demographics)	36,200,000	
• Discount Rate 7% to 6.8%	116,600,000	
• Asset Loss (Gain) (21.2% return for FY 2021)	(507,100,000)	
• Contribution & Experience Loss (Gain)	(3,100,000)	
• Total		(357,400,000)
■ **Unfunded Accrued Liability on 6/30/21**		488,800,000
■ **Projected Unfunded Accrued Liability on 6/30/22**		986,000,000

FUNDED RATIO - SAFETY



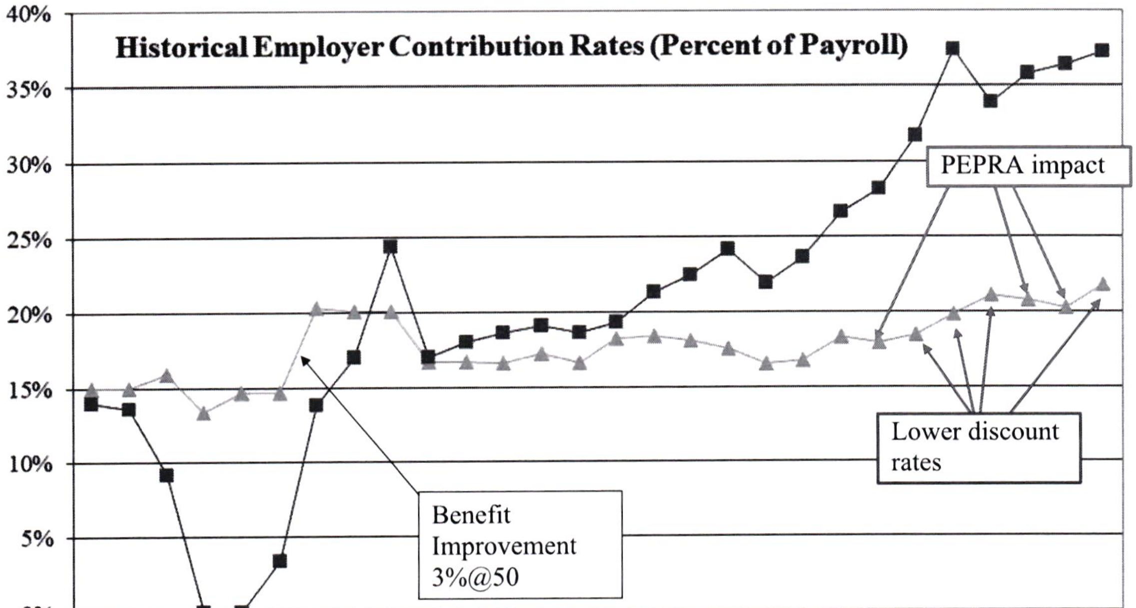
Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
Funded Ratio - MVA/AAL	104%	109%	116%	133%	144%	141%	118%	97%	84%	81%	86%	97%	100%	109%	97%	67%	71%	77%	75%	78%	80%	75%	69%	71%	70%	71%	79%	89%	79%*

FUNDED STATUS (BILLIONS) - SAFETY



Valuation Date	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
AAL	0.3	0.3	0.4	0.4	0.5	0.5	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.4	1.5	1.6	1.8	2.0	2.1	2.3	2.6	2.8	3.1	3.4	3.7	3.9	4.0	4.4	4.6
Assets	0.3	0.4	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.9	1.1	1.2	1.5	1.4	1.1	1.3	1.6	1.6	1.8	2.1	2.1	2.2	2.4	2.6	2.7	3.2	3.9	3.7

CONTRIBUTION RATES - SAFETY



	FY 97	FY 98	FY 99	FY 100	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 010
Normal Cost	15.0%	15.0%	16.0%	13.4%	14.7%	14.7%	20.3%	20.1%	20.1%	16.7%	16.7%	16.6%	17.2%	16.6%
Total Rate	14.0%	13.6%	9.1%	0.0%	0.0%	3.4%	13.8%	17.0%	24.4%	17.0%	18.0%	18.6%	19.0%	18.6%

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24
Normal Cost	18.2%	18.4%	18.1%	17.5%	16.6%	16.7%	18.3%	17.9%	18.5%	19.9%	21.1%	20.7%	20.2%	21.7%
Total Rate	19.3%	21.3%	22.5%	24.1%	21.9%	23.6%	26.6%	28.2%	31.6%	37.4%	33.9%	35.8%	36.4%	37.3%

CONTRIBUTION RATES - SAFETY

	6/30/20 2022/2023	6/30/21 2023/2024
■ Total Normal Cost	30.0%	31.9%
■ Employee Normal Cost	9.8%	10.2%
■ Employer Normal Cost	20.2%	21.7%
■ Amortization Payments	16.2%	15.5%[10]
■ Total Employer Contribution Rate	36.4%	37.3%

■ 2022/23 Employer Contribution Rate	36.4%
● 6/30/17 Discount Rate & Inflation (5th Year)	0.4%
● 6/30/18 Discount Rate change (4th Year)	0.8%
● 6/30/21 Demog. Assumption change (1st Year, no ramp)	1.9%
● 6/30/21 Risk Mitigation (Normal Cost change)	1.5%
● Other (Gains)/Losses mainly net investment gain	(3.7%)
■ 2023/24 Employer Contribution Rate	37.3%

[10] Equivalent to 11.9% of UAL. One year, 6.8% interest on the UAL is 8.9% of payroll. 2023/24 amortization payment exceeds interest on the UAL, so there is no "negative amortization."

Contribution Projection - Safety

- Market Value Investment Return:
  - June 30, 2022 (6.1%)[11]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[12]	25th Percentile	50th Percentile	75th Percentile
Current investment mix – first 10 years, without risk mitigation	**-1.8%**	**6.0%**	**14.7%**
Current investment mix – after 10 years, without risk mitigation	**-0.7%**	**7.5%**	**16.4%**

  - Assumes investment returns will generally be lower over the next 10 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy – Ultimate rate 6.0%
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection
- Impact of Risk Mitigation Policy:
  - Net impact of investment gain and discount rate change amortized over 20 years with 5 year ramp up
  - Same amortization method for all future years

[11] Gross return based on July 2022 CalPERS press release.
[12] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

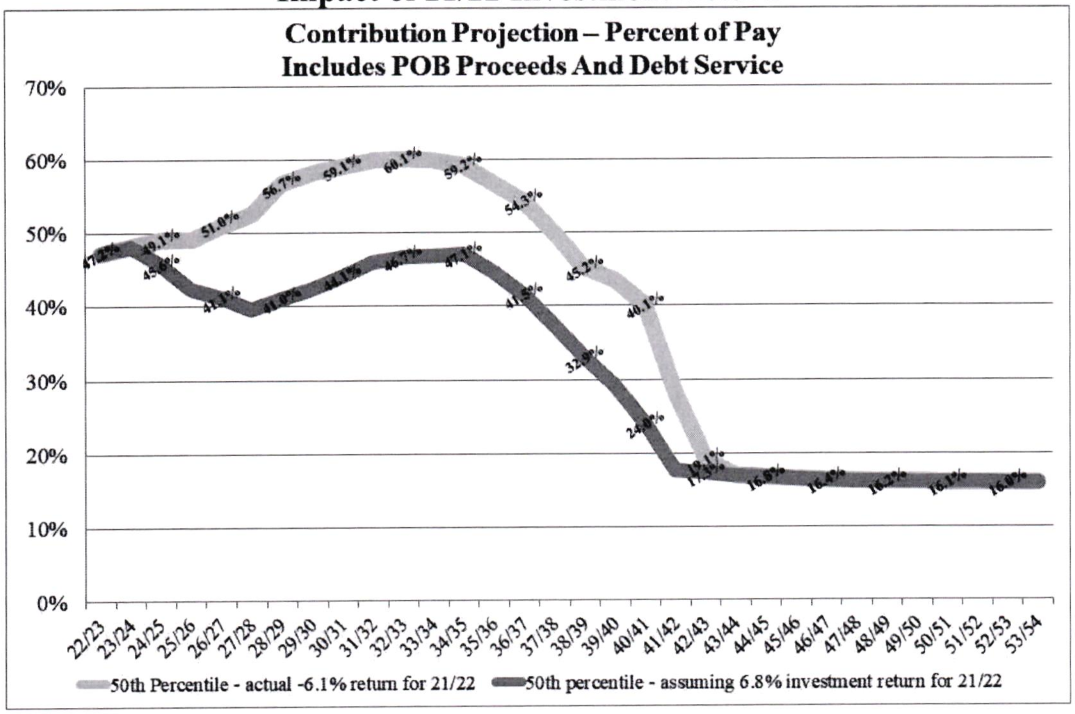
Contribution Projection - Safety

- New hire assumptions:
  - All new hires assumed PEPRA members and none are Classic members

- 6/30/21 employee distribution:

Benefit Tier	Count	% of Total	20/21 Payroll	% of Total
• 3%@50 FAE1	2,037	60.4%	$228,314,800	70.5%
• 2%@50 FAE3	146	4.3%	13,915,600	4.3%
• 2.7%@57 FAE3 (PEPRA)	1,187	35.2%	81,442,100	25.2%

Impact of 21/22 Investment Return



CONTRIBUTION PROJECTION - SAFETY

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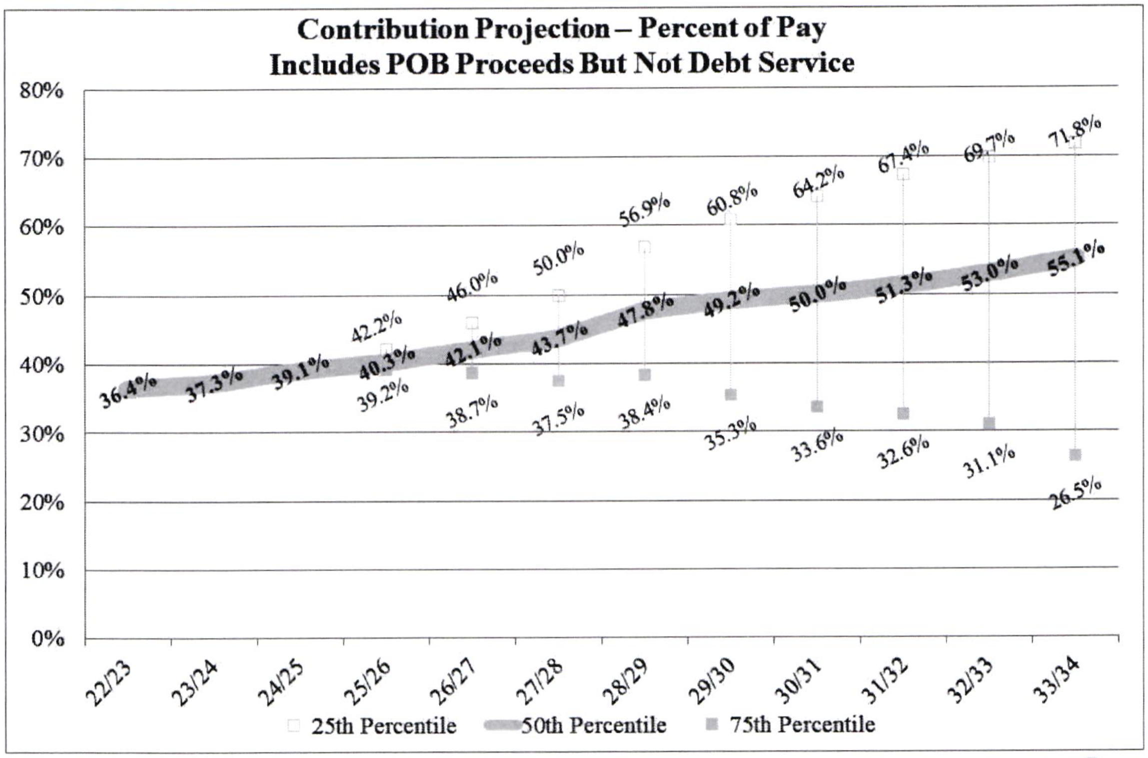
CONTRIBUTION PROJECTION - SAFETY



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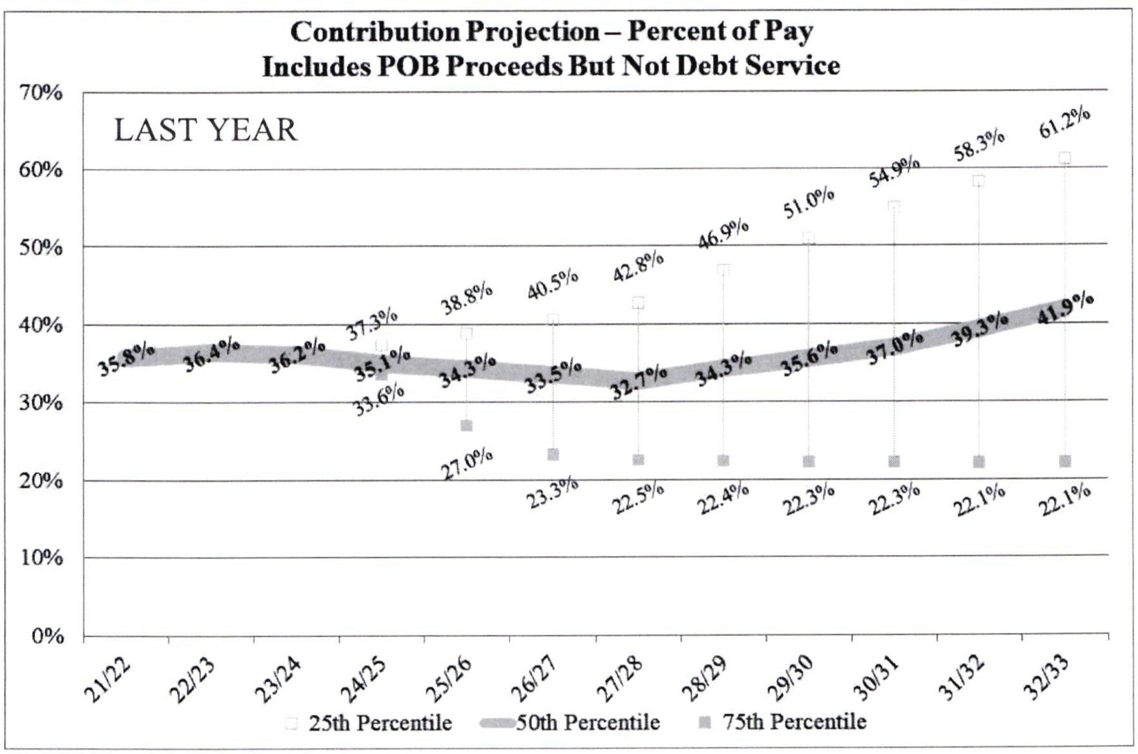

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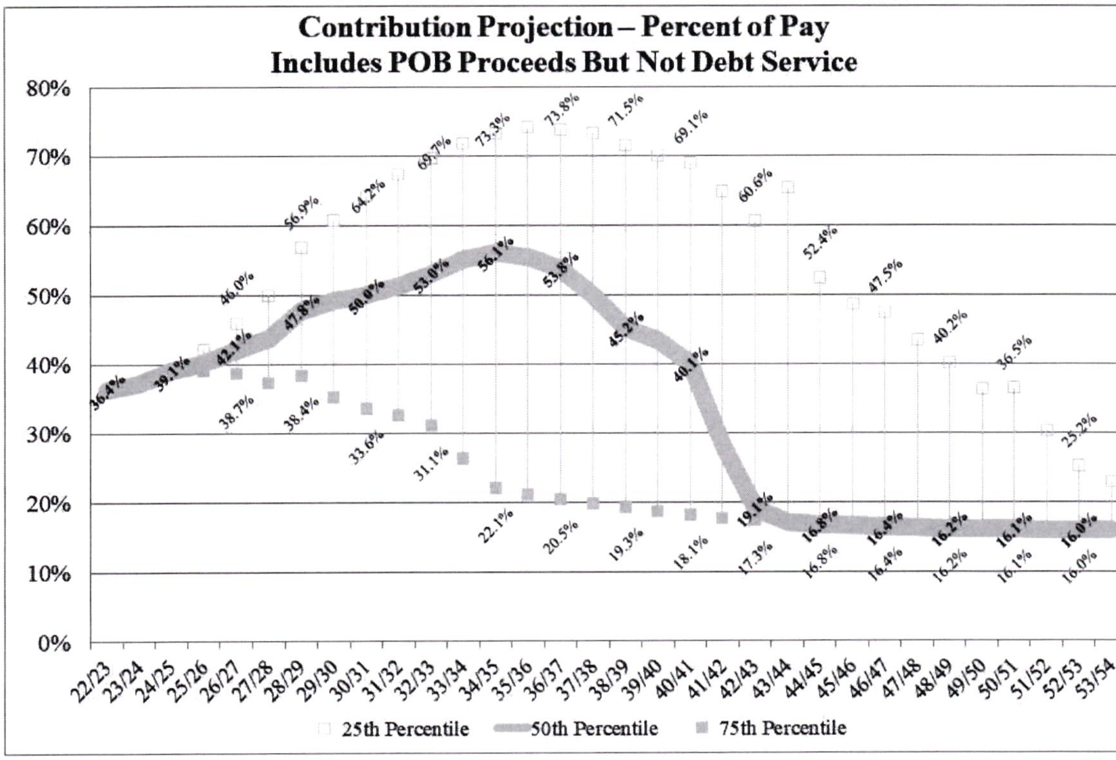

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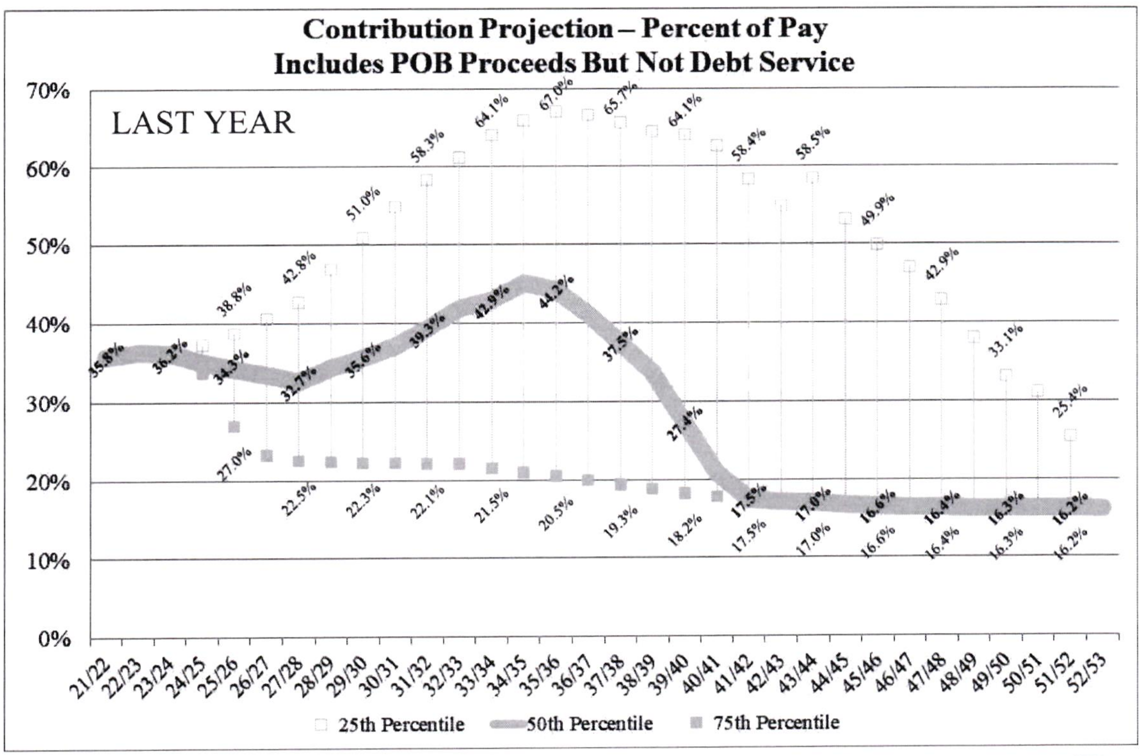

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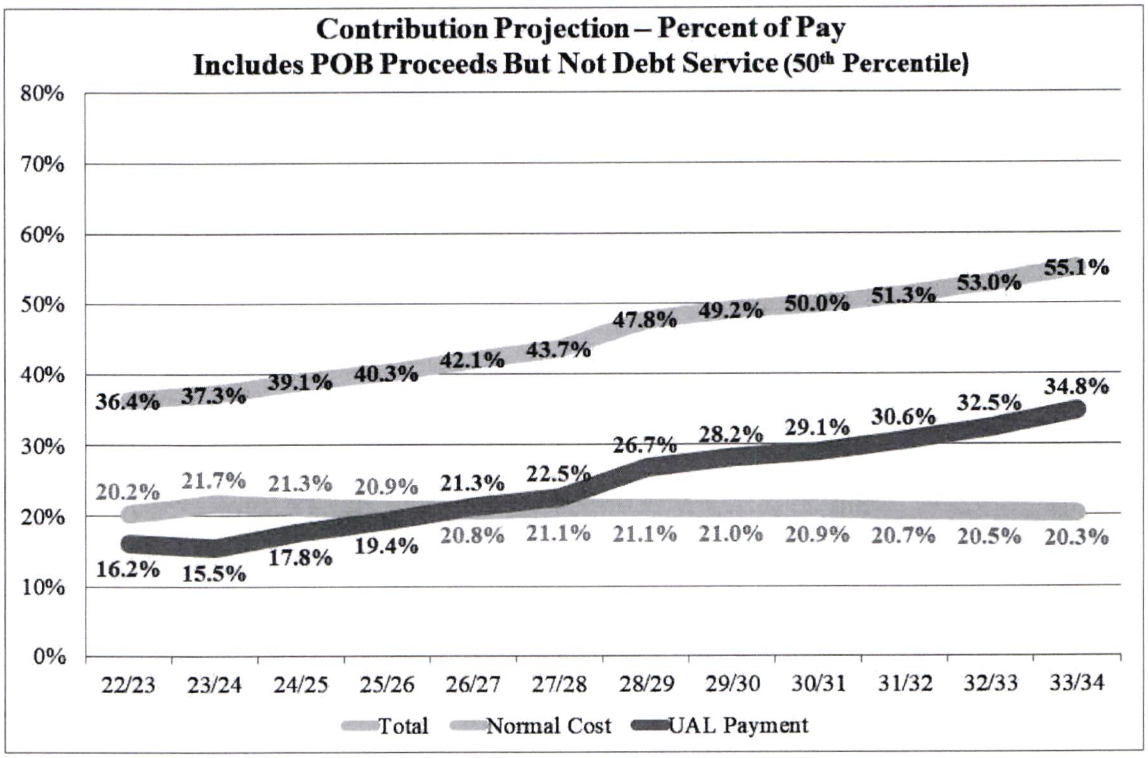

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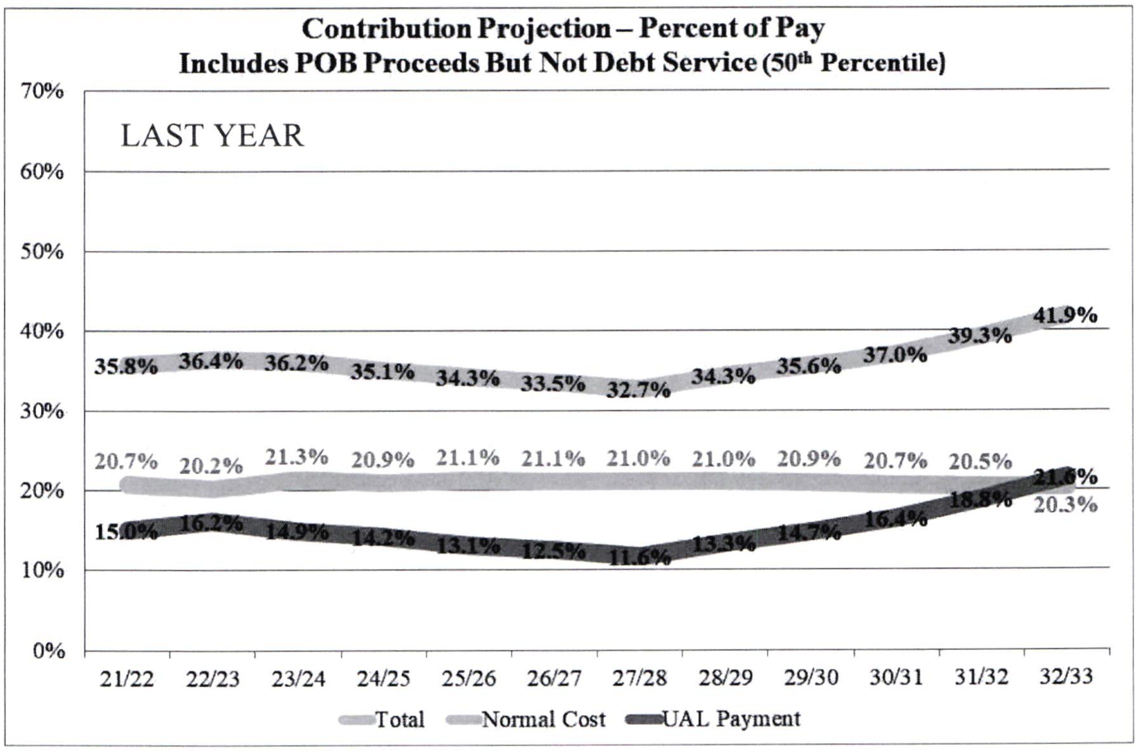
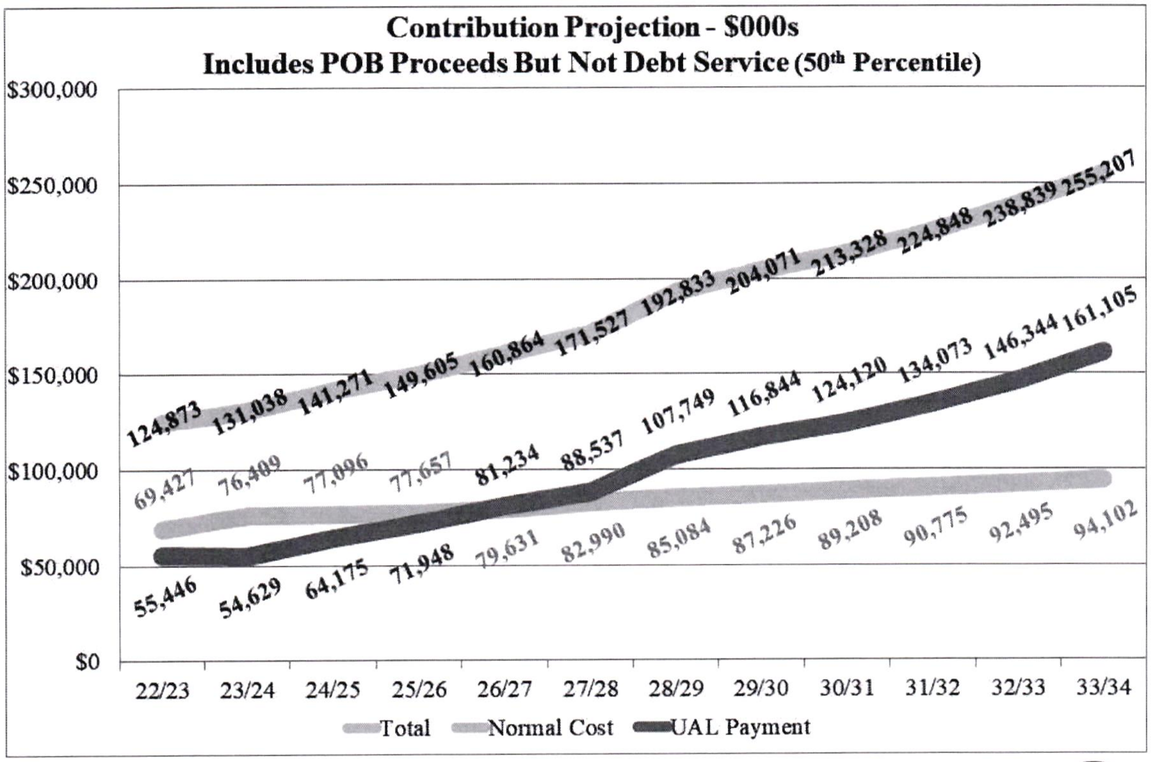
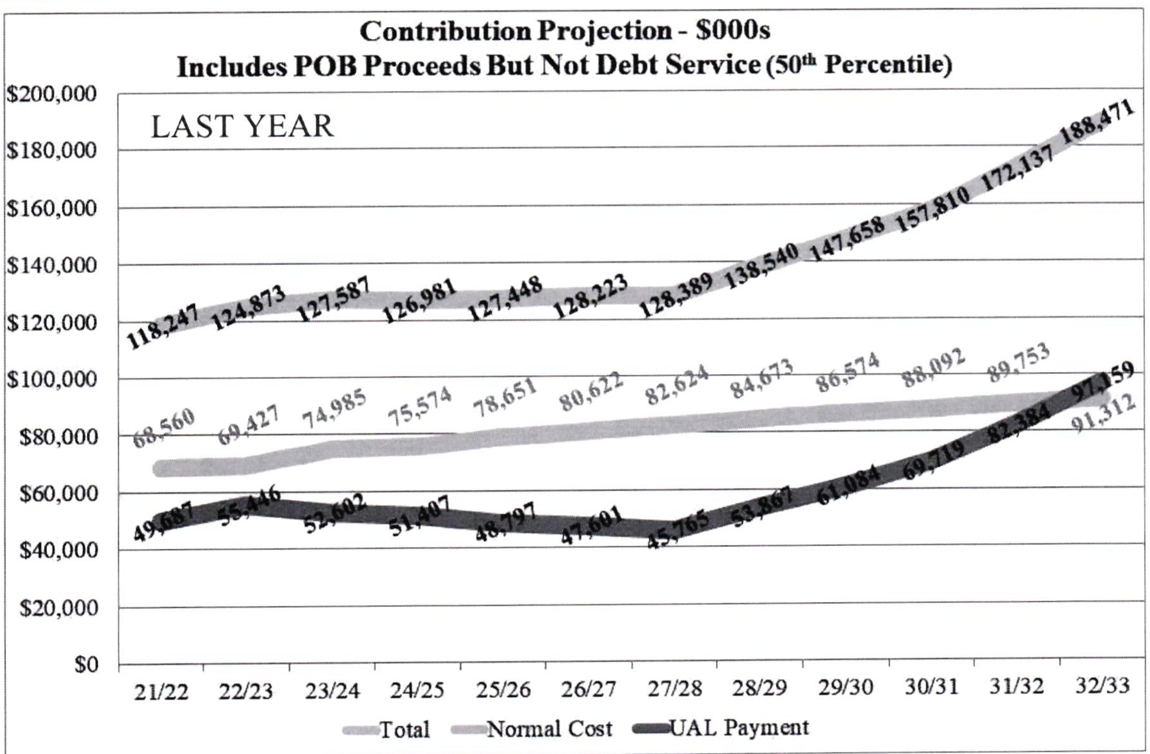


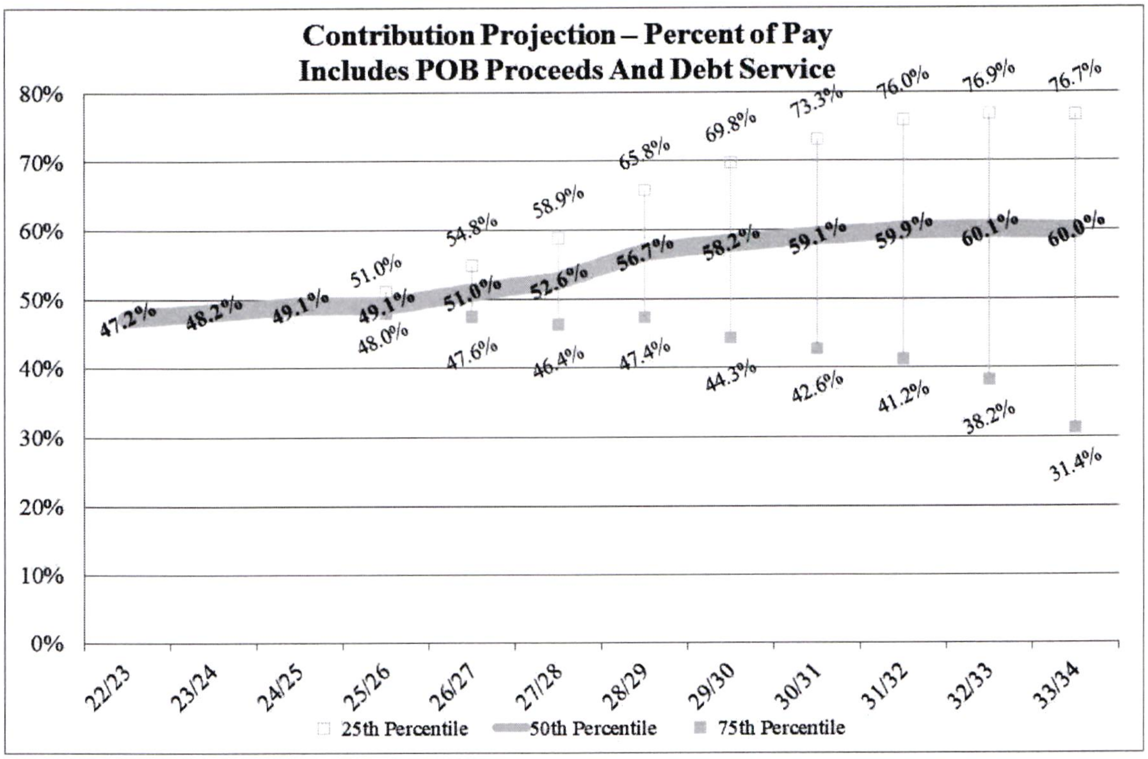
Contribution Projection - Safety



Contribution Projection - Safety



Contribution Projection - Safety



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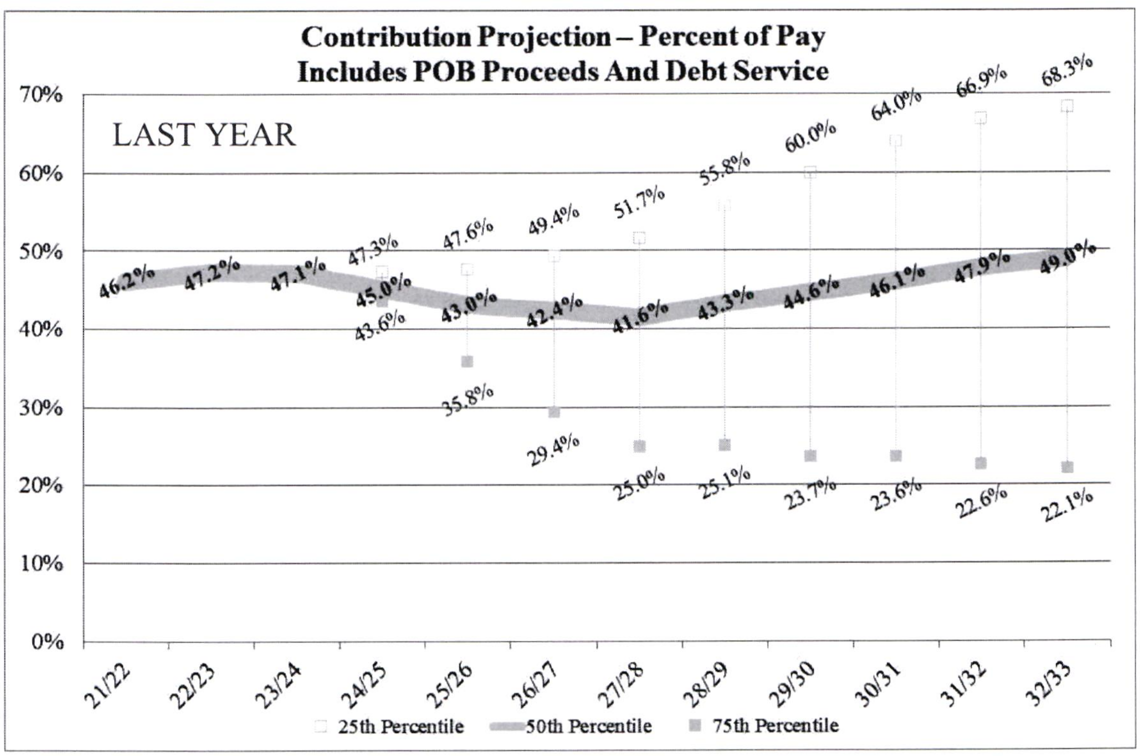

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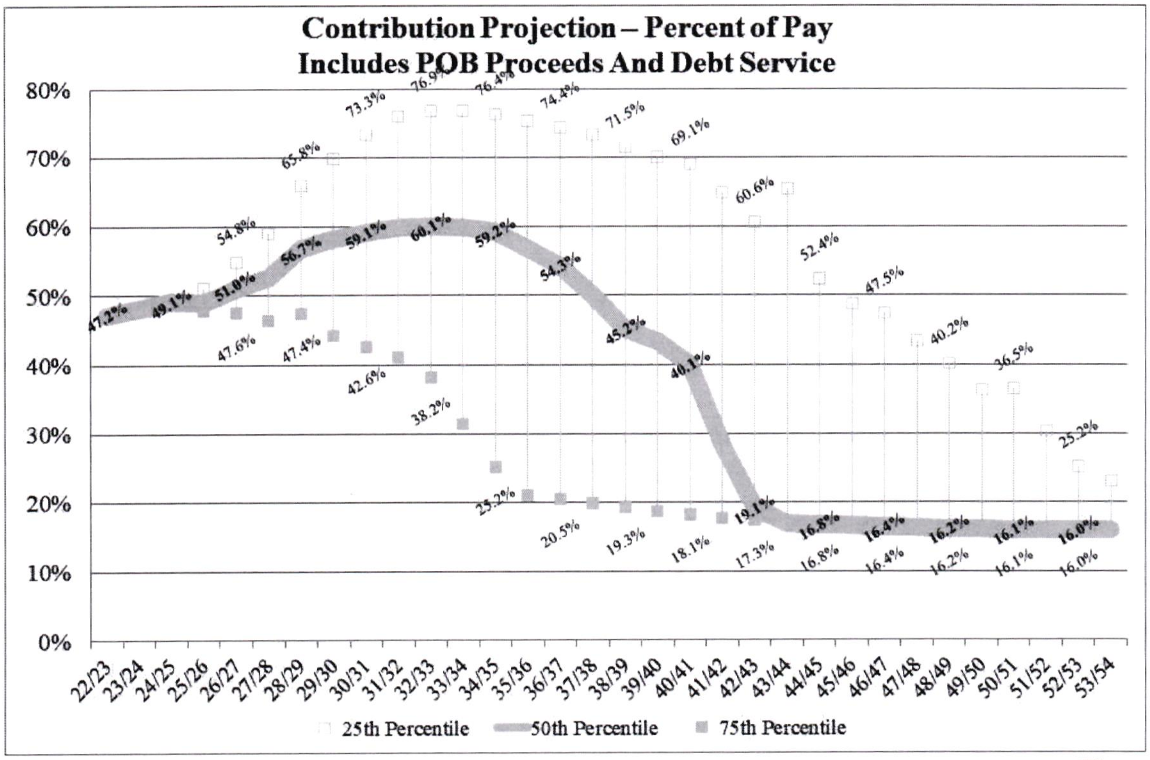

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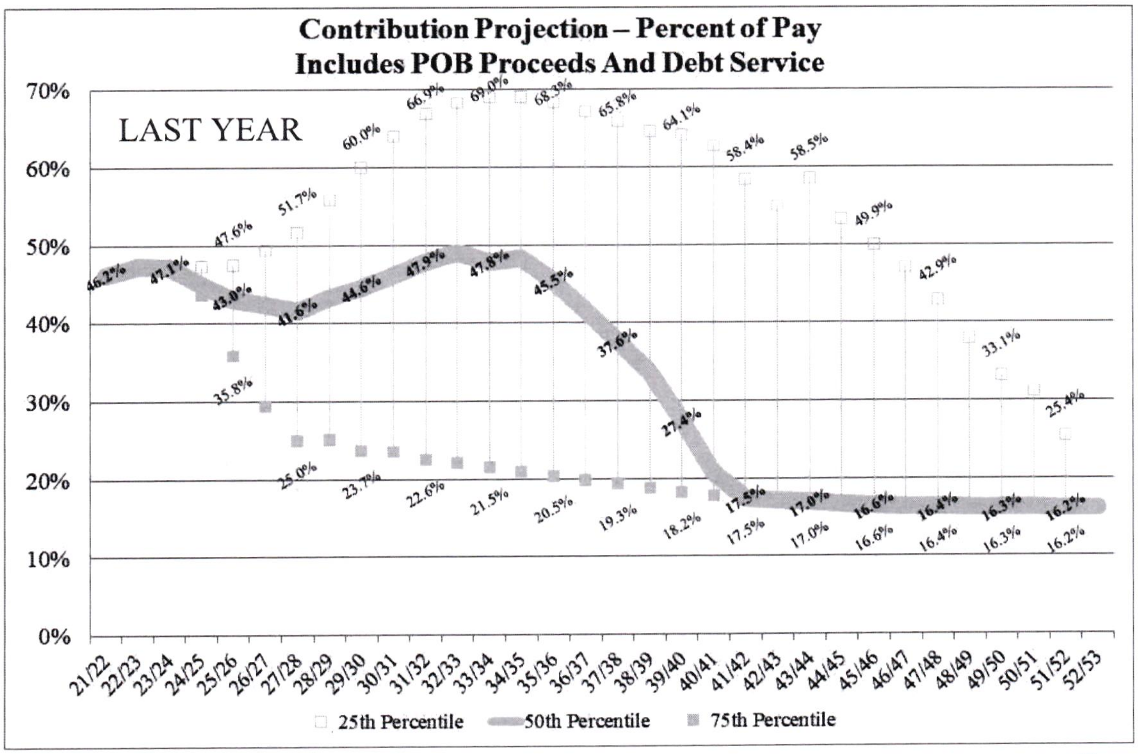

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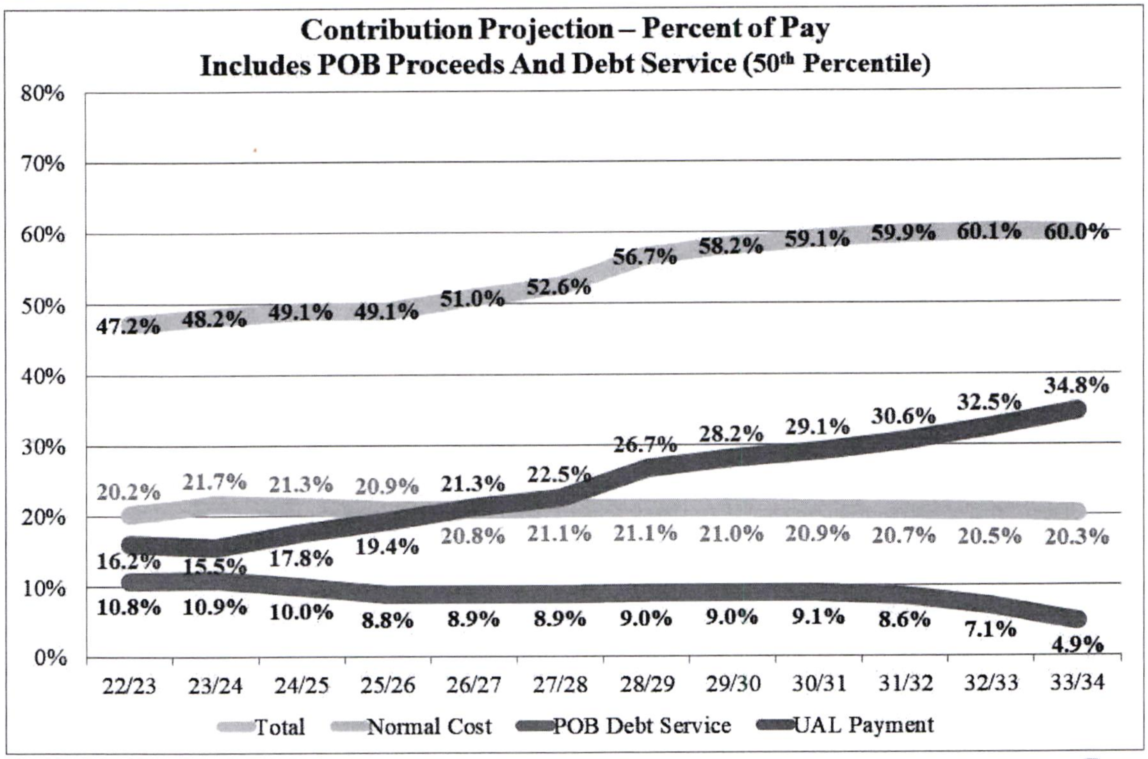

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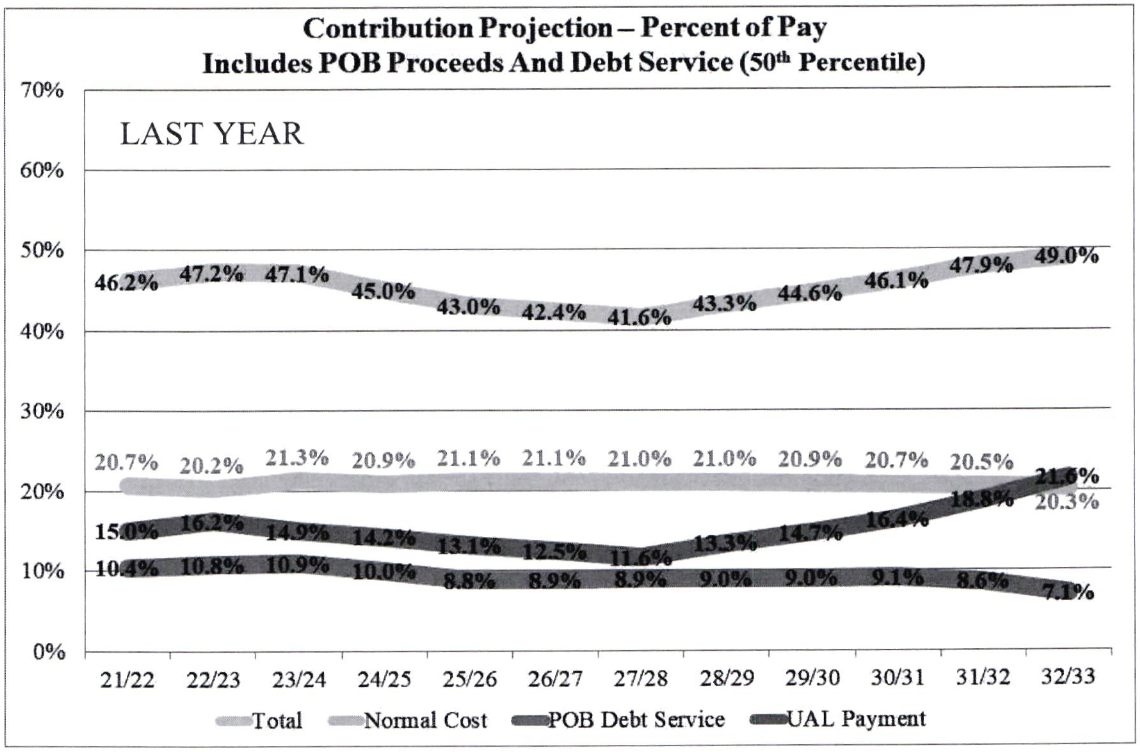

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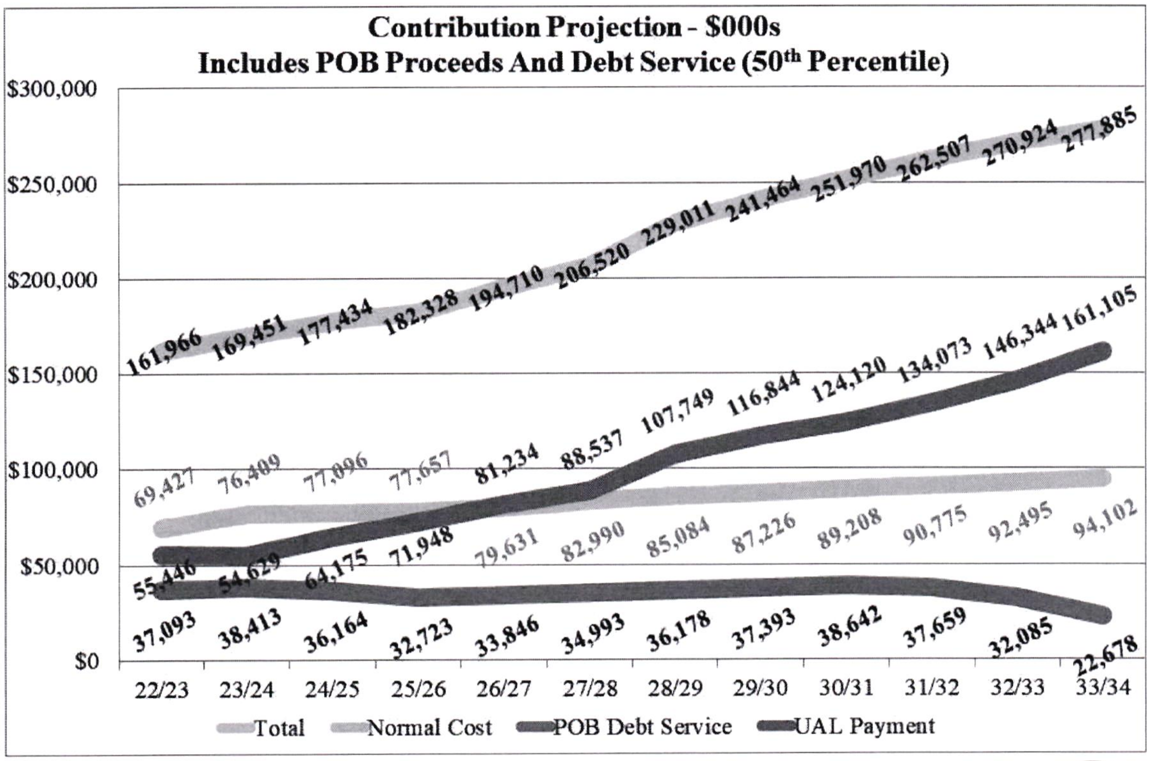

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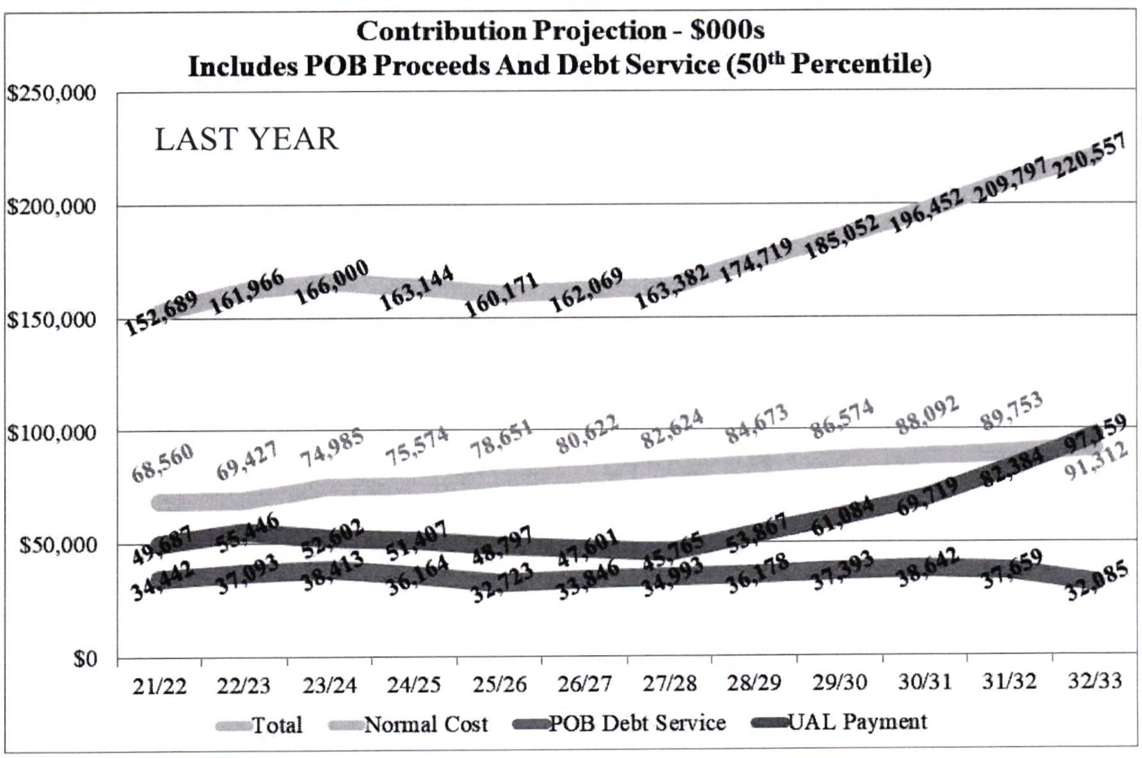
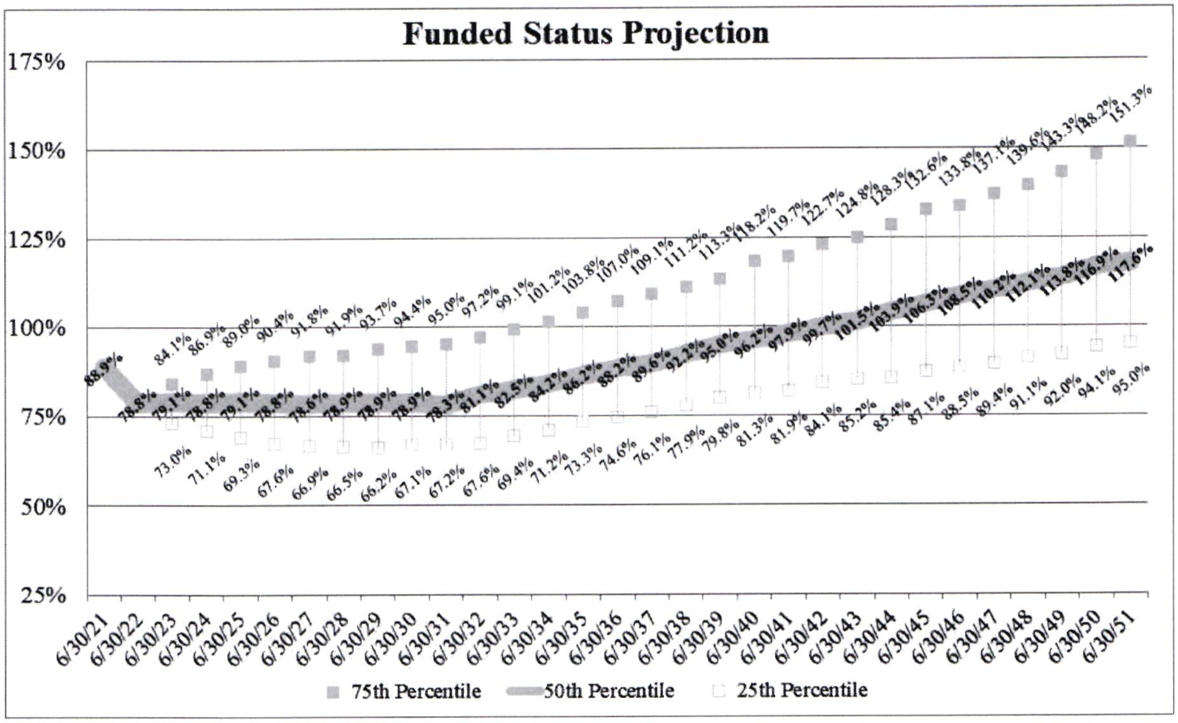
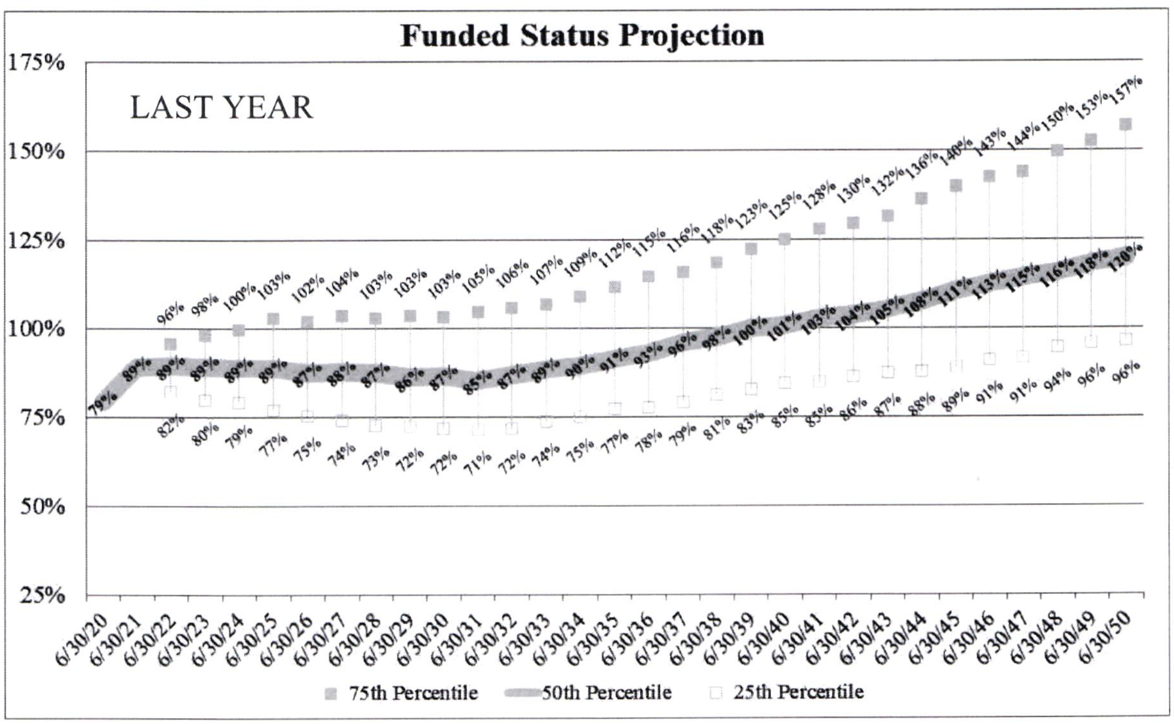


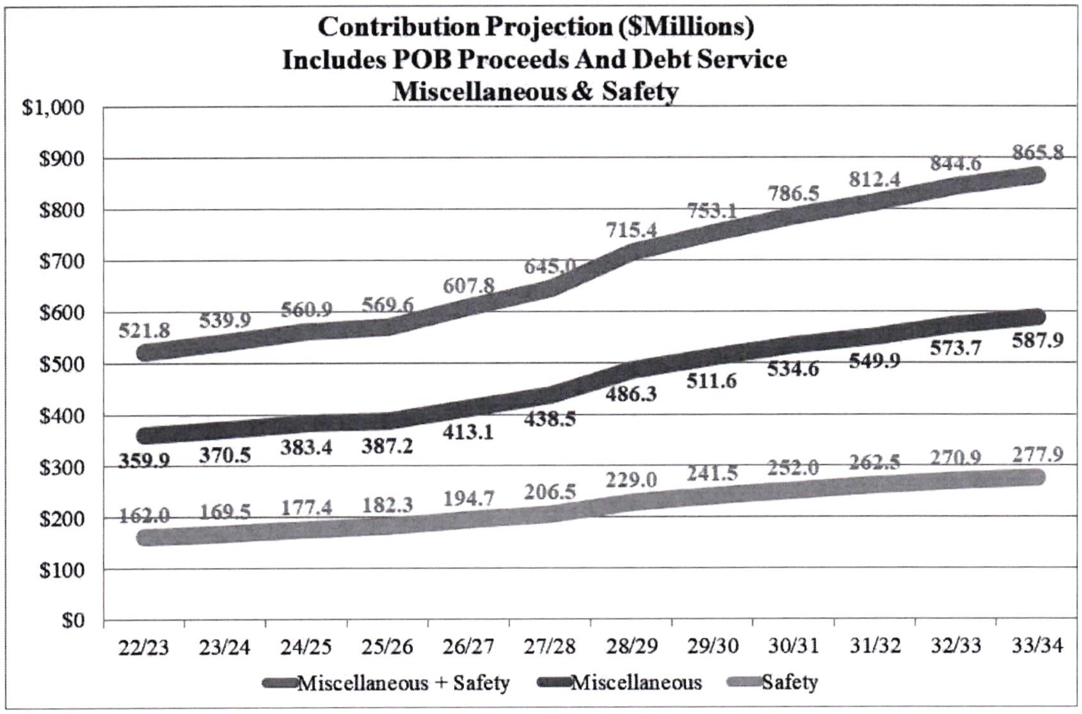
FUNDED STATUS - SAFETY



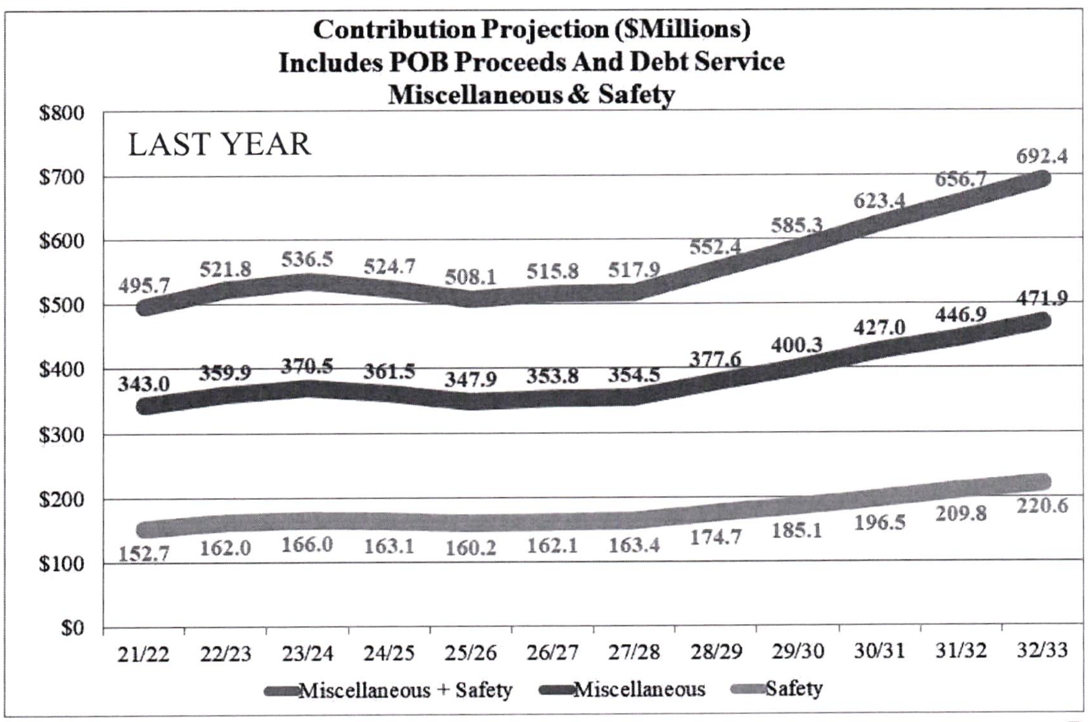
FUNDED STATUS - SAFETY



Combined Miscellaneous and Safety



Combined Miscellaneous and Safety



Combined Miscellaneous and Safety

Funded Status Summary on June 30, 2021
(Amounts in $Millions)

	Miscellaneous	Safety	Total
■ AAL	$ 9,670	$ 4,417	$ 14,087
■ Assets	8,273	3,928	12,201
■ Unfunded AAL	1,397	489	1,886
■ Funded Ratio	85.6%	88.9%	86.6%

Projected Funded Status Summary on June 30, 2022
(Amounts in $Millions)

	Miscellaneous	Safety	Total
■ AAL	$ 10,177	$ 4,649	$ 14,826
■ Assets	7,751	3,662	11,413
■ Unfunded AAL	2,426	987	3,413
■ Funded Ratio	76.2%	78.8%	77.0%

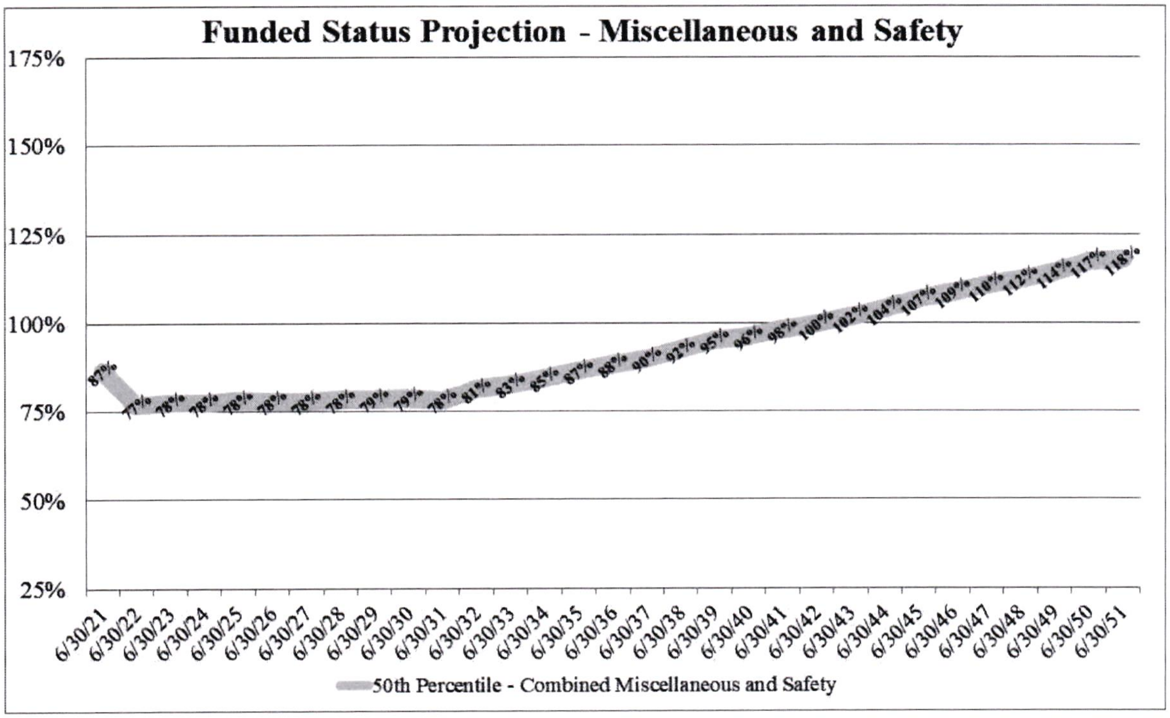
Combined Miscellaneous and Safety

Payroll Projections
($000s)

FY	22/23	23/24	24/25	25/26	26/27
Miscellaneous	$ 1,283,155	$ 1,315,646	$ 1,352,485	$ 1,390,354	$ 1,429,284
Safety	343,017	351,629	361,475	371,596	382,001
Total	1,626,172	1,667,275	1,713,960	1,761,950	1,811,285

FY	27/28	28/29	29/30	30/31	31/32
Miscellaneous	$ 1,469,304	$ 1,510,444	$ 1,552,737	$ 1,596,214	$ 1,640,908
Safety	392,697	403,693	414,996	426,616	438,561
Total	1,862,001	1,914,137	1,967,733	2,022,830	2,079,469

FY	32/33	33/34
Miscellaneous	$ 1,686,853	$ 1,734,085
Safety	450,841	463,464
Total	2,137,694	2,197,549



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LEAVING CALPERS

- Participation in CalPERS is governed by State law and CalPERS rules
- The following are considered "withdrawing" from CalPERS:
  - Exclude new hires from CalPERS & giving them a different pension
  - Stop accruing benefits for current employees
- "Withdrawal" from CalPERS:
  - Treated as plan termination
  - Liability increased for conservative investments
  - Liability increased for future demographic fluctuations
  - Liability must be funded immediately by withdrawing agency
  - Otherwise, retiree benefits are cut

LEAVING CALPERS

CalPERS Termination Estimates on June 30, 2021 (Amounts in Millions)

Discount Rate	Ongoing Plan 6.80%	Termination Basis 1.00%	2.25%
Miscellaneous			
Actuarial Accrued Liability	$ 9,670	$22,471	$18,116
Assets	8,273	8,273	8,273
Unfunded AAL (UAAL)	1,397	14,198	9,843
Safety			
Actuarial Accrued Liability	$ 4,417	$10,987	$8,739
Assets	3,928	3,928	3,928
Unfunded AAL (UAAL)	489	7,059	4,811
Total			
Unfunded AAL (UAAL)	$1,886	$21,257	$14,654
Funded Ratio	86.6%	36.5%	45.4%

2005 POB Proceeds Balance (Millions)

	Safety	Misc.	Total
■ POB @ **2/16/05**	**$ 85.7**	**$ 311.2**	**$ 396.9**
■ Accumulated earnings through 6/30/22	97.6	354.2	451.7
■ Accumulated amortization payments through 6/30/22	(93.7)	(340.1)	(433.8)
■ **Balance @ 6/30/22**	**89.6**	**325.2**	**414.8**
■ Earnings 7/1/22 - 2/15/23[13]	3.8	13.6	17.4
■ Amortization payment through 2/15/23[14]	(3.9)	(14.3)	(18.2)
■ **Balance @ 2/15/23**	**89.4**	**324.6**	**414.0**

[13] Based on assumed return from 7/1/22 to 2/15/23.

[14] Based on a 21 year closed amortization.

2005 POB Outstanding Balance (Millions)

	Payments			
	Principal	Interest	Total	Balance
■ 2/17/05	n/a	n/a	n/a	$400.0
■ 8/15/05	n/a	$9.4	$9.4	400.0
. . . . .				
■ 2/15/22	$30.6	4.7	35.3	160.5
■ 8/15/22	0.0	4.0	4.0	160.5
■ 2/15/23	33.7	4.0	37.7	126.9

2005 POB Net Estimated Gains (Millions)

- Estimated Gains through February 15, 2023:

A.	CalPERS Estimated Balance of Bond Proceeds (slide 87)	$ 414.0
B.	Outstanding Bond Balance (slide 88)	(126.9)
C.	Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service]	(99.6)
D.	**Net [(A) + (B) + (C)]**	**187.5**

- Estimated Gains through February 15, 2023:

E.	CalPERS Investment Earnings[15]	$ 469.1
F.	POB Interest Payments	(278.5)
G.	Cost of Issuance	(3.1)
H.	**Net [(E) + (F) + (G)]**	**187.5**

- Above estimates based on market rate of return.

[15] Accumulated earnings since issuance based on actual CalPERS investment return for each year

2020 POB Proceeds Balance (Millions)

	Safety	Misc.	Total
Total issued	**$ 346.3**	**$ 373.7**	**$ 720.0**
Cost of issuance	2.0	2.1	4.1
POB Deposited with CalPERS@ 5/6/20	**344.3**	**371.6**	**715.9**
Accumulated earnings through 6/30/22	51.0	55.0	106.0
Accumulated amortization payments through 6/30/22	(71.2)	(76.8)	(148.0)
Balance @ 6/30/22	**324.1**	**349.8**	**673.9**
Earnings 7/1/22 - 2/15/23[16]	13.6	14.7	28.3
Amortization payment through 2/15/23[17]	(19.2)	(20.7)	(39.9)
Balance @ 2/15/23	**318.5**	**343.8**	**662.3**

[16] Based on assumed return from 7/1/22 to 2/15/23.
[17] Based on a 18 year closed level dollar amortization.

2020 POB Outstanding Balance (Millions)

	Payments			
	Principal	**Interest**	**Total**	**Balance**
■ 5/06/2020	n/a	n/a	n/a	$720.0
■ 8/15/2020	n/a	$6.4	$6.4	720.0
■ 2/15/2021	$29.5	11.6	41.1	690.5
■ 8/15/2021	0.0	11.2	11.2	690.5
■ 2/15/2022	30.9	11.2	42.2	659.5
■ 8/15/2022	0.0	10.9	10.9	659.5
■ 2/15/2023	37.8	10.9	48.7	621.7

2020 POB NET Estimated Gains (Millions)

- Estimated Gains through February 15, 2023:

A.	CalPERS Estimated Balance (slide 90)	$662.2
B.	Bond Proceeds Balance (slide 91)	(621.7)
C.	Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service]	27.5
D.	**Net [(A) + (B) + (C)]**	**68.1**

- Estimated Gains through February 15, 2023:

E.	CalPERS Investment Earnings	$134.3
F.	POB Interest Payments	(62.1)
G.	Cost of Issuance	(4.1)
H.	**Net [(E) + (F) + (G)]**	**68.1**

- Above estimates based on market rate of return.

NET FUNDED RATIO (MILLIONS)

		Safety			
		6/30/20	6/30/21	Proj. 6/30/22	Proj. 6/30/23[18]
(1)	AAL	$4,046	$4,417	$4,649	$4,891
(2)	MVA	3,214	3,928	3,662	3,890
(3)	UAAL [(1) - (2)]	832	489	987	1,001
(4)	Funding Ratio [(2)/(1)]	79.4%	88.9%	78.8%	79.5%
(5)	POB Balance	$394	$373	$352	$326
(6)	Net MVA [(2) - (5)]	2,820	3,555	3,310	3,564
(7)	Net Funding Ratio [(6)/(1)]	69.7%	80.5%	71.2%	72.9%

18 Projected 6/30/23 MVA based on assumed returns for 2022/23.

NET FUNDED RATIO (MILLIONS)

		Miscellaneous			
		6/30/20	6/30/21	Proj. 6/30/22	Proj. 6/30/23[19]
(1)	AAL	$8,993	$9,670	$10,177	$10,705
(2)	MVA	6,746	8,273	7,751	8,272
(3)	UAAL [(1) - (2)]	2,247	1,397	2,426	2,433
(4)	Funding Ratio [(2)/(1)]	75.0%	85.6%	76.2%	77.3%
(5)	POB Balance	$545	$508	$468	$422
(6)	Net MVA [(2) - (5)]	6,201	7,765	7,283	7,850
(7)	Net Funding Ratio [(6)/(1)]	69.0%	80.3%	71.6%	73.3%

19 Projected 6/30/23 MVA based on assumed returns for 2022/23.

NET FUNDED RATIO (MILLIONS)

		Total			
		6/30/20	6/30/21	Proj. 6/30/22	Proj. 6/30/23[20]
(1)	AAL	$13,039	$14,087	$14,825	$15,596
(2)	MVA	9,960	12,201	11,412	12,162
(3)	UAAL [(1) - (2)]	3,079	1,886	3,413	3,434
(4)	Funding Ratio [(2)/(1)]	76.4%	86.6%	77.0%	78.0%
(5)	POB Balance	$939	$882	$820	$749
(6)	Net MVA [(2) - (5)]	9,021	11,320	10,593	11,414
(7)	Net Funding Ratio [(6)/(1)]	69.2%	80.4%	71.5%	73.2%

Amounts above exclude Section 115 Trust balances of $51.5M at 6/30/2021 and $62.4M at 6/30/22. If included, the net funding ratio on (7) would be 80.7% and 71.9% at 6/30/21 and 6/30/22 respectively.

[20] Projected 6/30/23 MVA based on assumed returns for 2022/23.

NET FUNDED RATIO (MILLIONS)

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PEPRA Cost Sharing

- Target of 50% of total normal cost paid by all employees
- *PEPRA members* must pay greater of 50% of total normal cost or bargained amount if higher
- Employer cannot pay any part of *PEPRA member* required employee contributions
- Employer may impose current employees pay 50% of total normal cost (limited to 8% of pay for Miscellaneous and 12% for Safety) if not agreed through collective bargaining
- Miscellaneous Plan 2023/24:

	Classic Members		New Members
	Tier 1 3%@60 FAE1	**Tier 2 2%@60 FAE3**	**PEPRA 2%@62 FAE3**
Employer Normal Cost	14.4%	11.3%	8.34%
Member Normal Cost	8.0%	7.0%	7.25%
Total Normal Cost	22.4%	18.3%	15.59%
50% Target	11.2%	9.2%	7.80%

PEPRA Cost Sharing

- Safety Plan 2023/24:

	Classic Members		New Members
	Tier 1 3%@50 FAE1	**Tier 2 2%@50 FAE3**	**PEPRA 2.7%@57 FAE3**
Employer Normal Cost	24.7%	21.4%	13.67%
Member Normal Cost	9.0%	9.0%	13.50%
Total Normal Cost	33.7%	30.4%	27.17%
50% Target	16.9%	15.2%	13.59%

- PEPRA Member Contributions:

	2022/23		2023/24			
Group	**Total NC (Basis)**	**Member Rate**	**Total Normal Cost**	**Change**	**Member Rate**	**Method**
Miscellaneous	14.67%	7.25%	15.59%	**0.92%**	**7.25%**	PEPRA Members
Safety	24.96%	12.50%	27.17%	**2.21%**	**13.50%**	PEPRA Members

Paying Down the UAL & Rate Stabilization

- Where do you get the money from?
- How do you use the money?

Where Do You Get the Money From?

- POB:
  - Usually thought of as interest arbitrage between expected earnings and rate paid on POB
  - No guaranteed savings
  - PEPRA prevents contributions from dropping below normal cost
    - Savings offset when investment return is good
  - GFOA Advisory
- Borrow from General Fund similar to State
- One time payments
  - Governing body resolution to use a portion of one time money, e.g.
    - 1/3 to one time projects
    - 1/3 to replenish reserves and
    - 1/3 to pay down unfunded liability

ADDITIONAL PAYMENTS TO CALPERS

- Internal Service Fund
  - Typically used for rate stabilization
  - Restricted investments:
    - ☐ Likely low (0.5%-1.0%) investment returns
    - ☐ Short term/high quality, designed for preservation of principal
  - Assets can be used by governing body for other purposes
  - Does not reduce Unfunded Liability

ADDITIONAL PAYMENTS TO CALPERS

Make payments directly to CalPERS:

- Likely best long-term investment return
- Must be considered an irrevocable decision
  - ☐ Extra payments cannot be used as future "credit"
  - ☐ PEPRA prevents contributions from dropping below normal cost

- Option #1: Request shorter amortization period (Fresh Start):
  - ☐ Higher short term payments
  - ☐ Less interest and lower long term payments
  - ☐ Likely cannot revert to old amortization schedule
    - ○ Savings offset when investment return is good (PEPRA)

ADDITIONAL PAYMENTS TO CALPERS

- Make payments directly to CalPERS (continued):
  - Option #2: Target specific amortization bases with an "Additional Discretionary Payment "ADP" :
    - Extra contribution's impact muted by reduced future contributions
      - CalPERS can't track the "would have been" contribution
    - No guaranteed savings
      - Larger asset pool means larger loss (or gain) opportunity
    - Paying off shorter amortization bases: larger contribution savings over shorter period:
      - e.g. 10 year base reduces contribution 13.7¢ for $1
      - Less interest savings vs paying off longer amortization bases
    - Paying off longer amortization bases: smaller contribution savings over longer period:
      - e.g. 25 year base reduces contribution 8.2¢ for $1
      - More interest savings vs paying off shorter amortization bases
    - Maintaining the current payment schedule – not letting payments reduce due to extra payment – gives the greatest long-term savings

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

- Can only be used to:
  - Reimburse County for CalPERS contributions
  - Make payments directly to CalPERS
- Investments significantly less restricted than County investment funds
  - Fiduciary rules govern Trust investments
  - Usually, designed for long term returns
- Assets don't count for GASB accounting
  - Are considered Employer assets
- Over 100 trusts established, mostly since 2015
  - Trust providers: PARS, PFM, Keenan
  - California Employers' Pension Prefunding Trust (CEPPT) effective July 2019
    - Strategy 1: 48% stocks / 52% bonds
    - Strategy 2: 22% stocks / 78% bonds

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

- More flexibility than paying CalPERS directly
  - County decides if and when and how much money to put into Trust
  - County decides if and when and how much to withdraw to pay CalPERS or reimburse Agency
- Funding strategies typically focus on:
  - Reducing the unfunded liability
    - ☐ Fund enough to make total CalPERS UAL = 0
    - ☐ Make PEPRA required payments from Trust when overfunded
  - Stabilizing contribution rates
    - ☐ Mitigate expected contribution rates to better manage budget
  - Combination
    - ☐ Use funds for rate stabilization/budget predictability
    - ☐ Target increasing fund balance to pay off UAL sooner

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

- Consider:
  - How much can you put into Trust?
    - ☐ Initial seed money?
    - ☐ Additional amounts in future years?
  - When do you take money out?
    - ☐ Target budget rate?
    - ☐ Year target budget rate kicks in?
      - Before or after CalPERS rate exceeds budgeted rate?

COMPARISON OF OPTIONS

- **Supplemental Trust**
  - Flexible
  - Likely lower long-term return
  - Investment strategy choice
  - Does not reduce net pension liability for GASB reporting
  - More visible
- **CalPERS**
  - Locked In
  - Likely higher long-term return
  - No investment choice
  - Reduces net pension liability for GASB reporting
  - More restricted

ACTUARIAL CERTIFICATION

This report presents analysis of the County of Riverside's CalPERS pension plans. The purpose of this report is to provide the County:

- Historical perspective on the plan investment returns, assets, funded status and contributions.
- Projections of likely future contributions and the impact of investment volatility

The calculations and projections in this report are based on information contained in the County's June 30, 2021 and earlier CalPERS actuarial valuation reports. We reviewed this information for reasonableness, but do not make any representation on the accuracy of the CalPERS reports.

Future investment returns and volatility are based on Foster & Foster's Capital Market model which results in long term returns summarized on pages 25 and 57.

Future results may differ from our projections due to differences in actual experience as well as changes in plan provisions, CalPERS actuarial assumptions or methodology. Other than variations in investment return, this study does not analyze these.

To the best of our knowledge, this report is complete and accurate and has been conducted using generally accepted actuarial principles and practices. As members of the American Academy of Actuaries meeting the Academy Qualification Standards, we certify the actuarial results and opinions herein.

Respectfully submitted,

Mary Elizabeth Redding

Bianca Lin

Mary Elizabeth Redding, FSA, EA, FCA, MAAA
Foster & Foster, Inc.
November 9, 2022

Bianca Lin, FSA, EA, FCA, MAAA
Foster & Foster, Inc.
November 9, 2022

CalPERS

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July 2022

Miscellaneous Plan of the County of Riverside (CalPERS ID: 5982690295)
Annual Valuation Report as of June 30, 2021

Dear Employer,

Attached to this letter, you will find the June 30, 2021 actuarial valuation report for the rate plan noted above. **Provided in this report is the determination of the minimum required employer contributions for fiscal year (FY) 2023-24**. In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration (board) adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 6.8%, which was adopted by the board in November 2021. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021.

Required Contributions

The table below shows the minimum required employer contributions and the PEPRA member rate for FY 2023-24 along with an estimate of the required contribution for FY 2024-25. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement between the agency and the employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	PEPRA Member Rate
2023-24	11.79%	$148,845,017	7.25%
Projected Results			
2024-25	*11.6%*	*$145,912,000*	*TBD*

The actual investment return for FY 2021-22 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 6.8%. ***To the extent the actual investment return for FY 2021-22 differs from 6.8%, the actual contribution requirements for FY 2024-25 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections, please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through FY *2028-29*.

Changes from Previous Year's Valuations

On July 12, 2021, CalPERS reported a preliminary 21.3% net return on investments for FY 2020-21. Since the return exceeded the 7.00% discount rate sufficiently, the CalPERS Funding Risk Mitigation policy allows CalPERS to use a portion of the investment gain to offset the cost of reducing the expected volatility of future investment returns. Based on the thresholds specified in the policy, the excess return of 14.3% prescribes a reduction in investment volatility that corresponds to a reduction in the discount rate of 0.20%, from 7.00% to 6.80%.

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the November 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for public agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new strategic asset allocation as part of its Asset Liability Management process. The new asset allocation, along with the new capital market assumptions and economic assumptions, support a discount rate of 6.80%. This includes a reduction in the price inflation assumption from 2.50% to 2.30%.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Actuarial Methods and Assumptions." The effects of the changes on the required contributions are included in the "Reconciliation of Required Employer Contributions" section.

Questions

We understand that you might have questions about these results, and the plan actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary, CalPERS

CalPERS

Actuarial Valuation as of June 30, 2021

for the Miscellaneous Plan of the County of Riverside

(CalPERS ID: 5982690295)
(Rate Plan ID: 62)

Required Contributions for Fiscal Year July 1, 2023 – June 30, 2024

Table of Contents

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Miscellaneous Plan of the County of Riverside and satisfies the actuarial valuation requirements of Government Code section 7504. This valuation is based on the member and financial data as of June 30, 2021 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

Kurt Schneider

KURT SCHNEIDER, MPA, ASA, EA, MAAA
Supervising Pension Actuary, CalPERS

Highlights and Executive Summary

- Introduction
- Purpose of the Report
- Required Contributions
- Additional Discretionary Employer Contributions
- Plan's Funded Status
- Projected Employer Contributions
- Cost
- Changes Since the Prior Year's Valuation
- Subsequent Events

Introduction

This report presents the results of the June 30, 2021 actuarial valuation of the Miscellaneous Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for fiscal year (FY) 2023-24.

Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2021. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2021;
- Determine the minimum required employer contributions for the FY July 1, 2023 through June 30, 2024;
- Provide actuarial information as of June 30, 2021 to the CalPERS Board of Administration (board) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for an Agent Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on the CalPERS website (www.calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The agency should contact the plan actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; changes in plan provisions or applicable law; and differences between the required contributions determined by the valuation and the actual contributions made by the agency.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates 5.8% and 7.8%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current post-retirement mortality assumptions adopted in 2021.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

	Fiscal Year
Required Employer Contributions	**2023-24**
Employer Normal Cost Rate	**11.79%**
Plus	
Required Payment on Amortization Bases	**$148,845,017**
Paid either as	
1) Monthly Payment	**$12,403,751**
Or	
2) Annual Prepayment Option*	**$144,028,578**
Required PEPRA Member Contribution Rate	**7.25%**

The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll and paid as payroll is reported) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly (1) or prepaid annually (2) in dollars).

** Only the UAL portion of the employer contribution can be prepaid* ***(which must be received in full no later than July 31)****.*

For additional detail regarding the determination of the required contribution for PEPRA members, see "PEPRA Member Contribution Rates" in the "Liabilities and Contributions" section. Required member contributions for Classic members can be found in Appendix B.

	Fiscal Year 2022-23	Fiscal Year 2023-24
Normal Cost Contribution as a Percentage of Payroll		
Total Normal Cost	18.34%	19.34%
Employee Contribution[1]	7.58%	7.55%
Employer Normal Cost[2]	10.76%	11.79%
Projected Annual Payroll for Contribution Year	$1,283,154,608	$1,315,646,404
Estimated Employer Contributions Based On Projected Payroll		
Total Normal Cost	$235,330,555	$254,446,015
Employee Contribution	97,263,119	99,331,304
Employer Normal Cost	138,067,436	155,114,711
Unfunded Liability Contribution	157,637,843	148,845,017
% of Projected Payroll (illustrative only)	12.29%	11.31%
Estimated Total Employer Contribution	$295,705,279	$303,959,728
% of Projected Payroll (illustrative only)	23.05%	23.10%

[1] For classic members, this is the percentage specified in the Public Employees' Retirement Law, net of any reduction from the use of a modified formula or other factors. For PEPRA members, the member contribution rate is based on 50% of the normal cost. A development of PEPRA member contribution rates can be found in the "Liabilities and Contributions" section. Employee cost sharing is not shown in this report.

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. For a breakout of normal cost by benefit group, see "Normal Cost by Benefit Group" in the "Liabilities and Contributions" section.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for FY 2023-24 is $148,845,017. CalPERS allows agencies to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Agencies can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during FY 2023-24 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

Agencies considering making an ADP should contact CalPERS for additional information.

Minimum Required Employer Contribution for Fiscal Year 2023-24

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$155,114,711	$148,845,017	$0	$148,845,017	$303,959,728

Alternative Fiscal Year 2023-24 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
10 years	$155,114,711	$148,845,017	$30,006,101	$178,851,118	$333,965,829
5 years	$155,114,711	$148,845,017	$158,722,950	$307,567,967	$462,682,678

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2023 as determined in the June 30, 2021 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions, and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits	$10,759,573,772	$11,710,325,693
2. Entry Age Accrued Liability	8,992,723,006	9,670,471,442
3. Market Value of Assets (MVA)	6,746,072,475	8,273,322,890
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	$2,246,650,531	$1,397,148,552
5. Funded Ratio [(3) / (2)]	75.0%	85.6%

The UAL and funded ratio are assessments of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. The funded ratio, on the other hand, is a relative measure of funded status that allows for comparison between plans of different sizes. For measures of funded status that are appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. In particular, the investment return beginning with FY 2021-22 is assumed to be 6.80% per year, net of investment and administrative expenses. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. The projected normal cost percentages below reflect that the normal cost will continue to decline over time as new employees are hired into lower cost benefit tiers. Future contribution requirements may differ significantly from those shown below. The actual long-term cost of the plan will depend on the actual benefits and expenses paid and the actual investment experience of the fund.

	Required Contribution	**Projected Future Employer Contributions (Assumes 6.80% Return for Fiscal Year 2021-22 and Beyond)**				
Fiscal Year	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**
Normal Cost %	11.79%	11.6%	11.4%	11.2%	11.0%	10.8%
UAL Payment	$148,845,017	$145,912,000	$136,113,000	$125,733,000	$111,570,000	$117,250,000
*Total as a % of Payroll**	*23.10%*	*22.4%*	*21.2%*	*20.0%*	*18.6%*	*18.6%*
Projected Payroll	*$1,315,646,404*	*$1,352,484,504*	*$1,390,354,069*	*$1,429,283,983*	*$1,469,303,936*	*$1,510,444,446*

*Illustrative only and based on the projected payroll shown.

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section. Our online pension plan projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook can help plan and budget pension costs under various scenarios.

Cost

Actuarial Determination of Plan Cost

Contributions to fund the plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2017-18, the Amortization of UAL component was expressed as a percentage of total active payroll. Starting with FY 2017-18, the Amortization of UAL component is expressed as a dollar amount and invoiced on a monthly basis. There is an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.9% over the 20 years ending June 30, 2021, yet individual fiscal year returns have ranged from -23.6% to +21.3%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2021.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B for a summary of the plan provisions used in this valuation. The effect of any mandated benefit changes or plan amendments on the unfunded liability is shown in the "(Gain) / Loss Analysis 6/30/20 – 6/30/21" and the effect on the employer contribution is shown in the "Reconciliation of Required Employer Contributions." It should be noted that no change in liability or contribution is shown for any plan changes which were already included in the prior year's valuation.

Actuarial Methods and Assumptions

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumptions for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new asset portfolio as part of its Asset Liability Management process. The new asset mix supports a 6.80% discount rate, which reflects a change in the price inflation assumption to 2.30%.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2021. Changes subsequent to that date are not reflected. Investment returns below the assumed rate of return may increase future required contributions while investment returns above the assumed rate of return may decrease future required contributions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 6.8% going forward and that the realized rate of return on assets for FY 2021-22 is 6.8%.

This actuarial valuation report reflects statutory changes, regulatory changes, and board actions through January 2022. Any subsequent changes or actions are not reflected.

Assets

- **Reconciliation of the Market Value of Assets**
- **Asset Allocation**
- **CalPERS History of Investment Returns**

Reconciliation of the Market Value of Assets

1.	Market Value of Assets as of 6/30/20 including Receivables	$6,746,072,475
2.	Change in Receivables for Service Buybacks	(1,816,337)
3.	Employer Contributions	267,320,741
4.	Employee Contributions	94,088,292
5.	Benefit Payments to Retirees and Beneficiaries	(369,406,431)
6.	Refunds	(8,356,226)
7.	Transfers	36,733
8.	Service Credit Purchase (SCP) Payments and Interest	2,890,240
9.	Administrative Expenses	(8,432,790)
10.	Miscellaneous Adjustments	1
11.	Investment Return (Net of Investment Expenses)	1,550,926,190
12.	Market Value of Assets as of 6/30/21 including Receivables	$8,273,322,890

Asset Allocation

CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return.

The asset allocation shown below reflects the allocation of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2021. The assets for County of Riverside Miscellaneous Plan are part of the PERF and are invested accordingly.

Asset Class	Current Allocation as of 6/30/2021	Policy Target Allocation as of 6/30/2021
Public Equity	51.4%	50.0%
Private Equity	8.3%	8.0%
Global Fixed Income	29.8%	28.0%
Real Assets	9.6%	13.0%
Liquidity	1.0%	1.0%
Total Fund Level Portfolios	2.5%	0.0%
Trust Level Financing	(2.6%)	0.0%
Total Fund	**100.0%**	**100.0%**

On November 17, 2021, the board adopted changes to the strategic asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

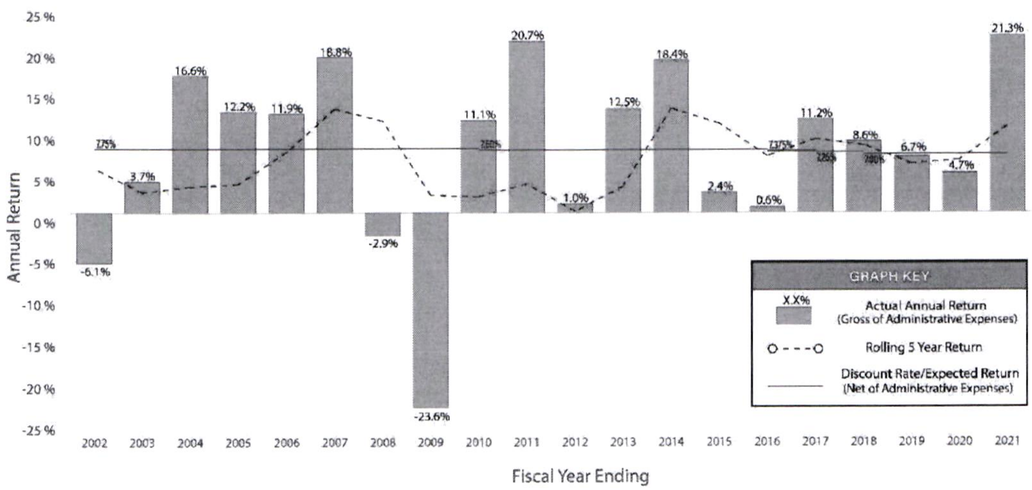
Strategic Asset Allocation Policy Targets

Asset Class	Policy Target Allocation effective 11/17/2021
Global Equity Cap-weighted	30.0%
Global Equity Non-cap-weighted	12.0%
Private Equity	13.0%
Private Debt	5.0%
Emerging Market Sovereign Bonds	5.0%
High Yield Bonds	5.0%
Investment Grade Corporates	10.0%
Mortgage-backed Securities	5.0%
Treasuries	5.0%
Real Assets	15.0%
Leverage	(5.0%)
Total Fund	**100.0%**

CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30 as reported by the Investment Office. Investment returns reported are net of investment expenses but without reduction for administrative expenses. The assumed rate of return, however, is net of both investment and administrative expenses. The Investment Office uses a three-month lag on private assets for investment performance reporting purposes. This can lead to a timing difference in the returns below and those used for financial reporting purposes. The investment gain or loss calculation in this report relies on assets that have been audited and are appropriate for financial reporting. Because of these differences, it is possible for the Investment Office to report a return higher than the discount rate while the rate plan experiences an investment loss, or a return lower than the discount rate while the rate plan experiences an investment gain.

History of Investment Returns (2002 - 2021)



The table below shows annualized investment returns of the PERF for various time periods ending on June 30, 2021 (figures reported are net of investment expenses but without reduction for administrative expenses). These returns are the annual rates that if compounded over the indicated number of years would equate to the actual time-weighted investment performance of the PERF. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 12.0% per year based on the most recent Asset Liability Management study. The realized volatility is a measure of the risk of the portfolio expressed as the standard deviation of the fund's total monthly return distribution, expressed as an annual percentage. Due to their volatile nature, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Compound Annual Rates of Return and Volatilities

	1 year	5 year	10 year	20 year	30 year
Compound Annual Return	21.3%	10.3%	8.5%	6.9%	8.4%
Realized Volatility	–	7.3%	7.2%	8.5%	8.5%

Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 6/30/20 - 6/30/21**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**
- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

Development of Accrued and Unfunded Liabilities

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits		
a) Active Members	$5,771,760,582	$6,273,998,198
b) Transferred Members	227,330,641	245,157,645
c) Terminated Members	251,020,488	292,149,736
d) Members and Beneficiaries Receiving Payments	4,509,462,061	4,899,020,114
e) Total	$10,759,573,772	$11,710,325,693
2. Present Value of Future Employer Normal Costs	$987,271,582	$1,197,393,802
3. Present Value of Future Employee Contributions	$779,579,184	$842,460,449
4. Entry Age Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	$4,004,909,816	$4,234,143,947
b) Transferred Members (1b)	227,330,641	245,157,645
c) Terminated Members (1c)	251,020,488	292,149,736
d) Members and Beneficiaries Receiving Payments (1d)	4,509,462,061	4,899,020,114
e) Total	$8,992,723,006	$9,670,471,442
5. Market Value of Assets (MVA)	$6,746,072,475	$8,273,322,890
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$2,246,650,531	$1,397,148,552
7. Funded Ratio [(5) / (4e)]	75.0%	85.6%

(Gain)/Loss Analysis 6/30/20 – 6/30/21

To calculate the cost requirements of the plan, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year, actual experience is compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

1.	**Total (Gain)/Loss for the Year**	
a)	Unfunded Accrued Liability (UAL) as of 6/30/20	$2,246,650,531
b)	Expected Payment on the UAL during 2020-21	125,990,950
c)	Interest through 6/30/21 [.07 x (1a) - ((1.07)$^{1/2}$ - 1) x (1b)]	152,930,436
d)	Expected UAL before all other changes [(1a) - (1b) + (1c)]	2,273,590,017
e)	Change due to plan changes	0
f)	Change due to AL Significant Increase	0
g)	Change due to assumption change	76,223,331
h)	Change due to method change	0
i)	Change due to Funding Risk Mitigation	244,247,681
j)	Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g) + (1h) + (1i)]	2,594,061,029
k)	Actual UAL as of 6/30/21	1,397,148,552
l)	Total (Gain)/Loss for 2020-21 [(1k) - (1j)]	($1,196,912,477)
2.	**Investment (Gain)/Loss for the Year**	
a)	Market Value of Assets as of 6/30/20	$6,746,072,475
b)	Prior Fiscal Year Receivables	(12,410,594)
c)	Current Fiscal Year Receivables	10,594,258
d)	Contributions Received	361,409,034
e)	Benefits and Refunds Paid	(377,762,657)
f)	Transfers, SCP Payments and Interest, and Miscellaneous Adjustments	2,926,974
g)	Expected Return at 7% per year	475,126,307
h)	Expected Assets as of 6/30/21 [(2a) + (2b) + (2c) + (2d) + (2e) + (2f) + (2g)]	7,205,955,797
i)	Actual Market Value of Assets as of 6/30/21	8,273,322,890
j)	Investment (Gain)/Loss [(2h) - (2i)]	($1,067,367,093)
3.	**Non-Investment (Gain)/Loss for the Year**	
a)	Total (Gain)/Loss (1l)	($1,196,912,477)
b)	Investment (Gain)/Loss (2j)	(1,067,367,093)
c)	Non-Investment (Gain)/Loss [(3a) - (3b)]	($129,545,384)

Schedule of Amortization Bases

Below is the schedule of the plan's amortization bases. Note that there is a two-year lag between the valuation date and the start of the contribution year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2021.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: FY 2023-24.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escalation Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Fresh Start	6/30/08	No Ramp		2.80%	17	(10,180,484)	(778,889)	(10,067,821)	(800,309)	(9,925,361)	(804,712)
Special (Gain)/Loss	6/30/09	No Ramp		2.80%	18	117,155,299	8,666,553	116,165,489	8,904,883	114,862,072	8,945,826
Golden Handshake	6/30/10	No Ramp		2.80%	0	989,285	112,998	939,780	971,207	0	0
Special (Gain)/Loss	6/30/10	No Ramp		2.80%	19	83,113,540	5,958,857	82,607,134	6,122,726	81,896,944	6,145,425
Special (Gain)/Loss	6/30/11	No Ramp		2.80%	20	(46,229,162)	(3,219,160)	(46,045,934)	(3,307,686)	(45,758,760)	(3,317,051)
(Gain)/Loss	6/30/12	No Ramp		2.80%	21	225,131,032	15,255,913	224,673,858	15,675,451	223,752,029	15,706,320
Payment (Gain)/Loss	6/30/12	No Ramp		2.80%	21	(71,082,738)	(4,816,893)	(70,938,390)	(4,949,358)	(70,647,332)	(4,959,104)
(Gain)/Loss	6/30/13	100%	Up/Down	2.80%	22	651,167,940	45,395,804	648,533,481	46,644,188	644,429,748	46,774,206
(Gain)/Loss	6/30/14	100%	Up/Down	2.80%	23	(519,394,893)	(35,234,184)	(518,301,300)	(36,203,124)	(516,132,001)	(36,273,012)
Assumption Change	6/30/14	100%	Up/Down	2.80%	13	369,682,845	37,173,839	356,404,315	38,196,120	341,166,378	38,619,384
(Gain)/Loss	6/30/15	100%	Up/Down	2.80%	23	496,489,199	33,680,331	495,443,834	34,606,540	493,370,202	34,673,346
(Gain)/Loss	6/30/16	100%	Up/Down	2.80%	23	629,622,655	296,519,196	366,001,944	25,583,412	364,451,133	25,613,100
(Gain)/Loss	6/30/17	0%	Up/Down	2.80%	0	(162,818,894)	(168,421,174)	0	0	0	0
Assumption Change	6/30/17	100%	Up/Down	2.80%	16	164,637,267	8,963,651	166,569,198	12,280,202	165,205,041	15,477,698
(Gain)/Loss	6/30/18	0%	Up/Down	2.80%	0	(101,475,607)	(104,967,184)	0	0	0	0
Assumption Change	6/30/18	80%	Up/Down	2.80%	17	298,978,605	10,902,379	308,042,186	16,803,292	311,623,846	22,564,893
Method Change	6/30/18	80%	Up/Down	2.80%	17	72,485,912	2,643,229	74,683,333	4,073,877	75,551,689	5,470,749
Investment (Gain)/Loss	6/30/19	60%	Up Only	0.00%	18	33,909,805	741,403	35,449,476	1,482,806	36,327,648	2,184,256
Non-Investment (Gain)/Loss	6/30/19	No Ramp		0.00%	18	(36,173,307)	(3,300,926)	(35,221,780)	(3,300,926)	(34,205,549)	(3,243,087)
Non-Investment (Gain)/Loss	6/30/20	No Ramp		0.00%	19	(93,786,194)	0	(100,163,655)	(9,157,359)	(97,511,195)	(8,992,749)

Schedule of Amortization Bases (continued)

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Investment (Gain)/Loss	6/30/20	40%	Up Only	0.00%	19	171,367,912	0	183,020,930	4,009,059	191,323,228	7,864,768
Assumption Change	6/30/21	No Ramp		0.00%	20	76,223,331	(7,967,699)	89,640,663	(8,190,795)	104,200,930	9,370,118
Net Investment (Gain)	6/30/21	20%	Up Only	0.00%	20	(803,023,565)	0	(857,629,167)	0	(915,947,950)	(19,688,021)
Non-Investment (Gain)/Loss	6/30/21	No Ramp		0.00%	20	(129,545,384)	0	(138,354,470)	0	(147,762,574)	(13,287,336)
Risk Mitigation	6/30/21	No Ramp		0.00%	1	244,247,681	(10,582,101)	271,792,499	(10,878,400)	301,516,572	311,599,544
Risk Mitigation Offset	6/30/21	No Ramp		0.00%	1	(264,343,528)	0	(282,318,888)	0	(301,516,572)	(311,599,544)
Total						**1,397,148,552**	**126,725,943**	**1,360,926,715**	**138,565,806**	**1,310,270,166**	**148,845,017**

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please contact the plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over an appropriate period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternative Schedules			
			15 Year Amortization		10 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2023	1,310,270,166	148,845,017	1,310,270,166	137,452,146	1,310,270,166	178,851,118
6/30/2024	1,245,546,013	145,912,461	1,257,319,874	137,452,146	1,214,536,485	178,851,118
6/30/2025	1,179,451,243	136,113,410	1,200,768,962	137,452,146	1,112,292,914	178,851,119
6/30/2026	1,118,988,770	125,732,666	1,140,372,588	137,452,146	1,003,096,779	178,851,119
6/30/2027	1,065,142,731	111,570,040	1,075,869,261	137,452,146	886,475,307	178,851,118
6/30/2028	1,022,271,400	117,250,144	1,006,979,708	137,452,147	761,923,576	178,851,119
6/30/2029	970,614,765	123,089,291	933,405,664	137,452,147	628,902,326	178,851,119
6/30/2030	909,411,068	129,091,931	854,828,585	137,452,147	486,835,631	178,851,118
6/30/2031	837,842,143	135,262,645	770,908,265	137,452,147	335,108,402	178,851,119
6/30/2032	755,029,465	131,702,998	681,281,363	137,452,146	173,063,720	178,851,119
6/30/2033	670,264,210	127,766,382	585,559,832	137,452,147		
6/30/2034	583,803,180	123,434,494	483,329,236	137,452,146		
6/30/2035	495,939,548	114,376,524	374,146,961	137,452,146		
6/30/2036	411,462,065	94,606,958	257,540,291	137,452,147		
6/30/2037	341,670,788	84,938,491	133,004,367	137,452,147		
6/30/2038	277,125,497	74,582,846				
6/30/2039	218,893,073	63,509,117				
6/30/2040	168,144,888	57,922,216				
6/30/2041	119,719,558	31,618,330				
6/30/2042	95,184,814	98,367,876				
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
6/30/2052						
Total		**2,175,693,837**		**2,061,782,197**		**1,788,511,186**
Interest Paid		**865,423,671**		**751,512,031**		**478,241,020**
Estimated Savings				**113,911,640**		**387,182,651**

Reconciliation of Required Employer Contributions

Normal Cost (% of Payroll)

1. For Period 7/1/22 – 6/30/23	
a) Employer Normal Cost	10.76%
b) Employee contribution	7.58%
c) Total Normal Cost	18.34%
2. Changes since the prior year annual valuation	
a) Effect of demographic experience	(0.49%)
b) Effect of plan changes	0.00%
c) Effect of Funding Risk Mitigation	0.85%
d) Effect of assumption changes	0.64%
e) Effect of method changes	0.00%
f) Net effect of the changes above [sum of (a) through (e)]	1.00%
3. For Period 7/1/23 – 6/30/24	
a) Employer Normal Cost	11.79%
b) Employee contribution	7.55%
c) Total Normal Cost	19.34%
Employer Normal Cost Change [(3a) – (1a)]	1.03%
Employee Contribution Change [(3b) – (1b)]	(0.03%)

Unfunded Liability Contribution ($)

1. For Period 7/1/22 – 6/30/23	157,637,843
2. Changes since the prior year annual valuation	
a) Effect of adjustments to prior year's amortization schedule	0
b) Effect of elimination of amortization bases	(974,049)
c) Effect of progression of amortization bases[1]	19,555,200
d) Effect of net investment (gain) after Funding Risk Mitigation[2]	(19,688,021)
e) Effect of non-investment (gain)/loss during the prior year	(13,287,336)
f) Effect of Funding Risk Mitigation (re-amortize existing bases at 6.8%)	(3,174,068)
g) Effect of Golden Handshake	0
h) Effect of plan changes	0
i) Effect of AL Significant Increase	0
j) Effect of assumption changes	8,775,448
k) Effect of changes due to Fresh Start or one year recognition of small balances	0
l) Effect of method change	0
m) Net effect of the changes above [sum of (a) through (l)]	(8,792,826)
3. For Period 7/1/23 – 6/30/24 [(1) + (2m)]	148,845,017

The amounts shown for the period 7/1/22 – 6/30/23 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] Includes scheduled escalation in individual amortization base payments due to the 5-year ramp and payroll growth assumption used in the pre-2019 amortization policy.

[2] The unfunded liability contribution for the investment (gain)/loss during the year prior to the valuation date is 20% of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line c) in future years.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2018 or after June 30, 2021 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Rate	Unfunded Liability Payment ($)	Additional Discretionary Payments
2014 - 15	10.341%	4.186%	N/A	N/A
2015 - 16	10.376%	5.053%	N/A	N/A
2016 - 17	10.650%	5.826%	N/A	N/A
2017 - 18	10.192%	N/A	73,598,564	N/A
2018 - 19	10.458%	N/A	100,265,926	0
2019 - 20	10.998%	N/A	129,905,894	371,563,461
2020 - 21	11.673%	N/A	155,375,654	2,672,775
2021 - 22	11.16%	N/A	145,275,743	
2022 - 23	10.76%	N/A	157,637,843	
2023 - 24	11.79%	N/A	148,845,017	

Funding History

The table below shows the recent history of actuarial accrued liability, market value of assets, unfunded accrued liability, funded ratio and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
6/30/2012	$4,708,881,750	$3,520,189,846	$1,188,691,904	74.8%	$836,418,298
6/30/2013	5,008,806,968	3,974,442,195	1,034,364,773	79.3%	856,593,282
6/30/2014	5,656,121,103	4,682,894,962	973,226,141	82.8%	897,506,714
6/30/2015	6,174,498,346	4,775,099,013	1,399,399,333	77.3%	1,000,223,148
6/30/2016	6,850,143,825	4,799,576,566	2,050,567,259	70.1%	1,090,295,411
6/30/2017	7,441,270,302	5,325,794,759	2,115,475,543	71.6%	1,128,397,500
6/30/2018	8,165,793,889	5,748,832,217	2,416,961,672	70.4%	1,118,711,056
6/30/2019	8,602,935,143	6,103,248,893	2,499,686,250	70.9%	1,145,579,094
6/30/2020	8,992,723,006	6,746,072,475	2,246,650,531	75.0%	1,182,860,410
6/30/2021	9,670,471,442	8,273,322,890	1,397,148,552	85.6%	1,211,043,768

Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for FY 2023-24. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

Rate Plan Identifier	Benefit Group Name	Total Normal Cost FY 2023-24	Number of Actives	Payroll on 6/30/2021
62	Miscellaneous First Level	18.96%	389	$32,550,412
26035	Miscellaneous PEPRA Level	15.59%	8,990	$510,437,107
30192	Miscellaneous Second Level	22.59%	7,684	$617,012,038
30193	Miscellaneous Third Level	18.29%	699	$51,044,211
	Plan Total	**19.34%**	**17,762**	**$1,211,043,768**

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost shown for the respective benefit level does not reflect those differences. Additionally, if a Second Level Benefit Group amended to the same benefit formula as a First Level Benefit Group, their Normal Costs may be dissimilar due to demographic or other population differences. For questions in these situations, please contact the plan actuary.

PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 ("PEPRA") established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code section 7522.30(b), "new members ... shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions, and demographics of the plan, particularly members' entry age into the plan. Should the total normal cost of the plan change by more than 1% from the base total normal cost established for the plan, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2023, based on 50% of the Total Normal Cost for each respective plan as of the June 30, 2021 valuation.

		Basis for Current Rate		Rates Effective July 1, 2023			
Rate Plan Identifier	**Benefit Group Name**	**Total Normal Cost**	**Member Rate**	**Total Normal Cost**	**Change**	**Change Needed**	**Member Rate**
26035	Miscellaneous PEPRA Level	14.672%	7.25%	15.59%	0.918%	No	7.25%

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions. For this reason, the PEPRA member contribution rate determined in the table above may not equal 50 % of the total normal cost of the PEPRA group shown on the "Normal Cost by Benefit Group" page.

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis using the investment return scenarios from the Asset Liability Management process completed in 2021 was performed to determine the effects of various future investment returns on required employer contributions. The projections below reflect the impact of the CalPERS Funding Risk Mitigation policy. The projected normal cost rates reflect that the rates are anticipated to decline over time as new employees are hired into lower-cost benefit tiers. The projections also assume that all other actuarial assumptions will be realized and that no further changes in assumptions, contributions, benefits, or funding will occur.

The first table shows projected contribution requirements if the fund were to earn either 3.0% or 10.8% annually. These alternate investment returns were chosen because 90% of long-term average returns are expected to fall between them over the 20-year period ending June 30, 2041.

Assumed Annual Return FY 2021-22 through FY 2040-41	Projected Employer Contributions				
	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29
3.0% (5th percentile)					
Normal Cost Rate	11.6%	11.4%	11.2%	11.0%	10.8%
UAL Contribution	$153,607,000	$159,421,000	$172,808,000	$190,809,000	$237,300,000
10.8% (95th percentile)					
Normal Cost Rate	11.9%	11.9%	11.9%	12.0%	12.1%
UAL Contribution	$139,050,000	$115,514,000	$83,667,000	$0	$0

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 3.0% or greater than 10.8% over a 20-year period, the likelihood of a single investment return less than 3.0% or greater than 10.8% in any given year is much greater. The following analysis illustrates the effect of an extreme, single year investment return.

The portfolio has an expected volatility (or standard deviation) of 12.0% per year. Accordingly, in any given year there is a 16% probability that the annual return will be -5.2% or less and a 2.5% probability that the annual return will be -17.2% or less. These returns represent one and two standard deviations below the expected return of 6.8%.

The following table shows the effect of a one or two standard deviation investment loss in FY 2021-22 on the FY 2024-25 contribution requirements. Note that a single-year investment gain or loss decreases or increases the required UAL contribution amount incrementally for each of the next five years, not just one, due to the 5-year ramp in the amortization policy. However, the contribution requirements beyond the first year are also impacted by investment returns beyond the first year. Historically, significant downturns in the market are often followed by higher than average returns. Such investment gains would offset the impact of these single year negative returns in years beyond FY 2024-25.

Assumed Annual Return for Fiscal Year 2021-22	Required Employer Contributions	Projected Employer Contributions
	FY 2023-24	FY 2024-25
(17.2%) (2 standard deviation loss)		
Normal Cost Rate	11.79%	11.6%
UAL Contribution	$148,845,017	$194,506,000
(5.2%) (1 standard deviation loss)		
Normal Cost Rate	11.79%	11.6%
UAL Contribution	$148,845,017	$170,210,000

- Without investment gains (returns higher than 6.8%) in year FY 2022-23 or later, projected contributions rates would continue to rise over the next four years due to the continued phase-in of the impact of the illustrated investment loss in FY 2021-22.
- The Pension Outlook Tool can be used to model projected contributions for these scenarios beyond FY 2024-25 as well as to model other investment return scenarios.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.5% and 2.3%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2021 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 6.8% as well as alternate discount rates of 5.8% and 7.8%. The rates of 5.8% and 7.8% were selected since they illustrate the impact of a 1.0% increase or decrease to the 6.8% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2021	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Price Inflation	2.3%	2.3%	2.3%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	24.75%	19.34%	15.31%
b) Accrued Liability	$11,095,266,732	$9,670,471,442	$8,505,876,992
c) Market Value of Assets	$8,273,322,890	$8,273,322,890	$8,273,322,890
d) Unfunded Liability/(Surplus) [(b) - (c)]	$2,821,943,842	$1,397,148,552	$232,554,102
e) Funded Ratio	74.6%	85.6%	97.3%

Sensitivity to the Price Inflation Assumption

As of June 30, 2021	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Price Inflation	**1.3%**	**2.3%**	**3.3%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	20.41%	19.34%	17.52%
b) Accrued Liability	$10,007,939,031	$9,670,471,442	$8,886,842,118
c) Market Value of Assets	$8,273,322,890	$8,273,322,890	$8,273,322,890
d) Unfunded Liability/(Surplus) [(b) - (c)]	$1,734,616,141	$1,397,148,552	$613,519,228
e) Funded Ratio	82.7%	85.6%	93.1%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2021 plan costs and funded status under two different longevity scenarios, namely assuming rates of post-retirement mortality are 10% lower or 10% higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long term.

As of June 30, 2021	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	19.64%	19.34%	19.07%
b) Accrued Liability	$9,856,366,068	$9,670,471,442	$9,499,159,933
c) Market Value of Assets	$8,273,322,890	$8,273,322,890	$8,273,322,890
d) Unfunded Liability/(Surplus) [(b) - (c)]	$1,583,043,178	$1,397,148,552	$1,225,837,043
e) Funded Ratio	83.9%	85.6%	87.1%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	June 30, 2020	June 30, 2021
1. Retiree Accrued Liability	4,509,462,061	4,899,020,114
2. Total Accrued Liability	8,992,723,006	9,670,471,442
3. Ratio of Retiree AL to Total AL [(1) / (2)]	50%	51%

Another measure of the maturity level of CalPERS and its plans is the ratio of actives to retirees, also called the support ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

To calculate the support ratio for the rate plan, retirees and beneficiaries receiving a continuance are each counted as one, even though they may have only worked a portion of their careers as an active member of this rate plan. For this reason, the support ratio, while intuitive, may be less informative than the ratio of retiree liability to total accrued liability above. For comparison, the support ratio for all CalPERS public agency plans is 0.82 and is calculated consistently with how it is for the individual rate plan. Note that to calculate the support ratio for all public agency plans, a retiree with service from more than one CalPERS agency is counted as a retiree more than once.

Support Ratio	June 30, 2020	June 30, 2021
1. Number of Actives	17,467	17,762
2. Number of Retirees	12,557	13,073
3. Support Ratio [(1) / (2)]	1.39	1.36

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Maturity Measures (continued)

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with AVR of 8 may experience twice the contribution volatility due to investment return volatility than a plan with AVR of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as a plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR of 8 is expected to have twice the contribution volatility of a plan with LVR of 4 when there is a change in accrued liability, such as when there is a change in actuarial assumptions. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded ratio approaches 100%.

Contribution Volatility	June 30, 2020	June 30, 2021
1. Market Value of Assets without Receivables	$6,733,661,881	$8,262,728,633
2. Payroll	1,182,860,410	1,211,043,768
3. Asset Volatility Ratio (AVR) [(1) / (2)]	5.7	6.8
4. Accrued Liability	$8,992,723,006	$9,670,471,442
5. Liability Volatility Ratio (LVR) [(4) / (2)]	7.6	8.0

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
6/30/2017	45%	1.58	4.7	6.6
6/30/2018	47%	1.47	5.1	7.3
6/30/2019	49%	1.42	5.3	7.5
6/30/2020	50%	1.39	5.7	7.6
6/30/2021	51%	1.36	6.8	8.0

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2021. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate assumption. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to seven months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 1.00%	Funded Ratio	Unfunded Termination Liability at 1.00%	Hypothetical Termination Liability[1,2] at 2.25%	Funded Ratio	Unfunded Termination Liability at 2.25%
$8,273,322,890	$22,471,173,368	36.8%	$14,197,850,478	$18,115,550,808	45.7%	$9,842,227,918

[1] The hypothetical liabilities calculated above include a 5% contingency load. The contingency load and other actuarial assumptions can be found in Appendix A.

[2] The discount rate used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.00% on June 30, 2021, the valuation date.

In order to terminate the plan, first contact our Pension Contract Services unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to provide a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. Before beginning this process, please consult with the plan actuary.

Plan's Major Benefit Provisions

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Misc	Misc	Misc	Misc	Misc	Misc	Misc
Demographics							
Actives	No	No	Yes	No	Yes	No	Yes
Transfers/Separated	Yes	No	No	Yes	Yes	No	Yes
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	2% @ 55		3% @ 60	2% @ 55	3% @ 60		2% @ 62
Social Security Coverage	Yes		Yes	Yes	Yes		Yes
Full/Modified	Modified		Modified	Modified	Modified		Full
Employee Contribution Rate			8.00%		8.00%		7.25%
Final Average Compensation Period	One Year		One Year	One Year	One Year		Three Year
Sick Leave Credit	No		No	No	No		No
Non-Industrial Disability	Standard		Standard	Standard	Standard		Standard
Industrial Disability	No		No	No	No		No
Pre-Retirement Death Benefits							
Optional Settlement 2	No		No	No	No		No
1959 Survivor Benefit Level	No		No	No	No		No
Special	No		No	No	No		No
Alternate (firefighters)	No		No	No	No		No
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major <u>optional</u> benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Misc	Misc	Misc	Misc	Misc	Misc	Misc
Demographics							
Actives	Yes	Yes	Yes	No	No	No	No
Transfers/Separated	Yes	Yes	Yes	Yes	Yes	No	No
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	2% @ 60	3% @ 60	3% @ 60	3% @ 60	2% @ 55		
Social Security Coverage	Yes	Yes	Yes	No	No		
Full/Modified	Modified	Modified	Modified	Full	Full		
Employee Contribution Rate	7.00%	8.00%	8.00%				
Final Average Compensation Period	Three Year	One Year	One Year	One Year	One Year		
Sick Leave Credit	No	No	No	No	No		
Non-Industrial Disability	Standard	Standard	Standard	Standard	Standard		
Industrial Disability	No	No	No	No	No		
Pre-Retirement Death Benefits							
Optional Settlement 2	No	No	No	No	No		
1959 Survivor Benefit Level	No	No	No	Indexed	Indexed		
Special	No	No	No	No	No		
Alternate (firefighters)	No	No	No	No	No		
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group				
Member Category	Misc	Misc	Misc	Misc	
Demographics					
Actives	No	No	No	No	
Transfers/Separated	No	No	No	No	
Receiving	Yes	Yes	Yes	Yes	
Benefit Provision					
Benefit Formula					
Social Security Coverage					
Full/Modified					
Employee Contribution Rate					
Final Average Compensation Period					
Sick Leave Credit					
Non-Industrial Disability					
Industrial Disability					
Pre-Retirement Death Benefits					
Optional Settlement 2					
1959 Survivor Benefit Level					
Special					
Alternate (firefighters)					
Post-Retirement Death Benefits					
Lump Sum	$500	$500	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	
COLA	2%	2%	2%	2%	

Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Glossary of Actuarial Terms**

Appendix A

Actuarial Methods and Assumptions

- **Actuarial Data**
- **Actuarial Methods**
- **Actuarial Assumptions**
- **Miscellaneous**

Actuarial Data

As stated in the Actuarial Certification, the data which serves as the basis of this valuation has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and generally do not have a material impact on the required employer contributions.

Actuarial Methods

Actuarial Cost Method

The actuarial cost method used is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

CalPERS uses an in-house proprietary actuarial model for calculating plan costs. We believe this model is fit for its intended purpose and meets all applicable Actuarial Standards of Practice. Furthermore, the actuarial results of our model are independently confirmed periodically by outside auditing actuaries. The actuarial assumptions used are internally consistent and the generated results are reasonable.

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

<u>Prior Policy (Bases Established prior to June 30, 2019)</u>

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

Driver	Source				
	(Gain)/Loss		Assumption/Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate - Active Plans - Inactive Plans	 2.80% 0%	 2.80% 0%	 2.80% 0%	 2.80% 0%	 2.80% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

The 5-year ramp up means that the payments in the first four years of the amortization period are 20%, 40%, 60% and 80% of the "full" payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

	Source				
	(Gain)/Loss		Assumption/ Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a "fresh start" approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

Exceptions for Plans in Surplus

If a surplus exists (i.e., the Market Value of Assets exceeds the plan's accrued liability) any prior amortization layers shall be considered fully amortized, and the surplus shall not be amortized.

In the event of any subsequent unfunded liability, a Fresh Start shall be used with an amortization period of 20 years or less.

Exceptions for Small Amounts

Where small unfunded liabilities are identified in annual valuations which result in small payment amounts, the actuary may shorten the remaining period for these bases.

- When the balance of a single amortization base has an absolute value less than $250, the amortization period is reduced to one year.
- When the entire unfunded liability is a small amount, the actuary may perform a Fresh Start and use an appropriate amortization period.

Exceptions for Inactive Plans

The following exceptions apply to plans classified as Inactive. These plans have no active members and no expectation to have active members in the future.

- Amortization of the unfunded liability is on a "level dollar" basis rather than a "level percent of pay" basis. For amortization layers, which utilize a ramp up and ramp down, the "ultimate" payment is constant.
- Actuarial judgment will be used to shorten amortization periods for Inactive plans with existing periods that are deemed too long given the duration of the liability. The specific demographics of the plan will be used to determine if shorter periods may be more appropriate.

Exceptions for Inactive Agencies

For a public agency with no active members in any CalPERS rate plan, the unfunded liability shall be amortized over a closed amortization period of no more than 15 years.

Asset Valuation Method

The Actuarial Value of Assets is set equal to the market value of assets. Asset values include accounts receivable.

PEPRA Normal Cost Rate Methodology

Per Government Code Section 7522.30(b), the "normal cost rate" shall mean the annual actuarially determined normal cost for the plan of retirement benefits provided to the new member and shall be established based on actuarial assumptions used to determine the liabilities and costs as part of the annual actuarial valuation. The plan of retirement benefits shall include any elements that would impact the actuarial determination of the normal cost, including, but not limited to, the retirement formula, eligibility and vesting criteria, ancillary benefit provisions, and any automatic cost-of-living adjustments as determined by the public retirement system.

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions.

Actuarial Assumptions

In 2021, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In November 2021, the board adopted changes to the asset allocation that increased the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 6.80%. The board also approved several changes to the demographic assumptions that more closely aligned with actual experience.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021 that can be found on the CalPERS website under: Forms and Publications. Click on "View All" and search for Experience Study.

All actuarial assumptions (except the discount rates used for the hypothetical termination liability) represent an estimate of future experience rather than observations of the estimates inherent in market data.

Economic Assumptions

Discount Rate

The prescribed discount rate assumption, adopted by the board on November 17, 2021, is 6.80% compounded annually (net of investment and administrative expenses) as of June 30, 2021.

Termination Liability Discount Rate

The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date.

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 19-month period from 12 months before the valuation date to seven months after. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 2.00% on June 30, 2021.

Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.80% for 2021) is added to these factors for total salary growth.

Public Agency Miscellaneous

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0764	0.0621	0.0521
1	0.0663	0.0528	0.0424
2	0.0576	0.0449	0.0346
3	0.0501	0.0381	0.0282
4	0.0435	0.0324	0.0229
5	0.0378	0.0276	0.0187
10	0.0201	0.0126	0.0108
15	0.0155	0.0102	0.0071
20	0.0119	0.0083	0.0047
25	0.0091	0.0067	0.0031
30	0.0070	0.0054	0.0020

Public Agency Fire

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1517	0.1549	0.0631
1	0.1191	0.1138	0.0517
2	0.0936	0.0835	0.0423
3	0.0735	0.0613	0.0346
4	0.0577	0.0451	0.0284
5	0.0453	0.0331	0.0232
10	0.0188	0.0143	0.0077
15	0.0165	0.0124	0.0088
20	0.0145	0.0108	0.0101
25	0.0127	0.0094	0.0115
30	0.0112	0.0082	0.0132

Public Agency Police

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1181	0.1051	0.0653
1	0.0934	0.0812	0.0532
2	0.0738	0.0628	0.0434
3	0.0584	0.0485	0.0353
4	0.0462	0.0375	0.0288
5	0.0365	0.0290	0.0235
10	0.0185	0.0155	0.0118
15	0.0183	0.0150	0.0131
20	0.0181	0.0145	0.0145
25	0.0179	0.0141	0.0161
30	0.0178	0.0136	0.0179

Salary Growth (continued)

Public Agency County Peace Officers

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1238	0.1053	0.0890
1	0.0941	0.0805	0.0674
2	0.0715	0.0616	0.0510
3	0.0544	0.0471	0.0387
4	0.0413	0.0360	0.0293
5	0.0314	0.0276	0.0222
10	0.0184	0.0142	0.0072
15	0.0174	0.0124	0.0073
20	0.0164	0.0108	0.0074
25	0.0155	0.0094	0.0075
30	0.0147	0.0083	0.0077

Schools

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0275	0.0275	0.0200
1	0.0422	0.0373	0.0298
2	0.0422	0.0373	0.0298
3	0.0422	0.0373	0.0298
4	0.0388	0.0314	0.0245
5	0.0308	0.0239	0.0179
10	0.0236	0.0160	0.0121
15	0.0182	0.0135	0.0103
20	0.0145	0.0109	0.0085
25	0.0124	0.0102	0.0058
30	0.0075	0.0053	0.0019

- The Miscellaneous salary scale is used for Local Prosecutors.
- The Police salary scale is used for Other Safety, Local Sheriff, and School Police.

Price Inflation

2.30% compounded annually.

Wage Inflation

2.80% compounded annually (used in projecting individual salary increases).

Payroll Growth

2.80% compounded annually (used in projecting the payroll over which the unfunded liability is amortized for level percent of payroll bases). This assumption is used for all plans with active members.

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 2.30% price inflation assumption and any potential liability loss from future member service purchases that are not reflected in the valuation.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1% for those plans that have adopted the provision of providing Credit for Unused Sick Leave.

Conversion of Employer Paid Member Contributions (EPMC)

Total years of service is increased by the Employee Contribution Rate for those plans with the provision providing for the Conversion of Employer Paid Member Contributions (EPMC) during the final compensation period.

Norris Decision (Best Factors)

Employees hired prior to July 1, 1982 have projected benefit amounts increased in order to reflect the use of "Best Factors" in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

Termination Liability

The termination liabilities include a 5% contingency load. This load is for unforeseen improvements in mortality.

Demographic Assumptions

Pre-Retirement Mortality

The mortality assumptions are based on mortality rates resulting from the most recent CalPERS Experience Study adopted by the CalPERS Board in November 2021. For purposes of the mortality rates, the rates incorporate generational mortality to capture on-going mortality improvement. Generational mortality explicitly assumes that members born more recently will live longer than the members born before them thereby capturing the mortality improvement seen in the past and expected continued improvement. For more details, please refer to the 2021 experience study report that can be found on the CalPERS website

Rates vary by age and gender are shown in the table below. This table only contains a sample of the 2017 base table rates for illustrative purposes. The non-industrial death rates are used for all plans. The industrial death rates are used for Safety plans (except for local Safety members described in Section 20423.6 where the agency has not specifically contracted for industrial death benefits.)

	Miscellaneous		Safety			
	Non-Industrial Death (Not Job-Related)		Non-Industrial Death (Not Job-Related)		Industrial Death (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
20	0.00039	0.00014	0.00038	0.00014	0.00004	0.00002
25	0.00033	0.00013	0.00034	0.00018	0.00004	0.00002
30	0.00044	0.00019	0.00042	0.00025	0.00005	0.00003
35	0.00058	0.00029	0.00048	0.00034	0.00005	0.00004
40	0.00075	0.00039	0.00055	0.00042	0.00006	0.00005
45	0.00093	0.00054	0.00066	0.00053	0.00007	0.00006
50	0.00134	0.00081	0.00092	0.00073	0.00010	0.00008
55	0.00198	0.00123	0.00138	0.00106	0.00015	0.00012
60	0.00287	0.00179	0.00221	0.00151	0.00025	0.00017
65	0.00403	0.00250	0.00346	0.00194	0.00038	0.00022
70	0.00594	0.00404	0.00606	0.00358	0.00067	0.00040
75	0.00933	0.00688	0.01099	0.00699	0.00122	0.00078
80	0.01515	0.01149	0.02027	0.01410	0.00225	0.00157

- The pre-retirement mortality rates above are for 2017 and are projected generationally for future years using 80% of the Society of Actuaries' Scale MP-2020.
- Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components: 99% will become the non-industrial death rate and 1% will become the industrial death rate.

Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

	Healthy Recipients		Non-Industrially Disabled (Not Job-Related)		Industrially Disabled (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
50	0.00267	0.00199	0.01701	0.01439	0.00430	0.00311
55	0.00390	0.00325	0.02210	0.01734	0.00621	0.00550
60	0.00578	0.00455	0.02708	0.01962	0.00944	0.00868
65	0.00857	0.00612	0.03334	0.02276	0.01394	0.01190
70	0.01333	0.00996	0.04001	0.02910	0.02163	0.01858
75	0.02391	0.01783	0.05376	0.04160	0.03446	0.03134
80	0.04371	0.03403	0.07936	0.06112	0.05853	0.05183
85	0.08274	0.06166	0.11561	0.09385	0.10137	0.08045
90	0.14539	0.11086	0.16608	0.14396	0.16584	0.12434
95	0.24665	0.20364	0.24665	0.20364	0.24665	0.20364
100	0.36198	0.31582	0.36198	0.31582	0.36198	0.31582
105	0.52229	0.44679	0.52229	0.44679	0.52229	0.44679
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The post-retirement mortality rates above are for 2017 and are projected generationally for future years using 80% of the Society of Actuaries' Scale MP-2020.

Marital Status

For active members, a percentage who are married upon retirement is assumed according to the member category as shown in the following table.

Member Category	Percent Married
Miscellaneous Member	70%
Local Police	85%
Local Fire	85%
Other Local Safety	70%
School Police	85%
Local County Peace Officers	75%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses. This assumption is used for all plans.

Terminated Members

It is assumed that terminated members refund immediately if non-vested. Terminated members who are vested are assumed to retire at age 59 for Miscellaneous members and age 54 for Safety members.

Termination with Refund

Rates vary by entry age and service for Miscellaneous plans. Rates vary by service for Safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40		Entry Age 45	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.1851	0.1944	0.1769	0.1899	0.1631	0.1824	0.1493	0.1749	0.1490	0.1731	0.1487	0.1713
1	0.1531	0.1673	0.1432	0.1602	0.1266	0.1484	0.1101	0.1366	0.1069	0.1323	0.1037	0.1280
2	0.1218	0.1381	0.1125	0.1307	0.0970	0.1183	0.0815	0.1058	0.0771	0.0998	0.0726	0.0938
3	0.0927	0.1085	0.0852	0.1020	0.0727	0.0912	0.0601	0.0804	0.0556	0.0737	0.0511	0.0669
4	0.0672	0.0801	0.0616	0.0752	0.0524	0.0670	0.0431	0.0587	0.0392	0.0523	0.0352	0.0459
5	0.0463	0.0551	0.0423	0.0517	0.0358	0.0461	0.0292	0.0404	0.0261	0.0350	0.0230	0.0296
10	0.0112	0.0140	0.0101	0.0129	0.0083	0.0112	0.0064	0.0094	0.0048	0.0071	0.0033	0.0049
15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire		Police		County Peace Officer	
	Male	Female	Male	Female	Male	Female
0	0.1022	0.1317	0.1298	0.1389	0.1086	0.1284
1	0.0686	0.1007	0.0789	0.0904	0.0777	0.0998
2	0.0441	0.0743	0.0464	0.0566	0.0549	0.0759
3	0.0272	0.0524	0.0274	0.0343	0.0385	0.0562
4	0.0161	0.0349	0.0170	0.0206	0.0268	0.0402
5	0.0092	0.0214	0.0113	0.0128	0.0186	0.0276
10	0.0015	0.0000	0.0032	0.0047	0.0046	0.0038
15	0.0000	0.0000	0.0000	0.0000	0.0023	0.0036
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

- The police termination and refund rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Termination with Refund (continued)

Schools

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40		Entry Age 45	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.2054	0.2120	0.1933	0.1952	0.1730	0.1672	0.1527	0.1392	0.1423	0.1212	0.1318	0.1032
1	0.1922	0.2069	0.1778	0.1883	0.1539	0.1573	0.1300	0.1264	0.1191	0.1087	0.1083	0.0910
2	0.1678	0.1859	0.1536	0.1681	0.1298	0.1383	0.1060	0.1086	0.0957	0.0934	0.0853	0.0782
3	0.1384	0.1575	0.1256	0.1417	0.1042	0.1155	0.0829	0.0893	0.0736	0.0774	0.0643	0.0656
4	0.1085	0.1274	0.0978	0.1143	0.0800	0.0925	0.0622	0.0707	0.0542	0.0620	0.0462	0.0533
5	0.0816	0.0991	0.0732	0.0887	0.0590	0.0713	0.0449	0.0539	0.0383	0.0476	0.0317	0.0413
10	0.0222	0.0248	0.0200	0.0221	0.0163	0.0174	0.0125	0.0128	0.0094	0.0100	0.0063	0.0072
15	0.0106	0.0132	0.0095	0.0113	0.0077	0.0083	0.0058	0.0052	0.0040	0.0039	0.0021	0.0026
20	0.0059	0.0065	0.0050	0.0054	0.0035	0.0036	0.0021	0.0019	0.0010	0.0009	0.0000	0.0000
25	0.0029	0.0034	0.0025	0.0029	0.0018	0.0020	0.0010	0.0012	0.0005	0.0006	0.0000	0.0000
30	0.0012	0.0015	0.0011	0.0013	0.0011	0.0011	0.0010	0.0009	0.0005	0.0005	0.0000	0.0000
35	0.0006	0.0007	0.0006	0.0007	0.0005	0.0006	0.0005	0.0005	0.0003	0.0002	0.0000	0.0000

Termination with Vested Benefits

Rates vary by entry age and service for Miscellaneous plans. Rates vary by service for Safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
5	0.0381	0.0524	0.0381	0.0524	0.0358	0.0464	0.0334	0.0405	0.0301	0.0380
10	0.0265	0.0362	0.0265	0.0362	0.0254	0.0334	0.0244	0.0307	0.0197	0.0236
15	0.0180	0.0252	0.0180	0.0252	0.0166	0.0213	0.0152	0.0174	0.0119	0.0132
20	0.0141	0.0175	0.0141	0.0175	0.0110	0.0131	0.0079	0.0087	0.0000	0.0000
25	0.0084	0.0108	0.0084	0.0108	0.0064	0.0076	0.0000	0.0000	0.0000	0.0000
30	0.0047	0.0056	0.0047	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0038	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire		Police		County Peace Officer	
	Male	Female	Male	Female	Male	Female
5	0.0089	0.0224	0.0156	0.0272	0.0177	0.0266
10	0.0066	0.0164	0.0113	0.0198	0.0126	0.0189
15	0.0048	0.0120	0.0083	0.0144	0.0089	0.0134
20	0.0035	0.0088	0.0060	0.0105	0.0063	0.0095
25	0.0024	0.0061	0.0042	0.0073	0.0042	0.0063
30	0.0012	0.0031	0.0021	0.0037	0.0021	0.0031
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

- After termination with vested benefits, a Miscellaneous member is assumed to retire at age 59 and a Safety member at age 54.
- The Police termination with vested benefits rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
5	0.0359	0.0501	0.0359	0.0501	0.0332	0.0402	0.0305	0.0304	0.0266	0.0272
10	0.0311	0.0417	0.0311	0.0417	0.0269	0.0341	0.0228	0.0265	0.0193	0.0233
15	0.0193	0.0264	0.0193	0.0264	0.0172	0.0220	0.0151	0.0175	0.0123	0.0142
20	0.0145	0.0185	0.0145	0.0185	0.0113	0.0141	0.0080	0.0097	0.0000	0.0000
25	0.0089	0.0123	0.0089	0.0123	0.0074	0.0093	0.0000	0.0000	0.0000	0.0000
30	0.0057	0.0064	0.0057	0.0064	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0040	0.0049	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Non-Industrial (Not Job-Related) Disability

Rates vary by age and gender for Miscellaneous plans. Rates vary by age and category for Safety plans.

	Miscellaneous		Fire	Police	County Peace Officer	Schools	
Age	Male	Female	Male and Female	Male and Female	Male and Female	Male	Female
20	0.0001	0.0000	0.0001	0.0001	0.0001	0.0000	0.0002
25	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0002
30	0.0002	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002
35	0.0004	0.0007	0.0001	0.0002	0.0003	0.0005	0.0004
40	0.0009	0.0012	0.0001	0.0002	0.0006	0.0010	0.0008
45	0.0015	0.0019	0.0002	0.0003	0.0011	0.0019	0.0015
50	0.0015	0.0019	0.0004	0.0005	0.0016	0.0027	0.0021
55	0.0014	0.0013	0.0006	0.0007	0.0009	0.0024	0.0017
60	0.0012	0.0009	0.0006	0.0011	0.0005	0.0020	0.0010

- The Miscellaneous non-industrial disability rates are used for Local Prosecutors.
- The police non-industrial disability rates are also used for Other Safety, Local Sheriff, and School Police.

Industrial (Job-Related) Disability

Rates vary by age and category.

Age	Fire	Police	County Peace Officer
20	0.0001	0.0000	0.0004
25	0.0002	0.0017	0.0013
30	0.0006	0.0048	0.0025
35	0.0012	0.0079	0.0037
40	0.0023	0.0110	0.0051
45	0.0040	0.0141	0.0067
50	0.0208	0.0185	0.0092
55	0.0307	0.0479	0.0151
60	0.0438	0.0602	0.0174

- The police industrial disability rates are also used for Local Sheriff and Other Safety.
- 50% of the police industrial disability rates are used for School Police.
- 1% of the police industrial disability rates are used for Local Prosecutors.
- Normally, rates are zero for Miscellaneous plans unless the agency has specifically contracted for industrial disability benefits. If so, each Miscellaneous non-industrial disability rate will be split into two components: 50% will become the non-industrial disability rate and 50% will become the industrial disability rate.

Service Retirement

Retirement rates vary by age, service, and formula, except for the Safety Half Pay at 55 and 2% at 55 formulas, where retirement rates vary by age only.

Public Agency Miscellaneous 1.5% at 65

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.011	0.013	0.015	0.017	0.019
51	0.007	0.010	0.012	0.013	0.015	0.017
52	0.010	0.014	0.017	0.019	0.021	0.024
53	0.008	0.012	0.015	0.017	0.019	0.022
54	0.012	0.016	0.019	0.022	0.025	0.028
55	0.018	0.025	0.031	0.035	0.038	0.043
56	0.015	0.021	0.025	0.029	0.032	0.036
57	0.020	0.028	0.033	0.038	0.043	0.048
58	0.024	0.033	0.040	0.046	0.052	0.058
59	0.028	0.039	0.048	0.054	0.060	0.067
60	0.049	0.069	0.083	0.094	0.105	0.118
61	0.062	0.087	0.106	0.120	0.133	0.150
62	0.104	0.146	0.177	0.200	0.223	0.251
63	0.099	0.139	0.169	0.191	0.213	0.239
64	0.097	0.136	0.165	0.186	0.209	0.233
65	0.140	0.197	0.240	0.271	0.302	0.339
66	0.092	0.130	0.157	0.177	0.198	0.222
67	0.129	0.181	0.220	0.249	0.277	0.311
68	0.092	0.129	0.156	0.177	0.197	0.221
69	0.092	0.130	0.158	0.178	0.199	0.224
70	0.103	0.144	0.175	0.198	0.221	0.248

Public Agency Miscellaneous 2% at 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.010	0.011	0.014	0.014	0.017	0.017
51	0.017	0.013	0.014	0.010	0.010	0.010
52	0.014	0.014	0.018	0.015	0.016	0.016
53	0.015	0.012	0.013	0.010	0.011	0.011
54	0.006	0.010	0.017	0.016	0.018	0.018
55	0.012	0.016	0.024	0.032	0.036	0.036
56	0.010	0.014	0.023	0.030	0.034	0.034
57	0.006	0.018	0.030	0.040	0.044	0.044
58	0.022	0.023	0.033	0.042	0.046	0.046
59	0.039	0.033	0.040	0.047	0.050	0.050
60	0.063	0.069	0.074	0.090	0.137	0.116
61	0.044	0.058	0.066	0.083	0.131	0.113
62	0.084	0.107	0.121	0.153	0.238	0.205
63	0.173	0.166	0.165	0.191	0.283	0.235
64	0.120	0.145	0.164	0.147	0.160	0.172
65	0.138	0.160	0.214	0.216	0.237	0.283
66	0.198	0.228	0.249	0.216	0.228	0.239
67	0.207	0.242	0.230	0.233	0.233	0.233
68	0.201	0.234	0.225	0.231	0.231	0.231
69	0.152	0.173	0.164	0.166	0.166	0.166
70	0.200	0.200	0.200	0.200	0.200	0.200

Service Retirement

Public Agency Miscellaneous 2% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.014	0.014	0.017	0.021	0.023	0.024
51	0.013	0.017	0.017	0.018	0.018	0.019
52	0.013	0.018	0.018	0.020	0.020	0.021
53	0.013	0.019	0.021	0.024	0.025	0.026
54	0.017	0.025	0.028	0.032	0.033	0.035
55	0.045	0.042	0.053	0.086	0.098	0.123
56	0.018	0.036	0.056	0.086	0.102	0.119
57	0.041	0.046	0.056	0.076	0.094	0.120
58	0.052	0.044	0.048	0.074	0.106	0.123
59	0.043	0.058	0.073	0.092	0.105	0.126
60	0.059	0.064	0.083	0.115	0.154	0.170
61	0.087	0.074	0.087	0.107	0.147	0.168
62	0.115	0.123	0.151	0.180	0.227	0.237
63	0.116	0.127	0.164	0.202	0.252	0.261
64	0.084	0.138	0.153	0.190	0.227	0.228
65	0.167	0.187	0.210	0.262	0.288	0.291
66	0.187	0.258	0.280	0.308	0.318	0.319
67	0.195	0.235	0.244	0.277	0.269	0.280
68	0.228	0.248	0.250	0.241	0.245	0.245
69	0.188	0.201	0.209	0.219	0.231	0.231
70	0.229	0.229	0.229	0.229	0.229	0.229

Public Agency Miscellaneous 2.5% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.014	0.017	0.027	0.035	0.046	0.050
51	0.019	0.021	0.025	0.030	0.038	0.040
52	0.018	0.020	0.026	0.034	0.038	0.037
53	0.013	0.021	0.031	0.045	0.052	0.053
54	0.025	0.025	0.030	0.046	0.057	0.068
55	0.029	0.042	0.064	0.109	0.150	0.225
56	0.036	0.047	0.068	0.106	0.134	0.194
57	0.051	0.047	0.060	0.092	0.116	0.166
58	0.035	0.046	0.062	0.093	0.119	0.170
59	0.029	0.053	0.072	0.112	0.139	0.165
60	0.039	0.069	0.094	0.157	0.177	0.221
61	0.080	0.077	0.086	0.140	0.167	0.205
62	0.086	0.131	0.149	0.220	0.244	0.284
63	0.135	0.135	0.147	0.214	0.222	0.262
64	0.114	0.128	0.158	0.177	0.233	0.229
65	0.112	0.174	0.222	0.209	0.268	0.273
66	0.235	0.254	0.297	0.289	0.321	0.337
67	0.237	0.240	0.267	0.249	0.267	0.277
68	0.258	0.271	0.275	0.207	0.210	0.212
69	0.117	0.208	0.266	0.219	0.250	0.270
70	0.229	0.229	0.229	0.229	0.229	0.229

Service Retirement

Public Agency Miscellaneous 2.7% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.011	0.016	0.022	0.033	0.034	0.038
51	0.018	0.019	0.023	0.032	0.031	0.031
52	0.019	0.020	0.026	0.035	0.034	0.037
53	0.020	0.020	0.025	0.043	0.048	0.053
54	0.018	0.030	0.040	0.052	0.053	0.070
55	0.045	0.058	0.082	0.138	0.208	0.278
56	0.057	0.062	0.080	0.121	0.178	0.222
57	0.045	0.052	0.071	0.106	0.147	0.182
58	0.074	0.060	0.074	0.118	0.163	0.182
59	0.058	0.067	0.086	0.123	0.158	0.187
60	0.087	0.084	0.096	0.142	0.165	0.198
61	0.073	0.084	0.101	0.138	0.173	0.218
62	0.130	0.133	0.146	0.187	0.214	0.249
63	0.122	0.140	0.160	0.204	0.209	0.243
64	0.104	0.124	0.154	0.202	0.214	0.230
65	0.182	0.201	0.242	0.264	0.293	0.293
66	0.272	0.249	0.273	0.285	0.312	0.312
67	0.182	0.217	0.254	0.249	0.264	0.264
68	0.223	0.197	0.218	0.242	0.273	0.273
69	0.217	0.217	0.217	0.217	0.217	0.217
70	0.227	0.227	0.227	0.227	0.227	0.227

Public Agency Miscellaneous 3% at 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.015	0.020	0.025	0.039	0.040	0.044
51	0.041	0.034	0.032	0.041	0.036	0.037
52	0.024	0.020	0.022	0.039	0.040	0.041
53	0.018	0.024	0.032	0.047	0.048	0.057
54	0.033	0.033	0.035	0.051	0.049	0.052
55	0.137	0.043	0.051	0.065	0.076	0.108
56	0.173	0.038	0.054	0.075	0.085	0.117
57	0.019	0.035	0.059	0.088	0.111	0.134
58	0.011	0.040	0.070	0.105	0.133	0.162
59	0.194	0.056	0.064	0.081	0.113	0.163
60	0.081	0.085	0.133	0.215	0.280	0.333
61	0.080	0.090	0.134	0.170	0.223	0.292
62	0.137	0.153	0.201	0.250	0.278	0.288
63	0.128	0.140	0.183	0.227	0.251	0.260
64	0.174	0.147	0.173	0.224	0.239	0.264
65	0.152	0.201	0.262	0.299	0.323	0.323
66	0.272	0.273	0.317	0.355	0.380	0.380
67	0.218	0.237	0.268	0.274	0.284	0.284
68	0.200	0.228	0.269	0.285	0.299	0.299
69	0.250	0.250	0.250	0.250	0.250	0.250
70	0.245	0.245	0.245	0.245	0.245	0.245

Service Retirement

Public Agency Miscellaneous 2% at 62

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.008	0.012	0.015	0.019	0.031
53	0.007	0.011	0.014	0.018	0.021	0.032
54	0.007	0.011	0.015	0.019	0.023	0.034
55	0.010	0.019	0.028	0.036	0.061	0.096
56	0.014	0.026	0.038	0.050	0.075	0.108
57	0.018	0.029	0.039	0.050	0.074	0.107
58	0.023	0.035	0.048	0.060	0.073	0.099
59	0.025	0.038	0.051	0.065	0.092	0.128
60	0.031	0.051	0.071	0.091	0.111	0.138
61	0.038	0.058	0.079	0.100	0.121	0.167
62	0.044	0.074	0.104	0.134	0.164	0.214
63	0.077	0.105	0.134	0.163	0.192	0.237
64	0.072	0.101	0.129	0.158	0.187	0.242
65	0.108	0.141	0.173	0.206	0.239	0.300
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Fire Half Pay at 55 and 2% at 55

Age	Rate	Age	Rate
50	0.016	56	0.111
51	0.000	57	0.000
52	0.034	58	0.095
53	0.020	59	0.044
54	0.041	60	1.000
55	0.075		

Public Agency Police Half Pay at 55 and 2% at 55

Age	Rate	Age	Rate
50	0.026	56	0.069
51	0.000	57	0.051
52	0.016	58	0.072
53	0.027	59	0.070
54	0.010	60	0.300
55	0.167		

Service Retirement

Public Agency Police 2% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.018	0.077	0.056	0.046	0.043	0.046
51	0.022	0.087	0.060	0.048	0.044	0.047
52	0.020	0.102	0.081	0.071	0.069	0.075
53	0.016	0.072	0.053	0.045	0.042	0.046
54	0.006	0.071	0.071	0.069	0.072	0.080
55	0.009	0.040	0.099	0.157	0.186	0.186
56	0.020	0.051	0.108	0.165	0.194	0.194
57	0.036	0.072	0.106	0.139	0.156	0.156
58	0.001	0.046	0.089	0.130	0.152	0.152
59	0.066	0.094	0.119	0.143	0.155	0.155
60	0.177	0.177	0.177	0.177	0.177	0.177
61	0.134	0.134	0.134	0.134	0.134	0.134
62	0.184	0.184	0.184	0.184	0.184	0.184
63	0.250	0.250	0.250	0.250	0.250	0.250
64	0.177	0.177	0.177	0.177	0.177	0.177
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.054	0.054	0.056	0.080	0.064	0.066
51	0.020	0.020	0.021	0.030	0.024	0.024
52	0.037	0.037	0.038	0.054	0.043	0.045
53	0.051	0.051	0.053	0.076	0.061	0.063
54	0.082	0.082	0.085	0.121	0.097	0.100
55	0.139	0.139	0.139	0.139	0.139	0.139
56	0.129	0.129	0.129	0.129	0.129	0.129
57	0.085	0.085	0.085	0.085	0.085	0.085
58	0.119	0.119	0.119	0.119	0.119	0.119
59	0.167	0.167	0.167	0.167	0.167	0.167
60	0.152	0.152	0.152	0.152	0.152	0.152
61	0.179	0.179	0.179	0.179	0.179	0.179
62	0.179	0.179	0.179	0.179	0.179	0.179
63	0.179	0.179	0.179	0.179	0.179	0.179
64	0.179	0.179	0.179	0.179	0.179	0.179
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.019	0.053	0.045	0.054	0.057	0.061
51	0.002	0.017	0.028	0.044	0.053	0.060
52	0.002	0.031	0.037	0.051	0.059	0.066
53	0.026	0.049	0.049	0.080	0.099	0.114
54	0.019	0.034	0.047	0.091	0.121	0.142
55	0.006	0.115	0.141	0.199	0.231	0.259
56	0.017	0.188	0.121	0.173	0.199	0.199
57	0.008	0.137	0.093	0.136	0.157	0.157
58	0.017	0.126	0.105	0.164	0.194	0.194
59	0.026	0.146	0.110	0.167	0.195	0.195
60	0.155	0.155	0.155	0.155	0.155	0.155
61	0.210	0.210	0.210	0.210	0.210	0.210
62	0.262	0.262	0.262	0.262	0.262	0.262
63	0.172	0.172	0.172	0.172	0.172	0.172
64	0.227	0.227	0.227	0.227	0.227	0.227
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.006	0.013	0.019	0.025	0.028
51	0.004	0.008	0.017	0.026	0.034	0.038
52	0.005	0.011	0.022	0.033	0.044	0.049
53	0.005	0.034	0.024	0.038	0.069	0.138
54	0.007	0.047	0.032	0.051	0.094	0.187
55	0.010	0.067	0.046	0.073	0.134	0.266
56	0.010	0.063	0.044	0.069	0.127	0.253
57	0.135	0.100	0.148	0.196	0.220	0.220
58	0.083	0.062	0.091	0.120	0.135	0.135
59	0.137	0.053	0.084	0.146	0.177	0.177
60	0.162	0.063	0.099	0.172	0.208	0.208
61	0.598	0.231	0.231	0.231	0.231	0.231
62	0.621	0.240	0.240	0.240	0.240	0.240
63	0.236	0.236	0.236	0.236	0.236	0.236
64	0.236	0.236	0.236	0.236	0.236	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.124	0.103	0.113	0.143	0.244	0.376
51	0.060	0.081	0.087	0.125	0.207	0.294
52	0.016	0.055	0.111	0.148	0.192	0.235
53	0.072	0.074	0.098	0.142	0.189	0.237
54	0.018	0.049	0.105	0.123	0.187	0.271
55	0.069	0.074	0.081	0.113	0.209	0.305
56	0.064	0.108	0.113	0.125	0.190	0.288
57	0.056	0.109	0.160	0.182	0.210	0.210
58	0.108	0.129	0.173	0.189	0.214	0.214
59	0.093	0.144	0.204	0.229	0.262	0.262
60	0.343	0.180	0.159	0.188	0.247	0.247
61	0.221	0.221	0.221	0.221	0.221	0.221
62	0.213	0.213	0.213	0.213	0.213	0.213
63	0.233	0.233	0.233	0.233	0.233	0.233
64	0.234	0.234	0.234	0.234	0.234	0.234
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.095	0.048	0.053	0.093	0.134	0.175
51	0.016	0.032	0.053	0.085	0.117	0.149
52	0.013	0.032	0.054	0.087	0.120	0.154
53	0.085	0.044	0.049	0.089	0.129	0.170
54	0.038	0.065	0.074	0.105	0.136	0.167
55	0.042	0.043	0.049	0.085	0.132	0.215
56	0.133	0.103	0.075	0.113	0.151	0.209
57	0.062	0.048	0.060	0.124	0.172	0.213
58	0.124	0.097	0.092	0.153	0.194	0.227
59	0.092	0.071	0.078	0.144	0.192	0.233
60	0.056	0.044	0.061	0.131	0.186	0.233
61	0.282	0.219	0.158	0.198	0.233	0.260
62	0.292	0.227	0.164	0.205	0.241	0.269
63	0.196	0.196	0.196	0.196	0.196	0.196
64	0.197	0.197	0.197	0.197	0.197	0.197
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.040	0.040	0.040	0.040	0.040	0.080
51	0.028	0.028	0.028	0.028	0.040	0.066
52	0.028	0.028	0.028	0.028	0.043	0.061
53	0.028	0.028	0.028	0.028	0.057	0.086
54	0.028	0.028	0.028	0.032	0.069	0.110
55	0.050	0.050	0.050	0.067	0.099	0.179
56	0.046	0.046	0.046	0.062	0.090	0.160
57	0.054	0.054	0.054	0.072	0.106	0.191
58	0.060	0.060	0.060	0.066	0.103	0.171
59	0.060	0.060	0.060	0.069	0.105	0.171
60	0.113	0.113	0.113	0.113	0.113	0.171
61	0.108	0.108	0.108	0.108	0.108	0.128
62	0.113	0.113	0.113	0.113	0.113	0.159
63	0.113	0.113	0.113	0.113	0.113	0.159
64	0.113	0.113	0.113	0.113	0.113	0.239
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.005	0.005	0.005	0.005	0.008	0.012
51	0.006	0.006	0.006	0.006	0.009	0.013
52	0.012	0.012	0.012	0.012	0.019	0.028
53	0.033	0.033	0.033	0.033	0.050	0.075
54	0.045	0.045	0.045	0.045	0.069	0.103
55	0.061	0.061	0.061	0.061	0.094	0.140
56	0.055	0.055	0.055	0.055	0.084	0.126
57	0.081	0.081	0.081	0.081	0.125	0.187
58	0.059	0.059	0.059	0.059	0.091	0.137
59	0.055	0.055	0.055	0.055	0.084	0.126
60	0.085	0.085	0.085	0.085	0.131	0.196
61	0.085	0.085	0.085	0.085	0.131	0.196
62	0.085	0.085	0.085	0.085	0.131	0.196
63	0.085	0.085	0.085	0.085	0.131	0.196
64	0.085	0.085	0.085	0.085	0.131	0.196
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.5% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.038	0.038	0.038	0.038	0.055	0.089
52	0.038	0.038	0.038	0.038	0.058	0.082
53	0.036	0.036	0.036	0.036	0.073	0.111
54	0.036	0.036	0.036	0.041	0.088	0.142
55	0.061	0.061	0.061	0.082	0.120	0.217
56	0.056	0.056	0.056	0.075	0.110	0.194
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.072	0.072	0.072	0.079	0.124	0.205
59	0.072	0.072	0.072	0.083	0.126	0.205
60	0.135	0.135	0.135	0.135	0.135	0.205
61	0.130	0.130	0.130	0.130	0.130	0.153
62	0.135	0.135	0.135	0.135	0.135	0.191
63	0.135	0.135	0.135	0.135	0.135	0.191
64	0.135	0.135	0.135	0.135	0.135	0.287
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.5% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.012	0.018
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.042	0.042	0.042	0.042	0.064	0.096
54	0.057	0.057	0.057	0.057	0.088	0.132
55	0.074	0.074	0.074	0.074	0.114	0.170
56	0.066	0.066	0.066	0.066	0.102	0.153
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.071	0.071	0.071	0.071	0.110	0.164
59	0.066	0.066	0.066	0.066	0.101	0.151
60	0.102	0.102	0.102	0.102	0.157	0.235
61	0.102	0.102	0.102	0.102	0.157	0.236
62	0.102	0.102	0.102	0.102	0.157	0.236
63	0.102	0.102	0.102	0.102	0.157	0.236
64	0.102	0.102	0.102	0.102	0.157	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.7% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.038	0.038	0.038	0.038	0.058	0.083
53	0.038	0.038	0.038	0.038	0.077	0.117
54	0.038	0.038	0.038	0.044	0.093	0.150
55	0.068	0.068	0.068	0.091	0.134	0.242
56	0.063	0.063	0.063	0.084	0.123	0.217
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.080	0.080	0.080	0.088	0.138	0.228
59	0.080	0.080	0.080	0.092	0.140	0.228
60	0.150	0.150	0.150	0.150	0.150	0.228
61	0.144	0.144	0.144	0.144	0.144	0.170
62	0.150	0.150	0.150	0.150	0.150	0.213
63	0.150	0.150	0.150	0.150	0.150	0.213
64	0.150	0.150	0.150	0.150	0.150	0.319
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.7% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.013	0.019
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.044	0.044	0.044	0.044	0.068	0.102
54	0.061	0.061	0.061	0.061	0.093	0.140
55	0.083	0.083	0.083	0.083	0.127	0.190
56	0.074	0.074	0.074	0.074	0.114	0.171
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.079	0.079	0.079	0.079	0.122	0.182
59	0.073	0.073	0.073	0.073	0.112	0.168
60	0.114	0.114	0.114	0.114	0.175	0.262
61	0.114	0.114	0.114	0.114	0.175	0.262
62	0.114	0.114	0.114	0.114	0.175	0.262
63	0.114	0.114	0.114	0.114	0.175	0.262
64	0.114	0.114	0.114	0.114	0.175	0.262
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Schools 2% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.004	0.006	0.007	0.010	0.010
51	0.004	0.005	0.007	0.008	0.011	0.011
52	0.005	0.007	0.008	0.009	0.012	0.012
53	0.007	0.008	0.010	0.012	0.015	0.015
54	0.006	0.009	0.012	0.015	0.020	0.021
55	0.011	0.023	0.034	0.057	0.070	0.090
56	0.012	0.027	0.036	0.056	0.073	0.095
57	0.016	0.027	0.036	0.055	0.068	0.087
58	0.019	0.030	0.040	0.062	0.078	0.103
59	0.023	0.034	0.046	0.070	0.085	0.109
60	0.022	0.043	0.062	0.095	0.113	0.141
61	0.030	0.051	0.071	0.103	0.124	0.154
62	0.065	0.098	0.128	0.188	0.216	0.248
63	0.075	0.112	0.144	0.197	0.222	0.268
64	0.091	0.116	0.138	0.180	0.196	0.231
65	0.163	0.164	0.197	0.232	0.250	0.271
66	0.208	0.204	0.243	0.282	0.301	0.315
67	0.189	0.185	0.221	0.257	0.274	0.287
68	0.127	0.158	0.200	0.227	0.241	0.244
69	0.168	0.162	0.189	0.217	0.229	0.238
70	0.191	0.190	0.237	0.250	0.246	0.254

Schools 2% at 62

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.004	0.007	0.010	0.011	0.013	0.015
53	0.004	0.008	0.010	0.013	0.014	0.016
54	0.005	0.011	0.015	0.018	0.020	0.022
55	0.014	0.027	0.038	0.045	0.050	0.056
56	0.013	0.026	0.037	0.043	0.048	0.055
57	0.013	0.027	0.038	0.045	0.050	0.055
58	0.017	0.034	0.047	0.056	0.062	0.069
59	0.019	0.037	0.052	0.062	0.068	0.076
60	0.026	0.053	0.074	0.087	0.097	0.108
61	0.030	0.058	0.081	0.095	0.106	0.119
62	0.053	0.105	0.147	0.174	0.194	0.217
63	0.054	0.107	0.151	0.178	0.198	0.222
64	0.053	0.105	0.147	0.174	0.194	0.216
65	0.072	0.142	0.199	0.235	0.262	0.293
66	0.077	0.152	0.213	0.252	0.281	0.314
67	0.070	0.139	0.194	0.229	0.255	0.286
68	0.063	0.124	0.173	0.205	0.228	0.255
69	0.066	0.130	0.183	0.216	0.241	0.270
70	0.071	0.140	0.196	0.231	0.258	0.289

Miscellaneous

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415(b) dollar limit for the 2021 calendar year is $230,000.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2021 calendar year is $290,000.

Appendix B

Principal Plan Provisions

The following is a description of the principal plan provisions used in calculating costs and liabilities. We have indicated whether a plan provision is standard or optional. Standard benefits are applicable to all members while optional benefits vary among employers. Optional benefits that apply to a single period of time, such as Golden Handshakes, have not been included. Many of the statements in this summary are general in nature, and are intended to provide an easily understood summary of the Public Employees' Retirement Law. The law itself governs in all situations.

Service Retirement

Eligibility

A classic CalPERS member or PEPRA Safety member becomes eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). For employees hired into a plan with the 1.5% at age 65 formula, eligibility for service retirement is age 55 with at least 5 years of service. PEPRA Miscellaneous members become eligible for service retirement upon attainment of age 52 with at least 5 years of service.

Benefit

The service retirement benefit is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation.*

- The *benefit factor* depends on the benefit formula specified in the agency's contract. The table below shows the factors for each of the available formulas. Factors vary by the member's age at retirement. Listed are the factors for retirement at whole year ages:

Miscellaneous Plan Formulas

Retirement Age	1.5% at 65	2% at 60	2% at 55	2.5% at 55	2.7% at 55	3% at 60	PEPRA 2% at 62
50	0.5000%	1.092%	1.426%	2.000%	2.000%	2.000%	N/A
51	0.5667%	1.156%	1.522%	2.100%	2.140%	2.100%	N/A
52	0.6334%	1.224%	1.628%	2.200%	2.280%	2.200%	1.000%
53	0.7000%	1.296%	1.742%	2.300%	2.420%	2.300%	1.100%
54	0.7667%	1.376%	1.866%	2.400%	2.560%	2.400%	1.200%
55	0.8334%	1.460%	2.000%	2.500%	2.700%	2.500%	1.300%
56	0.9000%	1.552%	2.052%	2.500%	2.700%	2.600%	1.400%
57	0.9667%	1.650%	2.104%	2.500%	2.700%	2.700%	1.500%
58	1.0334%	1.758%	2.156%	2.500%	2.700%	2.800%	1.600%
59	1.1000%	1.874%	2.210%	2.500%	2.700%	2.900%	1.700%
60	1.1667%	2.000%	2.262%	2.500%	2.700%	3.000%	1.800%
61	1.2334%	2.134%	2.314%	2.500%	2.700%	3.000%	1.900%
62	1.3000%	2.272%	2.366%	2.500%	2.700%	3.000%	2.000%
63	1.3667%	2.418%	2.418%	2.500%	2.700%	3.000%	2.100%
64	1.4334%	2.418%	2.418%	2.500%	2.700%	3.000%	2.200%
65	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.300%
66	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.400%
67 & up	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.500%

Safety Plan Formulas

Retirement Age	Half Pay at 55*	2% at 55	2% at 50	3% at 55	3% at 50
50	1.783%	1.426%	2.000%	2.400%	3.000%
51	1.903%	1.522%	2.140%	2.520%	3.000%
52	2.035%	1.628%	2.280%	2.640%	3.000%
53	2.178%	1.742%	2.420%	2.760%	3.000%
54	2.333%	1.866%	2.560%	2.880%	3.000%
55 & Up	2.500%	2.000%	2.700%	3.000%	3.000%

* For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or greater. If entry age is less than 35, then the age 55 benefit factor is 50% divided by the difference between age 55 and entry age. The benefit factor for ages prior to age 55 is the same proportion of the age 55 benefit factor as in the above table.

PEPRA Safety Plan Formulas

Retirement Age	2% at 57	2.5% at 57	2.7% at 57
50	1.426%	2.000%	2.000%
51	1.508%	2.071%	2.100%
52	1.590%	2.143%	2.200%
53	1.672%	2.214%	2.300%
54	1.754%	2.286%	2.400%
55	1.836%	2.357%	2.500%
56	1.918%	2.429%	2.600%
57 & Up	2.000%	2.500%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $128,059 for 2021 and for those employees that do not participate in Social Security the cap for 2021 is $153,671. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with no offsets.

Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is $317 if members are not covered by Social Security or $513 if members are covered by Social Security.

- The Miscellaneous and PEPRA Safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

The CalPERS classic members and PEPRA Safety members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 50 (55 for employees hired into a 1.5% at 65 plan). PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the service retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury, which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively employed by any CalPERS employer at the time of disability in order to be eligible for this benefit.

Standard Benefit

The standard Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33⅓% of final compensation.

Improved Benefit

Employers have the option of providing the improved Non-Industrial Disability Retirement benefit. This benefit provides a monthly allowance equal to 30% of final compensation for the first 5 years of service, plus 1% for each additional year of service to a maximum of 50% of final compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job Related) Disability Retirement

This is a standard benefit for Safety members except those described in Section 20423.6. For excluded Safety members and all Miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury, which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described below.

Standard Benefit

The standard Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation.

Increased Benefit (75% of Final Compensation)

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75% of final compensation for total disability.

Improved Benefit (50% to 90% of Final Compensation)

The improved Industrial Disability Retirement benefit is a monthly allowance equal to the Workman's Compensation Appeals Board permanent disability rate percentage (if 50% or greater, with a maximum of 90%) times the final compensation.

For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return of accumulated member contributions with respect to employment in this group. With the standard or increased benefit, a member may also choose to receive the annuitization of the accumulated member contributions.

If a member is eligible for service retirement and if the service retirement benefit is more than the industrial disability retirement benefit, the member may choose to receive the larger benefit.

Post-Retirement Death Benefit

Standard Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $500 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Improved Lump Sum Payment

Employers have the option of providing an improved lump sum death benefit of $600, $2,000, $3,000, $4,000 or $5,000.

Form of Payment for Retirement Allowance

Standard Form of Payment

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

Improved Form of Payment (Post-Retirement Survivor Allowance)

Employers have the option to contract for the post-retirement survivor allowance.

For retirement allowances with respect to service subject to the modified formula, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. For retirement allowances with respect to service subject to the full or supplemental formula, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is referred to as post-retirement survivor allowance (PRSA) or simply as survivor continuance.

In other words, 25% or 50% of the allowance, the continuance portion, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried child(ren) until they attain age 18; or, if no eligible child(ren), to a qualifying dependent parent) for the rest of his or her lifetime. This benefit will not be discontinued in the event the spouse remarries.

The remaining 75% or 50% of the retirement allowance, which may be referred to as the option portion of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this option portion to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

Pre-Retirement Death Benefits

Basic Death Benefit

This is a standard benefit.

Eligibility

An employee's beneficiary (or estate) may receive the basic death benefit if the member dies while actively employed. A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this basic death benefit.

Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited annually at the greater of 6% or the prevailing discount rate through the date of death, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

1957 Survivor Benefit

This is a standard benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for classic and PEPRA Safety members and age 52 for PEPRA Miscellaneous members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried child(ren) under age 18. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this 1957 Survivor benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified service retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to dependent child(ren), the benefit will be discontinued upon death or attainment of age 18, unless the child(ren) is disabled. The total amount paid will be at least equal to the basic death benefit.

Optional Settlement 2 Death Benefit

This is an optional benefit.

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2 Death benefit if the member dies while actively employed, has attained at least age 50 for classic and PEPRA Safety members and age 52 for PEPRA Miscellaneous members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this Optional Settlement 2 Death benefit.

Benefit

The Optional Settlement 2 Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected 100% to continue to the eligible survivor after the member's death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Special Death Benefit

This is a standard benefit for Safety members except those described in Section 20423.6. For excluded Safety members and all Miscellaneous members, employers have the option of providing this benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the special death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The special death benefit is a monthly allowance equal to 50% of final compensation and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving child(ren) (*eligible* means unmarried child(ren) under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- if 1 eligible child: 12.5% of final compensation
- if 2 eligible children: 20.0% of final compensation
- if 3 or more eligible children: 25.0% of final compensation

Alternate Death Benefit for Local Fire Members

This is an optional benefit available only to local fire members.

Eligibility

An employee's *eligible survivor(s)* may receive the alternate death benefit in lieu of the basic death benefit or the 1957 Survivor benefit if the member dies while actively employed and has at least 20 years of total CalPERS service. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 18.

Benefit

The Alternate Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2. (A retiree who elects Optional Settlement 2 receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) If the member has not yet attained age 50, the benefit is equal to that which would be payable if the member had retired at age 50, based on service credited at the time of death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Cost-of-Living Adjustments (COLA)

Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of price inflation. The resulting increase is divided by the total increase provided in prior years. For any given year, the COLA adjustment may be less than 2% (when the rate of price inflation is low), may be greater than the rate of price inflation (when the rate of price inflation is low after several years of high price inflation) or may even be greater than 2% (when price inflation is high after several years of low price inflation).

Improved Benefit

Employers have the option of providing a COLA of 3%, 4%, or 5%, determined in the same manner as described above for the standard 2% COLA. An improved COLA is not available with the 1.5% at 65 formula.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against price inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 80% of the initial allowance at retirement adjusted for price inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

Employee Contributions

Each employee contributes toward his or her retirement based upon the retirement formula. The standard employee contribution is as described below.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is $0 for full and supplemental formula members and $133.33 for employees covered by the modified formula.
- The percent contributed above the monthly compensation breakpoint depends upon the benefit formula, as shown in the table below.

Benefit Formula	Percent Contributed above the Breakpoint
Miscellaneous, 1.5% at 65	2%
Miscellaneous, 2% at 60	7%
Miscellaneous, 2% at 55	7%
Miscellaneous, 2.5% at 55	8%
Miscellaneous, 2.7% at 55	8%
Miscellaneous, 3% at 60	8%
Miscellaneous, 2% at 62	50% of the Total Normal Cost
Miscellaneous, 1.5% at 65	50% of the Total Normal Cost
Safety, Half Pay at 55	Varies by entry age
Safety, 2% at 55	7%
Safety, 2% at 50	9%
Safety, 3% at 55	9%
Safety, 3% at 50	9%
Safety, 2% at 57	50% of the Total Normal Cost
Safety, 2.5% at 57	50% of the Total Normal Cost
Safety, 2.7% at 57	50% of the Total Normal Cost

The employer may choose to "pick-up" these contributions for classic members (Employer Paid Member Contributions or EPMC). EPMC is prohibited for new PEPRA members.

An employer may also include Employee Cost Sharing in the contract, where employees agree to share the cost of the employer contribution. These contributions are paid in addition to the member contribution.

Auxiliary organizations of the CSU system may elect reduced contribution rates, in which case the offset is $317 and the contribution rate is 6% if members are not covered by Social Security. If members are covered by Social Security, the offset is $513 and the contribution rate is 5%.

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6% interest compounded annually.

1959 Survivor Benefit

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 is required to provide this benefit if the members are not covered by Social Security. The benefit is optional for agencies joining CalPERS prior to 1994. Levels 1, 2, and 3 are now closed. Any new agency or any agency wishing to add this benefit or increase the current level may only choose the 4th or Indexed Level.

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website.

Appendix C

Participant Data

- Summary of Valuation Data
- Active Members
- Transferred and Terminated Members
- Retired Members and Beneficiaries

Summary of Valuation Data

	June 30, 2020	June 30, 2021
1. **Active Members**		
a) Counts	17,467	17,762
b) Average Attained Age	44.09	43.89
c) Average Entry Age to Rate Plan	34.31	34.19
d) Average Years of Credited Service	9.56	9.47
e) Average Annual Covered Pay	$67,720	$68,182
f) Annual Covered Payroll	1,182,860,410	1,211,043,768
g) Projected Annual Payroll for Contribution Year	1,283,154,608	1,315,646,404
h) Present Value of Future Payroll	10,335,558,972	11,203,017,370
2. **Transferred Members**		
a) Counts	4,066	4,069
b) Average Attained Age	43.59	43.87
c) Average Years of Credited Service	2.57	2.58
d) Average Annual Covered Pay	$85,014	$87,702
3. **Terminated Members**		
a) Counts	10,518	11,338
b) Average Attained Age	45.36	45.42
c) Average Years of Credited Service	2.30	2.34
d) Average Annual Covered Pay	$46,103	$46,798
4. **Retired Members and Beneficiaries**		
a) Counts	12,557	13,073
b) Average Attained Age	68.95	69.06
c) Average Annual Benefits	$28,248	$29,199
5. **Active to Retired Ratio** [(1a) / (4a)]	1.39	1.36

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Average Annual Benefits represents benefit amounts payable by this plan only. Some members may have service with another agency and would therefore have a larger total benefit than would be included as part of the average shown here.

Active Members

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Active Members by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**
15-24	388	0	0	0	0	0	388
25-29	1,353	171	2	0	0	0	1,526
30-34	1,375	862	154	11	0	0	2,402
35-39	1,017	836	664	193	8	0	2,718
40-44	800	667	608	476	153	9	2,713
45-49	618	492	527	455	369	96	2,557
50-54	433	417	410	408	360	228	2,256
55-59	312	326	359	304	252	266	1,819
60-64	161	184	222	192	156	111	1,026
65 and Over	53	81	91	68	33	31	357
All Ages	**6,510**	**4,036**	**3,037**	**2,107**	**1,331**	**741**	**17,762**

Distribution of Average Annual Salaries by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Average Salary**
15-24	$40,391	$0	$0	$0	$0	$0	$40,391
25-29	48,641	48,699	48,693	0	0	0	48,647
30-34	52,378	57,400	61,374	60,776	0	0	54,795
35-39	55,696	65,281	72,650	76,140	69,712	0	64,279
40-44	60,054	66,957	85,128	80,816	74,428	88,304	71,918
45-49	60,614	70,860	86,450	83,618	84,156	86,307	76,366
50-54	62,328	73,434	83,104	82,851	88,231	87,130	78,508
55-59	65,604	72,187	79,257	78,558	81,677	84,099	76,575
60-64	68,038	68,557	77,940	77,275	80,355	83,623	75,561
65 and Over	75,751	82,917	92,652	82,120	81,906	98,360	85,430
Average	**$55,004**	**$65,756**	**$80,133**	**$80,676**	**$83,082**	**$85,894**	**$68,182**

Transferred and Terminated Members

Distribution of Transfers to Other CalPERS Plans by Age, Service, and average Salary

Attained Age	Years of Service at Valuation Date 0-4	5-9	10-14	15-19	20-24	25+	Total	Average Salary
15-24	33	0	0	0	0	0	33	$59,612
25-29	217	3	0	0	0	0	220	61,938
30-34	513	38	7	1	0	0	559	68,688
35-39	598	72	27	2	0	0	699	83,841
40-44	690	82	33	10	1	0	816	94,734
45-49	553	74	31	15	5	1	679	98,856
50-54	377	64	24	13	7	0	485	97,575
55-59	238	57	18	9	3	1	326	90,858
60-64	131	32	12	5	2	0	182	84,758
65 and Over	55	9	4	2	0	0	70	106,717
All Ages	**3,405**	**431**	**156**	**57**	**18**	**2**	**4,069**	**$87,702**

Distribution of Terminated Participants with Funds on Deposit by Age, Service, and average Salary

Attained Age	Years of Service at Valuation Date 0-4	5-9	10-14	15-19	20-24	25+	Total	Average Salary
15-24	97	0	0	0	0	0	97	$35,627
25-29	615	18	0	0	0	0	633	39,412
30-34	1,308	133	7	0	0	0	1,448	41,488
35-39	1,615	237	57	12	0	0	1,921	45,331
40-44	1,489	232	91	23	2	0	1,837	48,093
45-49	1,256	208	77	39	10	2	1,592	52,743
50-54	1,079	171	60	17	4	3	1,334	51,600
55-59	899	134	43	18	5	8	1,107	48,192
60-64	697	73	22	7	0	1	800	44,006
65 and Over	528	31	8	1	0	1	569	44,533
All Ages	**9,583**	**1,237**	**365**	**117**	**21**	**15**	**11,338**	**$46,798**

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	1	0	16	17
30-34	0	1	3	0	0	14	18
35-39	0	8	13	0	0	13	34
40-44	0	18	26	1	2	14	61
45-49	0	27	25	0	1	19	72
50-54	405	47	34	6	1	28	521
55-59	1,060	73	22	8	0	67	1,230
60-64	2,175	56	23	6	0	79	2,339
65-69	2,754	62	28	12	0	142	2,998
70-74	2,366	67	36	9	0	186	2,664
75-79	1,335	46	11	2	0	160	1,554
80-84	677	28	5	2	0	144	856
85 and Over	493	24	5	2	0	185	709
All Ages	**11,265**	**457**	**231**	**49**	**4**	**1,067**	**13,073**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 30	$0	$0	$0	$3,966	$0	$3,377	$3,412
30-34	0	6,521	180	0	0	6,639	5,556
35-39	0	14,204	233	0	0	5,332	5,470
40-44	0	14,289	265	9,189	222	5,528	5,756
45-49	0	17,599	307	0	139	11,852	9,836
50-54	22,206	13,263	1,975	9,769	941	11,380	19,313
55-59	32,608	12,455	1,074	20,998	0	12,781	29,693
60-64	37,720	13,225	4,009	10,131	0	16,622	36,019
65-69	34,272	13,038	1,616	11,265	0	18,915	32,708
70-74	31,423	14,787	2,661	14,892	0	17,305	29,574
75-79	28,327	15,381	2,140	7,213	0	21,288	27,007
80-84	24,546	14,614	364	20,939	0	15,687	22,581
85 and Over	17,501	11,425	1,346	4,681	0	13,075	15,990
All Ages	**$31,726**	**$13,820**	**$1,620**	**$12,968**	**$381**	**$15,928**	**$29,199**

Retired Members and Beneficiaries (continued)

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Yrs	3,713	81	61	15	1	434	4,305
5-9	2,371	70	51	12	0	250	2,754
10-14	2,640	61	25	10	2	185	2,923
15-19	1,448	71	28	6	0	96	1,649
20-24	621	94	22	3	1	58	799
25-29	298	47	17	1	0	25	388
30 and Over	174	33	27	2	0	19	255
All Years	**11,265**	**457**	**231**	**49**	**4**	**1,067**	**13,073**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 5 Yrs	$37,277	$15,598	$960	$12,678	$276	$16,983	$34,214
5-9	29,407	11,958	2,294	12,832	0	15,415	27,119
10-14	33,345	14,485	1,641	15,267	555	14,958	31,433
15-19	29,415	16,997	3,622	9,309	0	18,683	27,744
20-24	19,553	12,414	970	11,306	139	12,587	17,641
25-29	15,662	12,759	1,262	36,738	0	11,624	14,473
30 and Over	10,492	10,855	498	6,045	0	9,981	9,408
All Years	**$31,726**	**$13,820**	**$1,620**	**$12,968**	**$381**	**$15,928**	**$29,199**

* Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the total counts may not match information on C-1 of the report. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D

Glossary of Actuarial Terms

Glossary of Actuarial Terms

Accrued Liability *(Actuarial Accrued Liability)*
The portion of the Present Value of Benefits allocated to prior years. Based on CalPERS funding policies, the accrued liability is the target level of assets on any valuation date.

Actuarial Assumptions
Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability, and retirement rates. Economic assumptions include discount rate, salary growth, and inflation.

Actuarial Methods
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include an actuarial cost method, an amortization policy, and an asset valuation method.

Actuarial Valuation
The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change in plan provisions.

Amortization Bases
Separate payment schedules for different portions of the Unfunded Accrued Liability (UAL). The total UAL of a rate plan can be segregated by cause. The impact of such individual causes on the UAL are quantified at the time of their occurrence, resulting in new amortization bases. Each base is separately amortized and paid for over a specific period of time. Generally, in an actuarial valuation, the separate bases consist of changes in UAL due to contract amendments, actuarial assumption changes, method changes, and/or gains and losses.

Amortization Period
The number of years required to pay off an Amortization Base.

Classic Member (under PEPRA)
A member who joined a public retirement system prior to January 1, 2013 and who is not defined as a new member under PEPRA. (See definition of New Member below.)

Discount Rate
This is the rate used to discount the expected future benefit payments to the valuation date to determine the Projected Value of Benefits. The discount rate is based on the assumed long-term rate of return on plan assets, net of investment and administrative expenses. This rate is called the "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law.

Entry Age
The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Actuarial Cost Method
An actuarial cost method designed to fund a member's total plan benefit evenly over the course of his or her career. This method yields a total normal cost rate, expressed as a percentage of payroll, which is designed to remain level throughout the member's career.

Fresh Start
A Fresh Start is when multiple amortization bases are combined into a single base and amortized over a new Amortization Period.

Funded Ratio
Defined as the Market Value of Assets divided by the Accrued Liability. It is a measure of how well funded a rate plan is. A ratio greater than 100% means the rate plan has more assets than the target established by CalPERS

funding policies on the valuation date and the employer need only contribute the Normal Cost. A ratio less than 100% means assets are less than the funding target and contributions in addition to Normal Cost are required.

GASB 68

Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions.

New Member (under PEPRA)

A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

Normal Cost

The portion of the Present Value of Benefits allocated to the upcoming fiscal year for active employees. The normal cost plus the required amortization of the UAL, if any, make up the required contributions.

Pension Actuary

A business professional proficient in mathematics and statistics who performs the calculations necessary to properly fund a pension plan and allow the plan sponsor to disclose its liabilities. A pension actuary must satisfy the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

PEPRA

The California Public Employees' Pension Reform Act of 2013

Present Value of Benefits (PVB)

The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

Unfunded Accrued Liability (UAL)

The Accrued Liability minus the Market Value of Assets. If the UAL for a rate plan is positive, the employer is required to make contributions in excess of the Normal Cost.

CalPERS

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July 2022

Safety Plan of the County of Riverside (CalPERS ID: 5982690295)
Annual Valuation Report as of June 30, 2021

Dear Employer,

Attached to this letter, you will find the June 30, 2021 actuarial valuation report for the rate plan noted above. **Provided in this report is the determination of the minimum required employer contributions for fiscal year (FY) 2023-24**. In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration (board) adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 6.8%, which was adopted by the board in November 2021. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021.

Required Contributions

The table below shows the minimum required employer contributions and the PEPRA member rate for FY 2023-24 along with an estimate of the required contribution for FY 2024-25. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement between the agency and the employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	PEPRA Member Rate
2023-24	21.73%	$54,629,206	13.50%
Projected Results			
2024-25	*21.3%*	*$51,607,000*	*TBD*

The actual investment return for FY 2021-22 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 6.8%. ***To the extent the actual investment return for FY 2021-22 differs from 6.8%, the actual contribution requirements for FY 2024-25 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections, please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through FY *2028-29*.

Changes from Previous Year's Valuations

On July 12, 2021, CalPERS reported a preliminary 21.3% net return on investments for FY 2020-21. Since the return exceeded the 7.00% discount rate sufficiently, the CalPERS Funding Risk Mitigation policy allows CalPERS to use a portion of the investment gain to offset the cost of reducing the expected volatility of future investment returns. Based on the thresholds specified in the policy, the excess return of 14.3% prescribes a reduction in investment volatility that corresponds to a reduction in the discount rate of 0.20%, from 7.00% to 6.80%.

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the November 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for public agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new strategic asset allocation as part of its Asset Liability Management process. The new asset allocation, along with the new capital market assumptions and economic assumptions, support a discount rate of 6.80%. This includes a reduction in the price inflation assumption from 2.50% to 2.30%.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Actuarial Methods and Assumptions." The effects of the changes on the required contributions are included in the "Reconciliation of Required Employer Contributions" section.

Questions

We understand that you might have questions about these results, and the plan actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary, CalPERS

Actuarial Valuation as of June 30, 2021

for the Safety Plan of the County of Riverside

(CalPERS ID: 5982690295)
(Rate Plan ID: 63)

Required Contributions for Fiscal Year July 1, 2023 – June 30, 2024

Table of Contents

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Safety Plan of the County of Riverside and satisfies the actuarial valuation requirements of Government Code section 7504. This valuation is based on the member and financial data as of June 30, 2021 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

Kurt Schneider

KURT SCHNEIDER, MPA, ASA, EA, MAAA
Supervising Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of the Report**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2021 actuarial valuation of the Safety Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for fiscal year (FY) 2023-24.

Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2021. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2021;
- Determine the minimum required employer contributions for the FY July 1, 2023 through June 30, 2024;
- Provide actuarial information as of June 30, 2021 to the CalPERS Board of Administration (board) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for an Agent Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on the CalPERS website (www.calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The agency should contact the plan actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; changes in plan provisions or applicable law; and differences between the required contributions determined by the valuation and the actual contributions made by the agency.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates 5.8% and 7.8%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current post-retirement mortality assumptions adopted in 2021.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

	Fiscal Year
Required Employer Contributions	**2023-24**
Employer Normal Cost Rate	**21.73%**
Plus	
Required Payment on Amortization Bases	**$54,629,206**
Paid either as	
1) Monthly Payment	**$4,552,434**
Or	
2) Annual Prepayment Option*	**$52,861,473**
Required PEPRA Member Contribution Rate	**13.50%**

The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll and paid as payroll is reported) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly (1) or prepaid annually (2) in dollars).

** Only the UAL portion of the employer contribution can be prepaid* ***(which must be received in full no later than July 31).***

For additional detail regarding the determination of the required contribution for PEPRA members, see "PEPRA Member Contribution Rates" in the "Liabilities and Contributions" section. Required member contributions for Classic members can be found in Appendix B.

	Fiscal Year 2022-23	Fiscal Year 2023-24
Normal Cost Contribution as a Percentage of Payroll		
Total Normal Cost	30.05%	31.89%
Employee Contribution[1]	9.81%	10.16%
Employer Normal Cost[2]	20.24%	21.73%
Projected Annual Payroll for Contribution Year	$343,016,690	$351,629,460
Estimated Employer Contributions Based On Projected Payroll		
Total Normal Cost	$103,076,515	$112,134,635
Employee Contribution	33,649,937	35,725,553
Employer Normal Cost	69,426,578	76,409,082
Unfunded Liability Contribution	55,446,291	54,629,206
% of Projected Payroll (illustrative only)	16.16%	15.54%
Estimated Total Employer Contribution	$124,872,869	$131,038,288
% of Projected Payroll (illustrative only)	36.40%	37.27%

[1] For classic members, this is the percentage specified in the Public Employees' Retirement Law, net of any reduction from the use of a modified formula or other factors. For PEPRA members, the member contribution rate is based on 50% of the normal cost. A development of PEPRA member contribution rates can be found in the "Liabilities and Contributions" section. Employee cost sharing is not shown in this report.

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. For a breakout of normal cost by benefit group, see "Normal Cost by Benefit Group" in the "Liabilities and Contributions" section.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for FY 2023-24 is $54,629,206. CalPERS allows agencies to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Agencies can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during FY 2023-24 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

Agencies considering making an ADP should contact CalPERS for additional information.

Minimum Required Employer Contribution for Fiscal Year 2023-24

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$76,409,082	$54,629,206	$0	$54,629,206	$131,038,288

Alternative Fiscal Year 2023-24 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
10 years	$76,409,082	$54,629,206	$7,920,472	$62,549,678	$138,958,760
5 years	$76,409,082	$54,629,206	$52,936,669	$107,565,875	$183,974,957

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2023 as determined in the June 30, 2021 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions, and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits	$4,912,503,829	$5,349,485,247
2. Entry Age Accrued Liability	4,045,933,495	4,416,850,557
3. Market Value of Assets (MVA)	3,213,666,825	3,928,117,059
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	$832,266,670	$488,733,498
5. Funded Ratio [(3) / (2)]	79.4%	88.9%

The UAL and funded ratio are assessments of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. The funded ratio, on the other hand, is a relative measure of funded status that allows for comparison between plans of different sizes. For measures of funded status that are appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. In particular, the investment return beginning with FY 2021-22 is assumed to be 6.80% per year, net of investment and administrative expenses. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. The projected normal cost percentages below reflect that the normal cost will continue to decline over time as new employees are hired into lower cost benefit tiers. Future contribution requirements may differ significantly from those shown below. The actual long-term cost of the plan will depend on the actual benefits and expenses paid and the actual investment experience of the fund.

	Required Contribution	Projected Future Employer Contributions (Assumes 6.80% Return for Fiscal Year 2021-22 and Beyond)				
Fiscal Year	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**
Normal Cost %	21.73%	21.3%	20.8%	20.4%	19.9%	19.4%
UAL Payment	$54,629,206	$51,607,000	$46,309,000	$40,731,000	$33,309,000	$35,286,000
*Total as a % of Payroll**	*37.27%*	*35.6%*	*33.3%*	*31.0%*	*28.4%*	*28.2%*
Projected Payroll	*$351,629,460*	*$361,475,085*	*$371,596,387*	*$382,001,086*	*$392,697,117*	*$403,692,635*

*Illustrative only and based on the projected payroll shown.

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section. Our online pension plan projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook can help plan and budget pension costs under various scenarios.

Cost

Actuarial Determination of Plan Cost

Contributions to fund the plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2017-18, the Amortization of UAL component was expressed as a percentage of total active payroll. Starting with FY 2017-18, the Amortization of UAL component is expressed as a dollar amount and invoiced on a monthly basis. There is an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.9% over the 20 years ending June 30, 2021, yet individual fiscal year returns have ranged from -23.6% to +21.3%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2021.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B for a summary of the plan provisions used in this valuation. The effect of any mandated benefit changes or plan amendments on the unfunded liability is shown in the "(Gain) / Loss Analysis 6/30/20 – 6/30/21" and the effect on the employer contribution is shown in the "Reconciliation of Required Employer Contributions." It should be noted that no change in liability or contribution is shown for any plan changes which were already included in the prior year's valuation.

Actuarial Methods and Assumptions

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumptions for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new asset portfolio as part of its Asset Liability Management process. The new asset mix supports a 6.80% discount rate, which reflects a change in the price inflation assumption to 2.30%.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2021. Changes subsequent to that date are not reflected. Investment returns below the assumed rate of return may increase future required contributions while investment returns above the assumed rate of return may decrease future required contributions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 6.8% going forward and that the realized rate of return on assets for FY 2021-22 is 6.8%.

This actuarial valuation report reflects statutory changes, regulatory changes, and board actions through January 2022. Any subsequent changes or actions are not reflected.

Assets

- **Reconciliation of the Market Value of Assets**
- **Asset Allocation**
- **CalPERS History of Investment Returns**

Reconciliation of the Market Value of Assets

1.	Market Value of Assets as of 6/30/20 including Receivables	$3,213,666,825
2.	Change in Receivables for Service Buybacks	(585,627)
3.	Employer Contributions	113,527,169
4.	Employee Contributions	33,728,638
5.	Benefit Payments to Retirees and Beneficiaries	(165,092,335)
6.	Refunds	(1,198,991)
7.	Transfers	12,645
8.	Service Credit Purchase (SCP) Payments and Interest	1,488,725
9.	Administrative Expenses	(3,976,764)
10.	Miscellaneous Adjustments	0
11.	Investment Return (Net of Investment Expenses)	736,546,775
12.	Market Value of Assets as of 6/30/21 including Receivables	$3,928,117,059

Asset Allocation

CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return.

The asset allocation shown below reflects the allocation of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2021. The assets for County of Riverside Safety Plan are part of the PERF and are invested accordingly.

Asset Class	Current Allocation as of 6/30/2021	Policy Target Allocation as of 6/30/2021
Public Equity	51.4%	50.0%
Private Equity	8.3%	8.0%
Global Fixed Income	29.8%	28.0%
Real Assets	9.6%	13.0%
Liquidity	1.0%	1.0%
Total Fund Level Portfolios	2.5%	0.0%
Trust Level Financing	(2.6%)	0.0%
Total Fund	**100.0%**	**100.0%**

On November 17, 2021, the board adopted changes to the strategic asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

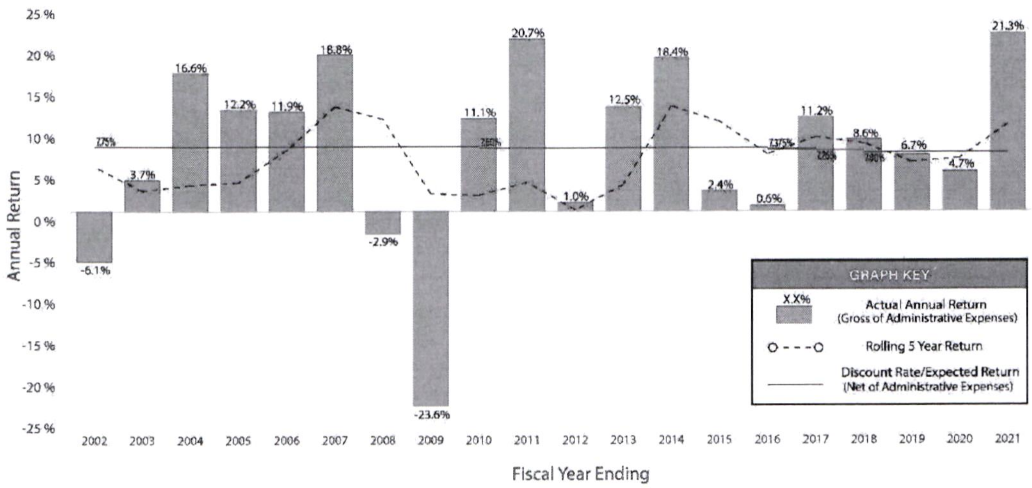
Strategic Asset Allocation Policy Targets

Asset Class	Policy Target Allocation effective 11/17/2021
Global Equity Cap-weighted	30.0%
Global Equity Non-cap-weighted	12.0%
Private Equity	13.0%
Private Debt	5.0%
Emerging Market Sovereign Bonds	5.0%
High Yield Bonds	5.0%
Investment Grade Corporates	10.0%
Mortgage-backed Securities	5.0%
Treasuries	5.0%
Real Assets	15.0%
Leverage	(5.0%)
Total Fund	**100.0%**

CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30 as reported by the Investment Office. Investment returns reported are net of investment expenses but without reduction for administrative expenses. The assumed rate of return, however, is net of both investment and administrative expenses. The Investment Office uses a three-month lag on private assets for investment performance reporting purposes. This can lead to a timing difference in the returns below and those used for financial reporting purposes. The investment gain or loss calculation in this report relies on assets that have been audited and are appropriate for financial reporting. Because of these differences, it is possible for the Investment Office to report a return higher than the discount rate while the rate plan experiences an investment loss, or a return lower than the discount rate while the rate plan experiences an investment gain.

History of Investment Returns (2002 - 2021)



The table below shows annualized investment returns of the PERF for various time periods ending on June 30, 2021 (figures reported are net of investment expenses but without reduction for administrative expenses). These returns are the annual rates that if compounded over the indicated number of years would equate to the actual time-weighted investment performance of the PERF. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 12.0% per year based on the most recent Asset Liability Management study. The realized volatility is a measure of the risk of the portfolio expressed as the standard deviation of the fund's total monthly return distribution, expressed as an annual percentage. Due to their volatile nature, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Compound Annual Rates of Return and Volatilities

	1 year	5 year	10 year	20 year	30 year
Compound Annual Return	21.3%	10.3%	8.5%	6.9%	8.4%
Realized Volatility	–	7.3%	7.2%	8.5%	8.5%

Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 6/30/20 - 6/30/21**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**
- **Normal Cost by Benefit Group**
- **Accrued Liability by Benefit Formula**
- **PEPRA Member Contribution Rates**

Development of Accrued and Unfunded Liabilities

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits		
a) Active Members	$2,491,626,150	$2,712,443,533
b) Transferred Members	77,842,492	82,700,423
c) Terminated Members	41,562,514	53,642,902
d) Members and Beneficiaries Receiving Payments	2,301,472,673	2,500,698,389
e) Total	$4,912,503,829	$5,349,485,247
2. Present Value of Future Employer Normal Costs	$559,574,652	$614,338,095
3. Present Value of Future Employee Contributions	$306,995,682	$318,296,595
4. Entry Age Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	$1,625,055,816	$1,779,808,843
b) Transferred Members (1b)	77,842,492	82,700,423
c) Terminated Members (1c)	41,562,514	53,642,902
d) Members and Beneficiaries Receiving Payments (1d)	2,301,472,673	2,500,698,389
e) Total	$4,045,933,495	$4,416,850,557
5. Market Value of Assets (MVA)	$3,213,666,825	$3,928,117,059
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$832,266,670	$488,733,498
7. Funded Ratio [(5) / (4e)]	79.4%	88.9%

The June 30, 2021 totals above can be divided into the following member categories.

	June 30, 2021	
	County Peace Officer	Firefighter
1. Present Value of Projected Benefits		
a) Active Members	$2,712,443,533	$0
b) Transferred Members	82,202,502	497,921
c) Terminated Members	53,642,902	0
d) Members and Beneficiaries Receiving Payments	2,488,212,079	12,486,310
e) Total	$5,336,501,016	$12,984,231
2. Present Value of Future Employer Normal Costs	$614,338,095	$0
3. Present Value of Future Employee Contributions	$318,296,595	$0
4. Entry Age Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	$1,779,808,843	$0
b) Transferred Members (1b)	82,202,502	497,921
c) Terminated Members (1c)	53,642,902	0
d) Members and Beneficiaries Receiving Payments (1d)	2,488,212,079	12,486,310
e) Total	$4,403,866,326	$12,984,231
5. Market Value of Assets (MVA)	$3,916,569,560	$11,547,499
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$487,296,766	$1,436,732
7. Funded Ratio [(5) / (4e)]	88.9%	88.9%

(Gain)/Loss Analysis 6/30/20 – 6/30/21

To calculate the cost requirements of the plan, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year, actual experience is compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

1. Total (Gain)/Loss for the Year	
a) Unfunded Accrued Liability (UAL) as of 6/30/20	$832,266,670
b) Expected Payment on the UAL during 2020-21	42,893,268
c) Interest through 6/30/21 [.07 x (1a) - ((1.07)$^{1/2}$ - 1) x (1b)]	56,782,794
d) Expected UAL before all other changes [(1a) - (1b) + (1c)]	846,156,196
e) Change due to plan changes	0
f) Change due to AL Significant Increase	0
g) Change due to assumption change	36,152,591
h) Change due to method change	0
i) Change due to Funding Risk Mitigation	116,598,422
j) Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g) + (1h) + (1i)]	998,907,209
k) Actual UAL as of 6/30/21	488,733,498
l) Total (Gain)/Loss for 2020-21 [(1k) - (1j)]	($510,173,711)
2. Investment (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/20	$3,213,666,825
b) Prior Fiscal Year Receivables	(4,747,355)
c) Current Fiscal Year Receivables	4,161,728
d) Contributions Received	147,255,807
e) Benefits and Refunds Paid	(166,291,326)
f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments	1,501,370
g) Expected Return at 7% per year	225,496,921
h) Expected Assets as of 6/30/21 [(2a) + (2b) + (2c) + (2d) + (2e) + (2f) + (2g)]	3,421,043,969
i) Actual Market Value of Assets as of 6/30/21	3,928,117,059
j) Investment (Gain)/Loss [(2h) - (2i)]	($507,073,090)
3. Non-Investment (Gain)/Loss for the Year	
a) Total (Gain)/Loss (1l)	($510,173,711)
b) Investment (Gain)/Loss (2j)	(507,073,090)
c) Non-Investment (Gain)/Loss [(3a) - (3b)]	($3,100,621)

Schedule of Amortization Bases

Below is the schedule of the plan's amortization bases. Note that there is a two-year lag between the valuation date and the start of the contribution year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2021.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: FY 2023-24.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation two ye ars ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Fresh Start	6/30/08	No Ramp		2.80%	17	(5,038,606)	(385,494)	(4,982,846)	(396,095)	(4,912,339)	(398,275)
Special (Gain)/Loss	6/30/09	No Ramp		2.80%	18	72,006,126	5,326,647	71,397,768	5,473,129	70,596,661	5,498,294
Special (Gain)/Loss	6/30/10	No Ramp		2.80%	19	57,660,684	4,134,005	57,309,361	4,247,690	56,816,661	4,263,438
Special (Gain)/Loss	6/30/11	No Ramp		2.80%	20	63,461,088	4,419,102	63,209,561	4,540,627	62,815,342	4,553,482
(Gain)/Loss	6/30/12	No Ramp		2.80%	21	(5,219,569)	(353,702)	(5,208,970)	(363,429)	(5,187,598)	(364,145)
Payment (Gain)/Loss	6/30/12	No Ramp		2.80%	21	(36,570,310)	(2,478,172)	(36,496,047)	(2,546,322)	(36,346,305)	(2,551,336)
(Gain)/Loss	6/30/13	100%	Up/Down	2.80%	22	380,808,444	26,547,845	379,267,791	27,277,911	376,867,893	27,353,946
(Gain)/Loss	6/30/14	100%	Up/Down	2.80%	23	(217,916,869)	(14,782,824)	(217,458,042)	(15,189,351)	(216,547,893)	(15,218,673)
(Gain)/Loss	6/30/15	100%	Up/Down	2.80%	24	207,607,035	13,728,407	207,536,817	14,105,938	207,071,668	14,121,275
(Gain)/Loss	6/30/16	100%	Up/Down	2.80%	25	213,918,140	13,521,729	214,490,666	14,370,605	214,224,861	14,203,780
(Gain)/Loss	6/30/17	100%	Up/Down	2.80%	26	(112,352,524)	(4,415,304)	(115,429,540)	(6,048,966)	(117,027,500)	(7,557,472)
Assumption Change	6/30/17	100%	Up/Down	2.80%	16	81,931,538	4,460,750	82,892,961	6,111,228	82,214,090	7,702,458
(Gain)/Loss	6/30/18	80%	Up/Down	2.80%	27	(56,855,555)	(1,511,316)	(59,159,877)	(2,329,315)	(60,775,539)	(3,100,960)
Assumption Change	6/30/18	80%	Up/Down	2.80%	17	142,857,417	5,209,355	147,188,161	8,028,918	148,899,544	10,781,916
Method Change	6/30/18	80%	Up/Down	2.80%	17	21,488,236	783,577	22,139,656	1,207,689	22,397,077	1,621,787
Investment (Gain)/Loss	6/30/19	60%	Up Only	0.00%	18	15,367,549	335,996	16,065,310	671,991	16,463,288	989,880
Non-Investment (Gain)/Loss	6/30/19	No Ramp		0.00%	18	(27,622,866)	(2,520,672)	(26,896,255)	(2,520,672)	(26,120,235)	(2,476,505)
Investment (Gain)/Loss	6/30/20	40%	Up Only	0.00%	19	82,677,078	0	88,299,119	1,934,185	92,304,593	3,794,386
Non-Investment (Gain)/Loss	6/30/20	No Ramp		0.00%	19	(32,050,840)	0	(34,230,297)	(3,129,470)	(33,323,835)	(3,073,215)
Risk Mitigation Offset	6/30/21	No Ramp		0.00%	1	(125,887,032)	0	(134,447,350)	0	(143,589,770)	(148,391,535)

Schedule of Amortization Bases (continued)

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escalation Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Assumption Change	6/30/21	No Ramp		0.00%	20	36,152,591	(2,262,601)	40,949,231	(2,325,954)	46,137,515	4,148,849
Net Investment (Gain)	6/30/21	20%	Up Only	0.00%	20	(381,186,058)	0	(407,106,710)	0	(434,789,966)	(9,345,677)
Non-Investment (Gain)/Loss	6/30/21	No Ramp		0.00%	20	(3,100,621)	0	(3,311,463)	0	(3,536,642)	(318,027)
Risk Mitigation	6/30/21	No Ramp		0.00%	1	116,598,422	(4,891,210)	129,581,891	(5,028,164)	143,589,770	148,391,535
Total						**488,733,498**	**44,866,118**	**475,600,896**	**48,092,173**	**458,241,341**	**54,629,206**

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please contact the plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over an appropriate period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternative Schedules: 15 Year Amortization		Alternative Schedules: 10 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2023	458,241,341	54,629,206	458,241,341	48,071,197	458,241,341	62,549,678
6/30/2024	432,945,698	51,606,955	439,723,013	48,071,197	424,760,359	62,549,677
6/30/2025	409,053,268	46,308,593	419,945,439	48,071,198	389,002,672	62,549,677
6/30/2026	389,011,699	40,731,238	398,822,989	48,071,197	350,813,462	62,549,678
6/30/2027	373,371,167	33,309,077	376,264,213	48,071,197	310,027,385	62,549,677
6/30/2028	364,337,446	35,286,451	352,171,441	48,071,198	266,467,856	62,549,678
6/30/2029	352,645,932	37,319,195	326,440,359	48,071,198	219,946,278	62,549,678
6/30/2030	338,058,674	39,408,857	298,959,563	48,071,197	170,261,232	62,549,678
6/30/2031	320,319,940	41,557,029	269,610,074	48,071,197	117,197,603	62,549,677
6/30/2032	299,154,967	43,765,345	238,264,820	48,071,197	60,525,648	62,549,677
6/30/2033	274,268,606	46,035,498	204,788,089	48,071,198		
6/30/2034	245,343,907	48,369,216	169,034,939	48,071,197		
6/30/2035	212,040,567	48,622,534	130,850,576	48,071,198		
6/30/2036	176,210,810	44,382,682	90,069,675	48,071,197		
6/30/2037	142,326,269	39,838,016	46,515,674	48,071,198		
6/30/2038	110,834,224	34,974,803				
6/30/2039	82,226,565	29,778,771				
6/30/2040	57,043,374	27,335,412				
6/30/2041	32,672,789	11,940,124				
6/30/2042	22,555,125	23,309,388				
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
6/30/2052						
Total		**778,508,390**		**721,067,961**		**625,496,775**
Interest Paid		**320,267,049**		**262,826,620**		**167,255,434**
Estimated Savings				**57,440,429**		**153,011,615**

Reconciliation of Required Employer Contributions

Normal Cost (% of Payroll)

1. For Period 7/1/22 – 6/30/23	
a) Employer Normal Cost	20.24%
b) Employee contribution	9.81%
c) Total Normal Cost	30.05%
2. Changes since the prior year annual valuation	
a) Effect of demographic experience	(0.31%)
b) Effect of plan changes	0.00%
c) Effect of Funding Risk Mitigation	1.47%
d) Effect of assumption changes	0.68%
e) Effect of method changes	0.00%
f) Net effect of the changes above [sum of (a) through (e)]	1.84%
3. For Period 7/1/23 – 6/30/24	
a) Employer Normal Cost	21.73%
b) Employee contribution	10.16%
c) Total Normal Cost	31.89%
Employer Normal Cost Change [(3a) – (1a)]	1.49%
Employee Contribution Change [(3b) – (1b)]	0.35%

Unfunded Liability Contribution ($)

1. For Period 7/1/22 – 6/30/23	55,446,291
2. Changes since the prior year annual valuation	
a) Effect of adjustments to prior year's amortization schedule	0
b) Effect of elimination of amortization bases	0
c) Effect of progression of amortization bases[1]	6,085,239
d) Effect of net investment (gain) after Funding Risk Mitigation[2]	(9,345,677)
e) Effect of non-investment (gain)/loss during the prior year	(318,027)
f) Effect of Funding Risk Mitigation (re-amortize existing bases at 6.8%)	(1,163,795)
g) Effect of Golden Handshake	0
h) Effect of plan changes	0
i) Effect of AL Significant Increase	0
j) Effect of assumption changes	3,925,175
k) Effect of changes due to Fresh Start or one year recognition of small balances	0
l) Effect of method change	0
m) Net effect of the changes above [sum of (a) through (l)]	(817,085)
3. For Period 7/1/23 – 6/30/24 [(1) + (2m)]	54,629,206

The amounts shown for the period 7/1/22 – 6/30/23 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] Includes scheduled escalation in individual amortization base payments due to the 5-year ramp and payroll growth assumption used in the pre-2019 amortization policy.

[2] The unfunded liability contribution for the investment (gain)/loss during the year prior to the valuation date is 20% of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line c) in future years.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2018 or after June 30, 2021 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Rate	Unfunded Liability Payment ($)	Additional Discretionary Payments
2014 - 15	16.564%	5.335%	N/A	N/A
2015 - 16	16.729%	6.856%	N/A	N/A
2016 - 17	18.321%	8.249%	N/A	N/A
2017 - 18	17.912%	N/A	35,778,888	N/A
2018 - 19	18.464%	N/A	48,790,038	0
2019 - 20	19.853%	N/A	62,876,977	344,292,468
2020 - 21	21.095%	N/A	73,668,397	0
2021 - 22	20.74%	N/A	49,686,992	
2022 - 23	20.24%	N/A	55,446,291	
2023 - 24	21.73%	N/A	54,629,206	

Funding History

The table below shows the recent history of actuarial accrued liability, market value of assets, unfunded accrued liability, funded ratio and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
6/30/2012	$2,086,406,405	$1,567,404,726	$519,001,679	75.1%	$261,703,717
6/30/2013	2,285,586,497	1,776,122,369	509,464,128	77.7%	271,367,032
6/30/2014	2,615,686,777	2,098,296,808	517,389,969	80.2%	295,171,068
6/30/2015	2,846,014,858	2,140,637,485	705,377,373	75.2%	319,499,129
6/30/2016	3,110,254,402	2,151,981,845	958,272,557	69.2%	338,809,025
6/30/2017	3,361,565,098	2,394,890,161	966,674,937	71.2%	328,400,573
6/30/2018	3,676,571,381	2,586,874,850	1,089,696,531	70.4%	309,713,827
6/30/2019	3,857,810,725	2,742,688,693	1,115,122,032	71.1%	304,732,882
6/30/2020	4,045,933,495	3,213,666,825	832,266,670	79.4%	316,205,748
6/30/2021	4,416,850,557	3,928,117,059	488,733,498	88.9%	323,672,580

Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for FY 2023-24. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

Rate Plan Identifier	Benefit Group Name	Total Normal Cost FY 2023-24	Number of Actives	Payroll on 6/30/2021
63	Safety County Peace Officer First Level	33.73%	2,037	$228,314,842
25051	Safety County Peace Officer PEPRA Level	27.17%	1,187	$81,442,099
30195	Safety County Peace Officer Second Level	30.36%	146	$13,915,639
	Plan Total	**31.89%**	**3,370**	**$323,672,580**

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost shown for the respective benefit level does not reflect those differences. Additionally, if a Second Level Benefit Group amended to the same benefit formula as a First Level Benefit Group, their Normal Costs may be dissimilar due to demographic or other population differences. For questions in these situations, please contact the plan actuary.

Accrued Liability by Benefit Formula

The table below displays the Accrued Liability broken out by benefit group as of June 30, 2020.

Member Category	Service Retirement Formula	Active Members	Transferred Members	Terminated Members	Retired Members and Beneficiaries	Accrued Liability
County Peace Officer	Half Pay at 55	0	0	0	4	$610,168
County Peace Officer	2% at 50	147	38	26	602	228,215,045
County Peace Officer	3% at 50	2,036	438	536	2,472	4,065,825,961
County Peace Officer	2.7% at 57	1,187	209	224	10	109,215,152
Firefighter	2% at 50	0	0	0	5	1,690,117
Firefighter	3% at 50	0	4	0	43	11,294,114
Plan Total		**3,370**	**689**	**786**	**3,136**	**$4,416,850,557**

PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 ("PEPRA") established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code section 7522.30(b), "new members ... shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions, and demographics of the plan, particularly members' entry age into the plan. Should the total normal cost of the plan change by more than 1% from the base total normal cost established for the plan, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2023, based on 50% of the Total Normal Cost for each respective plan as of the June 30, 2021 valuation.

		Basis for Current Rate		Rates Effective July 1, 2023			
Rate Plan Identifier	**Benefit Group Name**	**Total Normal Cost**	**Member Rate**	**Total Normal Cost**	**Change**	**Change Needed**	**Member Rate**
25051	Safety County Peace Officer PEPRA Level	24.961%	12.50%	27.17%	2.209%	Yes	13.50%

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions. For this reason, the PEPRA member contribution rate determined in the table above may not equal 50% of the total normal cost of the PEPRA group shown on the "Normal Cost by Benefit Group" page.

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis using the investment return scenarios from the Asset Liability Management process completed in 2021 was performed to determine the effects of various future investment returns on required employer contributions. The projections below reflect the impact of the CalPERS Funding Risk Mitigation policy. The projected normal cost rates reflect that the rates are anticipated to decline over time as new employees are hired into lower-cost benefit tiers. The projections also assume that all other actuarial assumptions will be realized and that no further changes in assumptions, contributions, benefits, or funding will occur.

The first table shows projected contribution requirements if the fund were to earn either 3.0% or 10.8% annually. These alternate investment returns were chosen because 90% of long-term average returns are expected to fall between them over the 20-year period ending June 30, 2041.

Assumed Annual Return FY 2021-22 through FY 2040-41	Projected Employer Contributions				
	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29
3.0% (5th percentile)					
Normal Cost Rate	21.3%	20.8%	20.4%	19.9%	19.4%
UAL Contribution	$55,256,000	$57,350,000	$63,011,000	$70,778,000	$92,005,000
10.8% (95th percentile)					
Normal Cost Rate	21.7%	21.7%	21.7%	21.7%	21.6%
UAL Contribution	$48,415,000	$36,678,000	$0	$0	$0

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 3.0% or greater than 10.8% over a 20-year period, the likelihood of a single investment return less than 3.0% or greater than 10.8% in any given year is much greater. The following analysis illustrates the effect of an extreme, single year investment return.

The portfolio has an expected volatility (or standard deviation) of 12.0% per year. Accordingly, in any given year there is a 16% probability that the annual return will be -5.2% or less and a 2.5% probability that the annual return will be -17.2% or less. These returns represent one and two standard deviations below the expected return of 6.8%.

The following table shows the effect of a one or two standard deviation investment loss in FY 2021-22 on the FY 2024-25 contribution requirements. Note that a single-year investment gain or loss decreases or increases the required UAL contribution amount incrementally for each of the next five years, not just one, due to the 5-year ramp in the amortization policy. However, the contribution requirements beyond the first year are also impacted by investment returns beyond the first year. Historically, significant downturns in the market are often followed by higher than average returns. Such investment gains would offset the impact of these single year negative returns in years beyond FY 2024-25.

Assumed Annual Return for Fiscal Year 2021-22	Required Employer Contributions	Projected Employer Contributions
	FY 2023-24	FY 2024-25
(17.2%) (2 standard deviation loss)		
Normal Cost Rate	21.73%	21.3%
UAL Contribution	$54,629,206	$74,649,000
(5.2%) (1 standard deviation loss)		
Normal Cost Rate	21.73%	21.3%
UAL Contribution	$54,629,206	$63,129,000

- Without investment gains (returns higher than 6.8%) in year FY 2022-23 or later, projected contributions rates would continue to rise over the next four years due to the continued phase-in of the impact of the illustrated investment loss in FY 2021-22.
- The Pension Outlook Tool can be used to model projected contributions for these scenarios beyond FY 2024-25 as well as to model other investment return scenarios.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.5% and 2.3%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2021 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 6.8% as well as alternate discount rates of 5.8% and 7.8%. The rates of 5.8% and 7.8% were selected since they illustrate the impact of a 1.0% increase or decrease to the 6.8% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2021	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Price Inflation	2.3%	2.3%	2.3%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	40.98%	31.89%	25.12%
b) Accrued Liability	$5,093,936,295	$4,416,850,557	$3,869,566,491
c) Market Value of Assets	$3,928,117,059	$3,928,117,059	$3,928,117,059
d) Unfunded Liability/(Surplus) [(b) - (c)]	$1,165,819,236	$488,733,498	($58,550,568)
e) Funded Ratio	77.1%	88.9%	101.5%

Sensitivity to the Price Inflation Assumption

As of June 30, 2021	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Price Inflation	**1.3%**	**2.3%**	**3.3%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	33.62%	31.89%	28.85%
b) Accrued Liability	$4,583,515,052	$4,416,850,557	$4,044,877,851
c) Market Value of Assets	$3,928,117,059	$3,928,117,059	$3,928,117,059
d) Unfunded Liability/(Surplus) [(b) - (c)]	$655,397,993	$488,733,498	$116,760,792
e) Funded Ratio	85.7%	88.9%	97.1%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2021 plan costs and funded status under two different longevity scenarios, namely assuming rates of post-retirement mortality are 10% lower or 10% higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long term.

As of June 30, 2021	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	32.25%	31.89%	31.56%
b) Accrued Liability	$4,482,014,993	$4,416,850,557	$4,356,405,085
c) Market Value of Assets	$3,928,117,059	$3,928,117,059	$3,928,117,059
d) Unfunded Liability/(Surplus) [(b) - (c)]	$553,897,934	$488,733,498	$428,288,026
e) Funded Ratio	87.6%	88.9%	90.2%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	June 30, 2020	June 30, 2021
1. Retiree Accrued Liability	2,301,472,673	2,500,698,389
2. Total Accrued Liability	4,045,933,495	4,416,850,557
3. Ratio of Retiree AL to Total AL [(1) / (2)]	57%	57%

Another measure of the maturity level of CalPERS and its plans is the ratio of actives to retirees, also called the support ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

To calculate the support ratio for the rate plan, retirees and beneficiaries receiving a continuance are each counted as one, even though they may have only worked a portion of their careers as an active member of this rate plan. For this reason, the support ratio, while intuitive, may be less informative than the ratio of retiree liability to total accrued liability above. For comparison, the support ratio for all CalPERS public agency plans is 0.82 and is calculated consistently with how it is for the individual rate plan. Note that to calculate the support ratio for all public agency plans, a retiree with service from more than one CalPERS agency is counted as a retiree more than once.

Support Ratio	June 30, 2020	June 30, 2021
1. Number of Actives	3,404	3,370
2. Number of Retirees	2,999	3,126
3. Support Ratio [(1) / (2)]	1.14	1.08

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Maturity Measures (continued)

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with AVR of 8 may experience twice the contribution volatility due to investment return volatility than a plan with AVR of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as a plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR of 8 is expected to have twice the contribution volatility of a plan with LVR of 4 when there is a change in accrued liability, such as when there is a change in actuarial assumptions. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded ratio approaches 100%.

Contribution Volatility	June 30, 2020	June 30, 2021
1. Market Value of Assets without Receivables	$3,208,919,470	$3,923,955,332
2. Payroll	316,205,748	323,672,580
3. Asset Volatility Ratio (AVR) [(1) / (2)]	10.1	12.1
4. Accrued Liability	$4,045,933,495	$4,416,850,557
5. Liability Volatility Ratio (LVR) [(4) / (2)]	12.8	13.6

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
6/30/2017	51%	1.38	7.3	10.2
6/30/2018	54%	1.20	8.3	11.9
6/30/2019	56%	1.14	9.0	12.7
6/30/2020	57%	1.14	10.1	12.8
6/30/2021	57%	1.08	12.1	13.6

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2021. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate assumption. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to seven months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 1.00%	Funded Ratio	Unfunded Termination Liability at 1.00%	Hypothetical Termination Liability[1,2] at 2.25%	Funded Ratio	Unfunded Termination Liability at 2.25%
$3,928,117,059	$10,986,557,856	35.8%	$7,058,440,797	$8,738,549,741	45.0%	$4,810,432,682

1 The hypothetical liabilities calculated above include a 5% contingency load. The contingency load and other actuarial assumptions can be found in Appendix A.

2 The discount rate used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.00% on June 30, 2021, the valuation date.

In order to terminate the plan, first contact our Pension Contract Services unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to provide a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. Before beginning this process, please consult with the plan actuary.

Plan's Major Benefit Provisions

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Peace	Fire	Peace	Peace	Peace	Peace	Fire
Demographics							
Actives	Yes	No	Yes	Yes	Yes	Yes	No
Transfers/Separated	Yes	Yes	No	Yes	Yes	Yes	No
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	3% @ 50	3% @ 50	2% @ 50	3% @ 50	2.7% @ 57	2% @ 50	
Social Security Coverage	No	No	No	No	No	No	
Full/Modified	Full	Full	Full	Full	Full	Full	
Employee Contribution Rate	9.00%		9.00%	9.00%	12.50%	9.00%	
Final Average Compensation Period	One Year	Three Year	One Year	One Year	Three Year	Three Year	
Sick Leave Credit	No	No	No	No	No	No	
Non-Industrial Disability	Standard	Standard	Standard	Standard	Standard	Standard	
Industrial Disability	Standard	Standard	Standard	Standard	Standard	Standard	
Pre-Retirement Death Benefits							
Optional Settlement 2	Yes	Yes	Yes	Yes	Yes	Yes	
1959 Survivor Benefit Level	Indexed	Indexed	Indexed	Indexed	Indexed	Indexed	
Special	Yes	Yes	Yes	Yes	Yes	Yes	
Alternate (firefighters)	No	No	No	No	No	No	
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group		
Member Category	Peace	Peace	
Demographics			
Actives	No	No	
Transfers/Separated	No	No	
Receiving	Yes	Yes	
Benefit Provision			
Benefit Formula			
Social Security Coverage			
Full/Modified			
Employee Contribution Rate			
Final Average Compensation Period			
Sick Leave Credit			
Non-Industrial Disability			
Industrial Disability			
Pre-Retirement Death Benefits			
Optional Settlement 2			
1959 Survivor Benefit Level			
Special			
Alternate (firefighters)			
Post-Retirement Death Benefits			
Lump Sum	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	
COLA	2%	2%	

Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Glossary of Actuarial Terms**

Appendix A

Actuarial Methods and Assumptions

- **Actuarial Data**
- **Actuarial Methods**
- **Actuarial Assumptions**
- **Miscellaneous**

Actuarial Data

As stated in the Actuarial Certification, the data which serves as the basis of this valuation has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and generally do not have a material impact on the required employer contributions.

Actuarial Methods

Actuarial Cost Method

The actuarial cost method used is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

CalPERS uses an in-house proprietary actuarial model for calculating plan costs. We believe this model is fit for its intended purpose and meets all applicable Actuarial Standards of Practice. Furthermore, the actuarial results of our model are independently confirmed periodically by outside auditing actuaries. The actuarial assumptions used are internally consistent and the generated results are reasonable.

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

<u>Prior Policy (Bases Established prior to June 30, 2019)</u>

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

Driver	Source				
	(Gain)/Loss		Assumption/Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate - Active Plans - Inactive Plans	 2.80% 0%	 2.80% 0%	 2.80% 0%	 2.80% 0%	 2.80% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

The 5-year ramp up means that the payments in the first four years of the amortization period are 20%, 40%, 60% and 80% of the "full" payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

	Source				
	(Gain)/Loss		Assumption/ Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a "fresh start" approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

Exceptions for Plans in Surplus

If a surplus exists (i.e., the Market Value of Assets exceeds the plan's accrued liability) any prior amortization layers shall be considered fully amortized, and the surplus shall not be amortized.

In the event of any subsequent unfunded liability, a Fresh Start shall be used with an amortization period of 20 years or less.

Exceptions for Small Amounts

Where small unfunded liabilities are identified in annual valuations which result in small payment amounts, the actuary may shorten the remaining period for these bases.

- When the balance of a single amortization base has an absolute value less than $250, the amortization period is reduced to one year.
- When the entire unfunded liability is a small amount, the actuary may perform a Fresh Start and use an appropriate amortization period.

Exceptions for Inactive Plans

The following exceptions apply to plans classified as Inactive. These plans have no active members and no expectation to have active members in the future.

- Amortization of the unfunded liability is on a "level dollar" basis rather than a "level percent of pay" basis. For amortization layers, which utilize a ramp up and ramp down, the "ultimate" payment is constant.
- Actuarial judgment will be used to shorten amortization periods for Inactive plans with existing periods that are deemed too long given the duration of the liability. The specific demographics of the plan will be used to determine if shorter periods may be more appropriate.

Exceptions for Inactive Agencies

For a public agency with no active members in any CalPERS rate plan, the unfunded liability shall be amortized over a closed amortization period of no more than 15 years.

Asset Valuation Method

The Actuarial Value of Assets is set equal to the market value of assets. Asset values include accounts receivable.

PEPRA Normal Cost Rate Methodology

Per Government Code Section 7522.30(b), the "normal cost rate" shall mean the annual actuarially determined normal cost for the plan of retirement benefits provided to the new member and shall be established based on actuarial assumptions used to determine the liabilities and costs as part of the annual actuarial valuation. The plan of retirement benefits shall include any elements that would impact the actuarial determination of the normal cost, including, but not limited to, the retirement formula, eligibility and vesting criteria, ancillary benefit provisions, and any automatic cost-of-living adjustments as determined by the public retirement system.

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions.

Actuarial Assumptions

In 2021, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In November 2021, the board adopted changes to the asset allocation that increased the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 6.80%. The board also approved several changes to the demographic assumptions that more closely aligned with actual experience.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021 that can be found on the CalPERS website under: Forms and Publications. Click on "View All" and search for Experience Study.

All actuarial assumptions (except the discount rates used for the hypothetical termination liability) represent an estimate of future experience rather than observations of the estimates inherent in market data.

Economic Assumptions

Discount Rate

The prescribed discount rate assumption, adopted by the board on November 17, 2021, is 6.80% compounded annually (net of investment and administrative expenses) as of June 30, 2021.

Termination Liability Discount Rate

The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date.

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 19-month period from 12 months before the valuation date to seven months after. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 2.00% on June 30, 2021.

Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.80% for 2021) is added to these factors for total salary growth.

Public Agency Miscellaneous

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0764	0.0621	0.0521
1	0.0663	0.0528	0.0424
2	0.0576	0.0449	0.0346
3	0.0501	0.0381	0.0282
4	0.0435	0.0324	0.0229
5	0.0378	0.0276	0.0187
10	0.0201	0.0126	0.0108
15	0.0155	0.0102	0.0071
20	0.0119	0.0083	0.0047
25	0.0091	0.0067	0.0031
30	0.0070	0.0054	0.0020

Public Agency Fire

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1517	0.1549	0.0631
1	0.1191	0.1138	0.0517
2	0.0936	0.0835	0.0423
3	0.0735	0.0613	0.0346
4	0.0577	0.0451	0.0284
5	0.0453	0.0331	0.0232
10	0.0188	0.0143	0.0077
15	0.0165	0.0124	0.0088
20	0.0145	0.0108	0.0101
25	0.0127	0.0094	0.0115
30	0.0112	0.0082	0.0132

Public Agency Police

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1181	0.1051	0.0653
1	0.0934	0.0812	0.0532
2	0.0738	0.0628	0.0434
3	0.0584	0.0485	0.0353
4	0.0462	0.0375	0.0288
5	0.0365	0.0290	0.0235
10	0.0185	0.0155	0.0118
15	0.0183	0.0150	0.0131
20	0.0181	0.0145	0.0145
25	0.0179	0.0141	0.0161
30	0.0178	0.0136	0.0179

Salary Growth (continued)

Public Agency County Peace Officers

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1238	0.1053	0.0890
1	0.0941	0.0805	0.0674
2	0.0715	0.0616	0.0510
3	0.0544	0.0471	0.0387
4	0.0413	0.0360	0.0293
5	0.0314	0.0276	0.0222
10	0.0184	0.0142	0.0072
15	0.0174	0.0124	0.0073
20	0.0164	0.0108	0.0074
25	0.0155	0.0094	0.0075
30	0.0147	0.0083	0.0077

Schools

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0275	0.0275	0.0200
1	0.0422	0.0373	0.0298
2	0.0422	0.0373	0.0298
3	0.0422	0.0373	0.0298
4	0.0388	0.0314	0.0245
5	0.0308	0.0239	0.0179
10	0.0236	0.0160	0.0121
15	0.0182	0.0135	0.0103
20	0.0145	0.0109	0.0085
25	0.0124	0.0102	0.0058
30	0.0075	0.0053	0.0019

- The Miscellaneous salary scale is used for Local Prosecutors.
- The Police salary scale is used for Other Safety, Local Sheriff, and School Police.

Price Inflation

2.30% compounded annually.

Wage Inflation

2.80% compounded annually (used in projecting individual salary increases).

Payroll Growth

2.80% compounded annually (used in projecting the payroll over which the unfunded liability is amortized for level percent of payroll bases). This assumption is used for all plans with active members.

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 2.30% price inflation assumption and any potential liability loss from future member service purchases that are not reflected in the valuation.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1% for those plans that have adopted the provision of providing Credit for Unused Sick Leave.

Conversion of Employer Paid Member Contributions (EPMC)

Total years of service is increased by the Employee Contribution Rate for those plans with the provision providing for the Conversion of Employer Paid Member Contributions (EPMC) during the final compensation period.

Norris Decision (Best Factors)

Employees hired prior to July 1, 1982 have projected benefit amounts increased in order to reflect the use of "Best Factors" in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

Termination Liability

The termination liabilities include a 5% contingency load. This load is for unforeseen improvements in mortality.

Demographic Assumptions

Pre-Retirement Mortality

The mortality assumptions are based on mortality rates resulting from the most recent CalPERS Experience Study adopted by the CalPERS Board in November 2021. For purposes of the mortality rates, the rates incorporate generational mortality to capture on-going mortality improvement. Generational mortality explicitly assumes that members born more recently will live longer than the members born before them thereby capturing the mortality improvement seen in the past and expected continued improvement. For more details, please refer to the 2021 experience study report that can be found on the CalPERS website

Rates vary by age and gender are shown in the table below. This table only contains a sample of the 2017 base table rates for illustrative purposes. The non-industrial death rates are used for all plans. The industrial death rates are used for Safety plans (except for local Safety members described in Section 20423.6 where the agency has not specifically contracted for industrial death benefits.)

	Miscellaneous		Safety			
	Non-Industrial Death (Not Job-Related)		Non-Industrial Death (Not Job-Related)		Industrial Death (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
20	0.00039	0.00014	0.00038	0.00014	0.00004	0.00002
25	0.00033	0.00013	0.00034	0.00018	0.00004	0.00002
30	0.00044	0.00019	0.00042	0.00025	0.00005	0.00003
35	0.00058	0.00029	0.00048	0.00034	0.00005	0.00004
40	0.00075	0.00039	0.00055	0.00042	0.00006	0.00005
45	0.00093	0.00054	0.00066	0.00053	0.00007	0.00006
50	0.00134	0.00081	0.00092	0.00073	0.00010	0.00008
55	0.00198	0.00123	0.00138	0.00106	0.00015	0.00012
60	0.00287	0.00179	0.00221	0.00151	0.00025	0.00017
65	0.00403	0.00250	0.00346	0.00194	0.00038	0.00022
70	0.00594	0.00404	0.00606	0.00358	0.00067	0.00040
75	0.00933	0.00688	0.01099	0.00699	0.00122	0.00078
80	0.01515	0.01149	0.02027	0.01410	0.00225	0.00157

- The pre-retirement mortality rates above are for 2017 and are projected generationally for future years using 80% of the Society of Actuaries' Scale MP-2020.
- Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components: 99% will become the non-industrial death rate and 1% will become the industrial death rate.

Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

	Healthy Recipients		Non-Industrially Disabled (Not Job-Related)		Industrially Disabled (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
50	0.00267	0.00199	0.01701	0.01439	0.00430	0.00311
55	0.00390	0.00325	0.02210	0.01734	0.00621	0.00550
60	0.00578	0.00455	0.02708	0.01962	0.00944	0.00868
65	0.00857	0.00612	0.03334	0.02276	0.01394	0.01190
70	0.01333	0.00996	0.04001	0.02910	0.02163	0.01858
75	0.02391	0.01783	0.05376	0.04160	0.03446	0.03134
80	0.04371	0.03403	0.07936	0.06112	0.05853	0.05183
85	0.08274	0.06166	0.11561	0.09385	0.10137	0.08045
90	0.14539	0.11086	0.16608	0.14396	0.16584	0.12434
95	0.24665	0.20364	0.24665	0.20364	0.24665	0.20364
100	0.36198	0.31582	0.36198	0.31582	0.36198	0.31582
105	0.52229	0.44679	0.52229	0.44679	0.52229	0.44679
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The post-retirement mortality rates above are for 2017 and are projected generationally for future years using 80% of the Society of Actuaries' Scale MP-2020.

Marital Status

For active members, a percentage who are married upon retirement is assumed according to the member category as shown in the following table.

Member Category	Percent Married
Miscellaneous Member	70%
Local Police	85%
Local Fire	85%
Other Local Safety	70%
School Police	85%
Local County Peace Officers	75%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses. This assumption is used for all plans.

Terminated Members

It is assumed that terminated members refund immediately if non-vested. Terminated members who are vested are assumed to retire at age 59 for Miscellaneous members and age 54 for Safety members.

Termination with Refund

Rates vary by entry age and service for Miscellaneous plans. Rates vary by service for Safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40		Entry Age 45	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.1851	0.1944	0.1769	0.1899	0.1631	0.1824	0.1493	0.1749	0.1490	0.1731	0.1487	0.1713
1	0.1531	0.1673	0.1432	0.1602	0.1266	0.1484	0.1101	0.1366	0.1069	0.1323	0.1037	0.1280
2	0.1218	0.1381	0.1125	0.1307	0.0970	0.1183	0.0815	0.1058	0.0771	0.0998	0.0726	0.0938
3	0.0927	0.1085	0.0852	0.1020	0.0727	0.0912	0.0601	0.0804	0.0556	0.0737	0.0511	0.0669
4	0.0672	0.0801	0.0616	0.0752	0.0524	0.0670	0.0431	0.0587	0.0392	0.0523	0.0352	0.0459
5	0.0463	0.0551	0.0423	0.0517	0.0358	0.0461	0.0292	0.0404	0.0261	0.0350	0.0230	0.0296
10	0.0112	0.0140	0.0101	0.0129	0.0083	0.0112	0.0064	0.0094	0.0048	0.0071	0.0033	0.0049
15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire		Police		County Peace Officer	
	Male	Female	Male	Female	Male	Female
0	0.1022	0.1317	0.1298	0.1389	0.1086	0.1284
1	0.0686	0.1007	0.0789	0.0904	0.0777	0.0998
2	0.0441	0.0743	0.0464	0.0566	0.0549	0.0759
3	0.0272	0.0524	0.0274	0.0343	0.0385	0.0562
4	0.0161	0.0349	0.0170	0.0206	0.0268	0.0402
5	0.0092	0.0214	0.0113	0.0128	0.0186	0.0276
10	0.0015	0.0000	0.0032	0.0047	0.0046	0.0038
15	0.0000	0.0000	0.0000	0.0000	0.0023	0.0036
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

- The police termination and refund rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Termination with Refund (continued)

Schools

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40		Entry Age 45	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.2054	0.2120	0.1933	0.1952	0.1730	0.1672	0.1527	0.1392	0.1423	0.1212	0.1318	0.1032
1	0.1922	0.2069	0.1778	0.1883	0.1539	0.1573	0.1300	0.1264	0.1191	0.1087	0.1083	0.0910
2	0.1678	0.1859	0.1536	0.1681	0.1298	0.1383	0.1060	0.1086	0.0957	0.0934	0.0853	0.0782
3	0.1384	0.1575	0.1256	0.1417	0.1042	0.1155	0.0829	0.0893	0.0736	0.0774	0.0643	0.0656
4	0.1085	0.1274	0.0978	0.1143	0.0800	0.0925	0.0622	0.0707	0.0542	0.0620	0.0462	0.0533
5	0.0816	0.0991	0.0732	0.0887	0.0590	0.0713	0.0449	0.0539	0.0383	0.0476	0.0317	0.0413
10	0.0222	0.0248	0.0200	0.0221	0.0163	0.0174	0.0125	0.0128	0.0094	0.0100	0.0063	0.0072
15	0.0106	0.0132	0.0095	0.0113	0.0077	0.0083	0.0058	0.0052	0.0040	0.0039	0.0021	0.0026
20	0.0059	0.0065	0.0050	0.0054	0.0035	0.0036	0.0021	0.0019	0.0010	0.0009	0.0000	0.0000
25	0.0029	0.0034	0.0025	0.0029	0.0018	0.0020	0.0010	0.0012	0.0005	0.0006	0.0000	0.0000
30	0.0012	0.0015	0.0011	0.0013	0.0011	0.0011	0.0010	0.0009	0.0005	0.0005	0.0000	0.0000
35	0.0006	0.0007	0.0006	0.0007	0.0005	0.0006	0.0005	0.0005	0.0003	0.0002	0.0000	0.0000

Termination with Vested Benefits

Rates vary by entry age and service for Miscellaneous plans. Rates vary by service for Safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
5	0.0381	0.0524	0.0381	0.0524	0.0358	0.0464	0.0334	0.0405	0.0301	0.0380
10	0.0265	0.0362	0.0265	0.0362	0.0254	0.0334	0.0244	0.0307	0.0197	0.0236
15	0.0180	0.0252	0.0180	0.0252	0.0166	0.0213	0.0152	0.0174	0.0119	0.0132
20	0.0141	0.0175	0.0141	0.0175	0.0110	0.0131	0.0079	0.0087	0.0000	0.0000
25	0.0084	0.0108	0.0084	0.0108	0.0064	0.0076	0.0000	0.0000	0.0000	0.0000
30	0.0047	0.0056	0.0047	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0038	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire		Police		County Peace Officer	
	Male	Female	Male	Female	Male	Female
5	0.0089	0.0224	0.0156	0.0272	0.0177	0.0266
10	0.0066	0.0164	0.0113	0.0198	0.0126	0.0189
15	0.0048	0.0120	0.0083	0.0144	0.0089	0.0134
20	0.0035	0.0088	0.0060	0.0105	0.0063	0.0095
25	0.0024	0.0061	0.0042	0.0073	0.0042	0.0063
30	0.0012	0.0031	0.0021	0.0037	0.0021	0.0031
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

- After termination with vested benefits, a Miscellaneous member is assumed to retire at age 59 and a Safety member at age 54.
- The Police termination with vested benefits rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20		Entry Age 25		Entry Age 30		Entry Age 35		Entry Age 40	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
5	0.0359	0.0501	0.0359	0.0501	0.0332	0.0402	0.0305	0.0304	0.0266	0.0272
10	0.0311	0.0417	0.0311	0.0417	0.0269	0.0341	0.0228	0.0265	0.0193	0.0233
15	0.0193	0.0264	0.0193	0.0264	0.0172	0.0220	0.0151	0.0175	0.0123	0.0142
20	0.0145	0.0185	0.0145	0.0185	0.0113	0.0141	0.0080	0.0097	0.0000	0.0000
25	0.0089	0.0123	0.0089	0.0123	0.0074	0.0093	0.0000	0.0000	0.0000	0.0000
30	0.0057	0.0064	0.0057	0.0064	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	0.0040	0.0049	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Non-Industrial (Not Job-Related) Disability

Rates vary by age and gender for Miscellaneous plans. Rates vary by age and category for Safety plans.

	Miscellaneous		Fire	Police	County Peace Officer	Schools	
Age	Male	Female	Male and Female	Male and Female	Male and Female	Male	Female
20	0.0001	0.0000	0.0001	0.0001	0.0001	0.0000	0.0002
25	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0002
30	0.0002	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002
35	0.0004	0.0007	0.0001	0.0002	0.0003	0.0005	0.0004
40	0.0009	0.0012	0.0001	0.0002	0.0006	0.0010	0.0008
45	0.0015	0.0019	0.0002	0.0003	0.0011	0.0019	0.0015
50	0.0015	0.0019	0.0004	0.0005	0.0016	0.0027	0.0021
55	0.0014	0.0013	0.0006	0.0007	0.0009	0.0024	0.0017
60	0.0012	0.0009	0.0006	0.0011	0.0005	0.0020	0.0010

- The Miscellaneous non-industrial disability rates are used for Local Prosecutors.
- The police non-industrial disability rates are also used for Other Safety, Local Sheriff, and School Police.

Industrial (Job-Related) Disability

Rates vary by age and category.

Age	Fire	Police	County Peace Officer
20	0.0001	0.0000	0.0004
25	0.0002	0.0017	0.0013
30	0.0006	0.0048	0.0025
35	0.0012	0.0079	0.0037
40	0.0023	0.0110	0.0051
45	0.0040	0.0141	0.0067
50	0.0208	0.0185	0.0092
55	0.0307	0.0479	0.0151
60	0.0438	0.0602	0.0174

- The police industrial disability rates are also used for Local Sheriff and Other Safety.
- 50% of the police industrial disability rates are used for School Police.
- 1% of the police industrial disability rates are used for Local Prosecutors.
- Normally, rates are zero for Miscellaneous plans unless the agency has specifically contracted for industrial disability benefits. If so, each Miscellaneous non-industrial disability rate will be split into two components: 50% will become the non-industrial disability rate and 50% will become the industrial disability rate.

Service Retirement

Retirement rates vary by age, service, and formula, except for the Safety Half Pay at 55 and 2% at 55 formulas, where retirement rates vary by age only.

Public Agency Miscellaneous 1.5% at 65

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.011	0.013	0.015	0.017	0.019
51	0.007	0.010	0.012	0.013	0.015	0.017
52	0.010	0.014	0.017	0.019	0.021	0.024
53	0.008	0.012	0.015	0.017	0.019	0.022
54	0.012	0.016	0.019	0.022	0.025	0.028
55	0.018	0.025	0.031	0.035	0.038	0.043
56	0.015	0.021	0.025	0.029	0.032	0.036
57	0.020	0.028	0.033	0.038	0.043	0.048
58	0.024	0.033	0.040	0.046	0.052	0.058
59	0.028	0.039	0.048	0.054	0.060	0.067
60	0.049	0.069	0.083	0.094	0.105	0.118
61	0.062	0.087	0.106	0.120	0.133	0.150
62	0.104	0.146	0.177	0.200	0.223	0.251
63	0.099	0.139	0.169	0.191	0.213	0.239
64	0.097	0.136	0.165	0.186	0.209	0.233
65	0.140	0.197	0.240	0.271	0.302	0.339
66	0.092	0.130	0.157	0.177	0.198	0.222
67	0.129	0.181	0.220	0.249	0.277	0.311
68	0.092	0.129	0.156	0.177	0.197	0.221
69	0.092	0.130	0.158	0.178	0.199	0.224
70	0.103	0.144	0.175	0.198	0.221	0.248

Public Agency Miscellaneous 2% at 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.010	0.011	0.014	0.014	0.017	0.017
51	0.017	0.013	0.014	0.010	0.010	0.010
52	0.014	0.014	0.018	0.015	0.016	0.016
53	0.015	0.012	0.013	0.010	0.011	0.011
54	0.006	0.010	0.017	0.016	0.018	0.018
55	0.012	0.016	0.024	0.032	0.036	0.036
56	0.010	0.014	0.023	0.030	0.034	0.034
57	0.006	0.018	0.030	0.040	0.044	0.044
58	0.022	0.023	0.033	0.042	0.046	0.046
59	0.039	0.033	0.040	0.047	0.050	0.050
60	0.063	0.069	0.074	0.090	0.137	0.116
61	0.044	0.058	0.066	0.083	0.131	0.113
62	0.084	0.107	0.121	0.153	0.238	0.205
63	0.173	0.166	0.165	0.191	0.283	0.235
64	0.120	0.145	0.164	0.147	0.160	0.172
65	0.138	0.160	0.214	0.216	0.237	0.283
66	0.198	0.228	0.249	0.216	0.228	0.239
67	0.207	0.242	0.230	0.233	0.233	0.233
68	0.201	0.234	0.225	0.231	0.231	0.231
69	0.152	0.173	0.164	0.166	0.166	0.166
70	0.200	0.200	0.200	0.200	0.200	0.200

Service Retirement

Public Agency Miscellaneous 2% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.014	0.014	0.017	0.021	0.023	0.024
51	0.013	0.017	0.017	0.018	0.018	0.019
52	0.013	0.018	0.018	0.020	0.020	0.021
53	0.013	0.019	0.021	0.024	0.025	0.026
54	0.017	0.025	0.028	0.032	0.033	0.035
55	0.045	0.042	0.053	0.086	0.098	0.123
56	0.018	0.036	0.056	0.086	0.102	0.119
57	0.041	0.046	0.056	0.076	0.094	0.120
58	0.052	0.044	0.048	0.074	0.106	0.123
59	0.043	0.058	0.073	0.092	0.105	0.126
60	0.059	0.064	0.083	0.115	0.154	0.170
61	0.087	0.074	0.087	0.107	0.147	0.168
62	0.115	0.123	0.151	0.180	0.227	0.237
63	0.116	0.127	0.164	0.202	0.252	0.261
64	0.084	0.138	0.153	0.190	0.227	0.228
65	0.167	0.187	0.210	0.262	0.288	0.291
66	0.187	0.258	0.280	0.308	0.318	0.319
67	0.195	0.235	0.244	0.277	0.269	0.280
68	0.228	0.248	0.250	0.241	0.245	0.245
69	0.188	0.201	0.209	0.219	0.231	0.231
70	0.229	0.229	0.229	0.229	0.229	0.229

Public Agency Miscellaneous 2.5% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.014	0.017	0.027	0.035	0.046	0.050
51	0.019	0.021	0.025	0.030	0.038	0.040
52	0.018	0.020	0.026	0.034	0.038	0.037
53	0.013	0.021	0.031	0.045	0.052	0.053
54	0.025	0.025	0.030	0.046	0.057	0.068
55	0.029	0.042	0.064	0.109	0.150	0.225
56	0.036	0.047	0.068	0.106	0.134	0.194
57	0.051	0.047	0.060	0.092	0.116	0.166
58	0.035	0.046	0.062	0.093	0.119	0.170
59	0.029	0.053	0.072	0.112	0.139	0.165
60	0.039	0.069	0.094	0.157	0.177	0.221
61	0.080	0.077	0.086	0.140	0.167	0.205
62	0.086	0.131	0.149	0.220	0.244	0.284
63	0.135	0.135	0.147	0.214	0.222	0.262
64	0.114	0.128	0.158	0.177	0.233	0.229
65	0.112	0.174	0.222	0.209	0.268	0.273
66	0.235	0.254	0.297	0.289	0.321	0.337
67	0.237	0.240	0.267	0.249	0.267	0.277
68	0.258	0.271	0.275	0.207	0.210	0.212
69	0.117	0.208	0.266	0.219	0.250	0.270
70	0.229	0.229	0.229	0.229	0.229	0.229

Service Retirement

Public Agency Miscellaneous 2.7% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.011	0.016	0.022	0.033	0.034	0.038
51	0.018	0.019	0.023	0.032	0.031	0.031
52	0.019	0.020	0.026	0.035	0.034	0.037
53	0.020	0.020	0.025	0.043	0.048	0.053
54	0.018	0.030	0.040	0.052	0.053	0.070
55	0.045	0.058	0.082	0.138	0.208	0.278
56	0.057	0.062	0.080	0.121	0.178	0.222
57	0.045	0.052	0.071	0.106	0.147	0.182
58	0.074	0.060	0.074	0.118	0.163	0.182
59	0.058	0.067	0.086	0.123	0.158	0.187
60	0.087	0.084	0.096	0.142	0.165	0.198
61	0.073	0.084	0.101	0.138	0.173	0.218
62	0.130	0.133	0.146	0.187	0.214	0.249
63	0.122	0.140	0.160	0.204	0.209	0.243
64	0.104	0.124	0.154	0.202	0.214	0.230
65	0.182	0.201	0.242	0.264	0.293	0.293
66	0.272	0.249	0.273	0.285	0.312	0.312
67	0.182	0.217	0.254	0.249	0.264	0.264
68	0.223	0.197	0.218	0.242	0.273	0.273
69	0.217	0.217	0.217	0.217	0.217	0.217
70	0.227	0.227	0.227	0.227	0.227	0.227

Public Agency Miscellaneous 3% at 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.015	0.020	0.025	0.039	0.040	0.044
51	0.041	0.034	0.032	0.041	0.036	0.037
52	0.024	0.020	0.022	0.039	0.040	0.041
53	0.018	0.024	0.032	0.047	0.048	0.057
54	0.033	0.033	0.035	0.051	0.049	0.052
55	0.137	0.043	0.051	0.065	0.076	0.108
56	0.173	0.038	0.054	0.075	0.085	0.117
57	0.019	0.035	0.059	0.088	0.111	0.134
58	0.011	0.040	0.070	0.105	0.133	0.162
59	0.194	0.056	0.064	0.081	0.113	0.163
60	0.081	0.085	0.133	0.215	0.280	0.333
61	0.080	0.090	0.134	0.170	0.223	0.292
62	0.137	0.153	0.201	0.250	0.278	0.288
63	0.128	0.140	0.183	0.227	0.251	0.260
64	0.174	0.147	0.173	0.224	0.239	0.264
65	0.152	0.201	0.262	0.299	0.323	0.323
66	0.272	0.273	0.317	0.355	0.380	0.380
67	0.218	0.237	0.268	0.274	0.284	0.284
68	0.200	0.228	0.269	0.285	0.299	0.299
69	0.250	0.250	0.250	0.250	0.250	0.250
70	0.245	0.245	0.245	0.245	0.245	0.245

Service Retirement

Public Agency Miscellaneous 2% at 62

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.008	0.012	0.015	0.019	0.031
53	0.007	0.011	0.014	0.018	0.021	0.032
54	0.007	0.011	0.015	0.019	0.023	0.034
55	0.010	0.019	0.028	0.036	0.061	0.096
56	0.014	0.026	0.038	0.050	0.075	0.108
57	0.018	0.029	0.039	0.050	0.074	0.107
58	0.023	0.035	0.048	0.060	0.073	0.099
59	0.025	0.038	0.051	0.065	0.092	0.128
60	0.031	0.051	0.071	0.091	0.111	0.138
61	0.038	0.058	0.079	0.100	0.121	0.167
62	0.044	0.074	0.104	0.134	0.164	0.214
63	0.077	0.105	0.134	0.163	0.192	0.237
64	0.072	0.101	0.129	0.158	0.187	0.242
65	0.108	0.141	0.173	0.206	0.239	0.300
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Fire Half Pay at 55 and 2% at 55

Age	Rate	Age	Rate
50	0.016	56	0.111
51	0.000	57	0.000
52	0.034	58	0.095
53	0.020	59	0.044
54	0.041	60	1.000
55	0.075		

Public Agency Police Half Pay at 55 and 2% at 55

Age	Rate	Age	Rate
50	0.026	56	0.069
51	0.000	57	0.051
52	0.016	58	0.072
53	0.027	59	0.070
54	0.010	60	0.300
55	0.167		

Service Retirement

Public Agency Police 2% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.018	0.077	0.056	0.046	0.043	0.046
51	0.022	0.087	0.060	0.048	0.044	0.047
52	0.020	0.102	0.081	0.071	0.069	0.075
53	0.016	0.072	0.053	0.045	0.042	0.046
54	0.006	0.071	0.071	0.069	0.072	0.080
55	0.009	0.040	0.099	0.157	0.186	0.186
56	0.020	0.051	0.108	0.165	0.194	0.194
57	0.036	0.072	0.106	0.139	0.156	0.156
58	0.001	0.046	0.089	0.130	0.152	0.152
59	0.066	0.094	0.119	0.143	0.155	0.155
60	0.177	0.177	0.177	0.177	0.177	0.177
61	0.134	0.134	0.134	0.134	0.134	0.134
62	0.184	0.184	0.184	0.184	0.184	0.184
63	0.250	0.250	0.250	0.250	0.250	0.250
64	0.177	0.177	0.177	0.177	0.177	0.177
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.054	0.054	0.056	0.080	0.064	0.066
51	0.020	0.020	0.021	0.030	0.024	0.024
52	0.037	0.037	0.038	0.054	0.043	0.045
53	0.051	0.051	0.053	0.076	0.061	0.063
54	0.082	0.082	0.085	0.121	0.097	0.100
55	0.139	0.139	0.139	0.139	0.139	0.139
56	0.129	0.129	0.129	0.129	0.129	0.129
57	0.085	0.085	0.085	0.085	0.085	0.085
58	0.119	0.119	0.119	0.119	0.119	0.119
59	0.167	0.167	0.167	0.167	0.167	0.167
60	0.152	0.152	0.152	0.152	0.152	0.152
61	0.179	0.179	0.179	0.179	0.179	0.179
62	0.179	0.179	0.179	0.179	0.179	0.179
63	0.179	0.179	0.179	0.179	0.179	0.179
64	0.179	0.179	0.179	0.179	0.179	0.179
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.019	0.053	0.045	0.054	0.057	0.061
51	0.002	0.017	0.028	0.044	0.053	0.060
52	0.002	0.031	0.037	0.051	0.059	0.066
53	0.026	0.049	0.049	0.080	0.099	0.114
54	0.019	0.034	0.047	0.091	0.121	0.142
55	0.006	0.115	0.141	0.199	0.231	0.259
56	0.017	0.188	0.121	0.173	0.199	0.199
57	0.008	0.137	0.093	0.136	0.157	0.157
58	0.017	0.126	0.105	0.164	0.194	0.194
59	0.026	0.146	0.110	0.167	0.195	0.195
60	0.155	0.155	0.155	0.155	0.155	0.155
61	0.210	0.210	0.210	0.210	0.210	0.210
62	0.262	0.262	0.262	0.262	0.262	0.262
63	0.172	0.172	0.172	0.172	0.172	0.172
64	0.227	0.227	0.227	0.227	0.227	0.227
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% at 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.006	0.013	0.019	0.025	0.028
51	0.004	0.008	0.017	0.026	0.034	0.038
52	0.005	0.011	0.022	0.033	0.044	0.049
53	0.005	0.034	0.024	0.038	0.069	0.138
54	0.007	0.047	0.032	0.051	0.094	0.187
55	0.010	0.067	0.046	0.073	0.134	0.266
56	0.010	0.063	0.044	0.069	0.127	0.253
57	0.135	0.100	0.148	0.196	0.220	0.220
58	0.083	0.062	0.091	0.120	0.135	0.135
59	0.137	0.053	0.084	0.146	0.177	0.177
60	0.162	0.063	0.099	0.172	0.208	0.208
61	0.598	0.231	0.231	0.231	0.231	0.231
62	0.621	0.240	0.240	0.240	0.240	0.240
63	0.236	0.236	0.236	0.236	0.236	0.236
64	0.236	0.236	0.236	0.236	0.236	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.124	0.103	0.113	0.143	0.244	0.376
51	0.060	0.081	0.087	0.125	0.207	0.294
52	0.016	0.055	0.111	0.148	0.192	0.235
53	0.072	0.074	0.098	0.142	0.189	0.237
54	0.018	0.049	0.105	0.123	0.187	0.271
55	0.069	0.074	0.081	0.113	0.209	0.305
56	0.064	0.108	0.113	0.125	0.190	0.288
57	0.056	0.109	0.160	0.182	0.210	0.210
58	0.108	0.129	0.173	0.189	0.214	0.214
59	0.093	0.144	0.204	0.229	0.262	0.262
60	0.343	0.180	0.159	0.188	0.247	0.247
61	0.221	0.221	0.221	0.221	0.221	0.221
62	0.213	0.213	0.213	0.213	0.213	0.213
63	0.233	0.233	0.233	0.233	0.233	0.233
64	0.234	0.234	0.234	0.234	0.234	0.234
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% at 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.095	0.048	0.053	0.093	0.134	0.175
51	0.016	0.032	0.053	0.085	0.117	0.149
52	0.013	0.032	0.054	0.087	0.120	0.154
53	0.085	0.044	0.049	0.089	0.129	0.170
54	0.038	0.065	0.074	0.105	0.136	0.167
55	0.042	0.043	0.049	0.085	0.132	0.215
56	0.133	0.103	0.075	0.113	0.151	0.209
57	0.062	0.048	0.060	0.124	0.172	0.213
58	0.124	0.097	0.092	0.153	0.194	0.227
59	0.092	0.071	0.078	0.144	0.192	0.233
60	0.056	0.044	0.061	0.131	0.186	0.233
61	0.282	0.219	0.158	0.198	0.233	0.260
62	0.292	0.227	0.164	0.205	0.241	0.269
63	0.196	0.196	0.196	0.196	0.196	0.196
64	0.197	0.197	0.197	0.197	0.197	0.197
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.040	0.040	0.040	0.040	0.040	0.080
51	0.028	0.028	0.028	0.028	0.040	0.066
52	0.028	0.028	0.028	0.028	0.043	0.061
53	0.028	0.028	0.028	0.028	0.057	0.086
54	0.028	0.028	0.028	0.032	0.069	0.110
55	0.050	0.050	0.050	0.067	0.099	0.179
56	0.046	0.046	0.046	0.062	0.090	0.160
57	0.054	0.054	0.054	0.072	0.106	0.191
58	0.060	0.060	0.060	0.066	0.103	0.171
59	0.060	0.060	0.060	0.069	0.105	0.171
60	0.113	0.113	0.113	0.113	0.113	0.171
61	0.108	0.108	0.108	0.108	0.108	0.128
62	0.113	0.113	0.113	0.113	0.113	0.159
63	0.113	0.113	0.113	0.113	0.113	0.159
64	0.113	0.113	0.113	0.113	0.113	0.239
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.005	0.005	0.005	0.005	0.008	0.012
51	0.006	0.006	0.006	0.006	0.009	0.013
52	0.012	0.012	0.012	0.012	0.019	0.028
53	0.033	0.033	0.033	0.033	0.050	0.075
54	0.045	0.045	0.045	0.045	0.069	0.103
55	0.061	0.061	0.061	0.061	0.094	0.140
56	0.055	0.055	0.055	0.055	0.084	0.126
57	0.081	0.081	0.081	0.081	0.125	0.187
58	0.059	0.059	0.059	0.059	0.091	0.137
59	0.055	0.055	0.055	0.055	0.084	0.126
60	0.085	0.085	0.085	0.085	0.131	0.196
61	0.085	0.085	0.085	0.085	0.131	0.196
62	0.085	0.085	0.085	0.085	0.131	0.196
63	0.085	0.085	0.085	0.085	0.131	0.196
64	0.085	0.085	0.085	0.085	0.131	0.196
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.5% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.038	0.038	0.038	0.038	0.055	0.089
52	0.038	0.038	0.038	0.038	0.058	0.082
53	0.036	0.036	0.036	0.036	0.073	0.111
54	0.036	0.036	0.036	0.041	0.088	0.142
55	0.061	0.061	0.061	0.082	0.120	0.217
56	0.056	0.056	0.056	0.075	0.110	0.194
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.072	0.072	0.072	0.079	0.124	0.205
59	0.072	0.072	0.072	0.083	0.126	0.205
60	0.135	0.135	0.135	0.135	0.135	0.205
61	0.130	0.130	0.130	0.130	0.130	0.153
62	0.135	0.135	0.135	0.135	0.135	0.191
63	0.135	0.135	0.135	0.135	0.135	0.191
64	0.135	0.135	0.135	0.135	0.135	0.287
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.5% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.012	0.018
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.042	0.042	0.042	0.042	0.064	0.096
54	0.057	0.057	0.057	0.057	0.088	0.132
55	0.074	0.074	0.074	0.074	0.114	0.170
56	0.066	0.066	0.066	0.066	0.102	0.153
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.071	0.071	0.071	0.071	0.110	0.164
59	0.066	0.066	0.066	0.066	0.101	0.151
60	0.102	0.102	0.102	0.102	0.157	0.235
61	0.102	0.102	0.102	0.102	0.157	0.236
62	0.102	0.102	0.102	0.102	0.157	0.236
63	0.102	0.102	0.102	0.102	0.157	0.236
64	0.102	0.102	0.102	0.102	0.157	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.7% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.038	0.038	0.038	0.038	0.058	0.083
53	0.038	0.038	0.038	0.038	0.077	0.117
54	0.038	0.038	0.038	0.044	0.093	0.150
55	0.068	0.068	0.068	0.091	0.134	0.242
56	0.063	0.063	0.063	0.084	0.123	0.217
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.080	0.080	0.080	0.088	0.138	0.228
59	0.080	0.080	0.080	0.092	0.140	0.228
60	0.150	0.150	0.150	0.150	0.150	0.228
61	0.144	0.144	0.144	0.144	0.144	0.170
62	0.150	0.150	0.150	0.150	0.150	0.213
63	0.150	0.150	0.150	0.150	0.150	0.213
64	0.150	0.150	0.150	0.150	0.150	0.319
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.7% at 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.013	0.019
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.044	0.044	0.044	0.044	0.068	0.102
54	0.061	0.061	0.061	0.061	0.093	0.140
55	0.083	0.083	0.083	0.083	0.127	0.190
56	0.074	0.074	0.074	0.074	0.114	0.171
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.079	0.079	0.079	0.079	0.122	0.182
59	0.073	0.073	0.073	0.073	0.112	0.168
60	0.114	0.114	0.114	0.114	0.175	0.262
61	0.114	0.114	0.114	0.114	0.175	0.262
62	0.114	0.114	0.114	0.114	0.175	0.262
63	0.114	0.114	0.114	0.114	0.175	0.262
64	0.114	0.114	0.114	0.114	0.175	0.262
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Schools 2% at 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.004	0.006	0.007	0.010	0.010
51	0.004	0.005	0.007	0.008	0.011	0.011
52	0.005	0.007	0.008	0.009	0.012	0.012
53	0.007	0.008	0.010	0.012	0.015	0.015
54	0.006	0.009	0.012	0.015	0.020	0.021
55	0.011	0.023	0.034	0.057	0.070	0.090
56	0.012	0.027	0.036	0.056	0.073	0.095
57	0.016	0.027	0.036	0.055	0.068	0.087
58	0.019	0.030	0.040	0.062	0.078	0.103
59	0.023	0.034	0.046	0.070	0.085	0.109
60	0.022	0.043	0.062	0.095	0.113	0.141
61	0.030	0.051	0.071	0.103	0.124	0.154
62	0.065	0.098	0.128	0.188	0.216	0.248
63	0.075	0.112	0.144	0.197	0.222	0.268
64	0.091	0.116	0.138	0.180	0.196	0.231
65	0.163	0.164	0.197	0.232	0.250	0.271
66	0.208	0.204	0.243	0.282	0.301	0.315
67	0.189	0.185	0.221	0.257	0.274	0.287
68	0.127	0.158	0.200	0.227	0.241	0.244
69	0.168	0.162	0.189	0.217	0.229	0.238
70	0.191	0.190	0.237	0.250	0.246	0.254

Schools 2% at 62

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.004	0.007	0.010	0.011	0.013	0.015
53	0.004	0.008	0.010	0.013	0.014	0.016
54	0.005	0.011	0.015	0.018	0.020	0.022
55	0.014	0.027	0.038	0.045	0.050	0.056
56	0.013	0.026	0.037	0.043	0.048	0.055
57	0.013	0.027	0.038	0.045	0.050	0.055
58	0.017	0.034	0.047	0.056	0.062	0.069
59	0.019	0.037	0.052	0.062	0.068	0.076
60	0.026	0.053	0.074	0.087	0.097	0.108
61	0.030	0.058	0.081	0.095	0.106	0.119
62	0.053	0.105	0.147	0.174	0.194	0.217
63	0.054	0.107	0.151	0.178	0.198	0.222
64	0.053	0.105	0.147	0.174	0.194	0.216
65	0.072	0.142	0.199	0.235	0.262	0.293
66	0.077	0.152	0.213	0.252	0.281	0.314
67	0.070	0.139	0.194	0.229	0.255	0.286
68	0.063	0.124	0.173	0.205	0.228	0.255
69	0.066	0.130	0.183	0.216	0.241	0.270
70	0.071	0.140	0.196	0.231	0.258	0.289

Miscellaneous

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415(b) dollar limit for the 2021 calendar year is $230,000.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2021 calendar year is $290,000.

Appendix B

Principal Plan Provisions

The following is a description of the principal plan provisions used in calculating costs and liabilities. We have indicated whether a plan provision is standard or optional. Standard benefits are applicable to all members while optional benefits vary among employers. Optional benefits that apply to a single period of time, such as Golden Handshakes, have not been included. Many of the statements in this summary are general in nature, and are intended to provide an easily understood summary of the Public Employees' Retirement Law. The law itself governs in all situations.

Service Retirement

Eligibility

A classic CalPERS member or PEPRA Safety member becomes eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). For employees hired into a plan with the 1.5% at age 65 formula, eligibility for service retirement is age 55 with at least 5 years of service. PEPRA Miscellaneous members become eligible for service retirement upon attainment of age 52 with at least 5 years of service.

Benefit

The service retirement benefit is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation.*

- The *benefit factor* depends on the benefit formula specified in the agency's contract. The table below shows the factors for each of the available formulas. Factors vary by the member's age at retirement. Listed are the factors for retirement at whole year ages:

Miscellaneous Plan Formulas

Retirement Age	1.5% at 65	2% at 60	2% at 55	2.5% at 55	2.7% at 55	3% at 60	PEPRA 2% at 62
50	0.5000%	1.092%	1.426%	2.000%	2.000%	2.000%	N/A
51	0.5667%	1.156%	1.522%	2.100%	2.140%	2.100%	N/A
52	0.6334%	1.224%	1.628%	2.200%	2.280%	2.200%	1.000%
53	0.7000%	1.296%	1.742%	2.300%	2.420%	2.300%	1.100%
54	0.7667%	1.376%	1.866%	2.400%	2.560%	2.400%	1.200%
55	0.8334%	1.460%	2.000%	2.500%	2.700%	2.500%	1.300%
56	0.9000%	1.552%	2.052%	2.500%	2.700%	2.600%	1.400%
57	0.9667%	1.650%	2.104%	2.500%	2.700%	2.700%	1.500%
58	1.0334%	1.758%	2.156%	2.500%	2.700%	2.800%	1.600%
59	1.1000%	1.874%	2.210%	2.500%	2.700%	2.900%	1.700%
60	1.1667%	2.000%	2.262%	2.500%	2.700%	3.000%	1.800%
61	1.2334%	2.134%	2.314%	2.500%	2.700%	3.000%	1.900%
62	1.3000%	2.272%	2.366%	2.500%	2.700%	3.000%	2.000%
63	1.3667%	2.418%	2.418%	2.500%	2.700%	3.000%	2.100%
64	1.4334%	2.418%	2.418%	2.500%	2.700%	3.000%	2.200%
65	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.300%
66	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.400%
67 & up	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.500%

Safety Plan Formulas

Retirement Age	Half Pay at 55*	2% at 55	2% at 50	3% at 55	3% at 50
50	1.783%	1.426%	2.000%	2.400%	3.000%
51	1.903%	1.522%	2.140%	2.520%	3.000%
52	2.035%	1.628%	2.280%	2.640%	3.000%
53	2.178%	1.742%	2.420%	2.760%	3.000%
54	2.333%	1.866%	2.560%	2.880%	3.000%
55 & Up	2.500%	2.000%	2.700%	3.000%	3.000%

* For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or greater. If entry age is less than 35, then the age 55 benefit factor is 50% divided by the difference between age 55 and entry age. The benefit factor for ages prior to age 55 is the same proportion of the age 55 benefit factor as in the above table.

PEPRA Safety Plan Formulas

Retirement Age	2% at 57	2.5% at 57	2.7% at 57
50	1.426%	2.000%	2.000%
51	1.508%	2.071%	2.100%
52	1.590%	2.143%	2.200%
53	1.672%	2.214%	2.300%
54	1.754%	2.286%	2.400%
55	1.836%	2.357%	2.500%
56	1.918%	2.429%	2.600%
57 & Up	2.000%	2.500%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $128,059 for 2021 and for those employees that do not participate in Social Security the cap for 2021 is $153,671. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with no offsets.

Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is $317 if members are not covered by Social Security or $513 if members are covered by Social Security.

- The Miscellaneous and PEPRA Safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

The CalPERS classic members and PEPRA Safety members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 50 (55 for employees hired into a 1.5% at 65 plan). PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the service retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury, which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively employed by any CalPERS employer at the time of disability in order to be eligible for this benefit.

Standard Benefit

The standard Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33⅓% of final compensation.

Improved Benefit

Employers have the option of providing the improved Non-Industrial Disability Retirement benefit. This benefit provides a monthly allowance equal to 30% of final compensation for the first 5 years of service, plus 1% for each additional year of service to a maximum of 50% of final compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job Related) Disability Retirement

This is a standard benefit for Safety members except those described in Section 20423.6. For excluded Safety members and all Miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury, which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described below.

Standard Benefit

The standard Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation.

Increased Benefit (75% of Final Compensation)

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75% of final compensation for total disability.

Improved Benefit (50% to 90% of Final Compensation)

The improved Industrial Disability Retirement benefit is a monthly allowance equal to the Workman's Compensation Appeals Board permanent disability rate percentage (if 50% or greater, with a maximum of 90%) times the final compensation.

For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return of accumulated member contributions with respect to employment in this group. With the standard or increased benefit, a member may also choose to receive the annuitization of the accumulated member contributions.

If a member is eligible for service retirement and if the service retirement benefit is more than the industrial disability retirement benefit, the member may choose to receive the larger benefit.

Post-Retirement Death Benefit

Standard Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $500 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Improved Lump Sum Payment

Employers have the option of providing an improved lump sum death benefit of $600, $2,000, $3,000, $4,000 or $5,000.

Form of Payment for Retirement Allowance

Standard Form of Payment

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

Improved Form of Payment (Post-Retirement Survivor Allowance)

Employers have the option to contract for the post-retirement survivor allowance.

For retirement allowances with respect to service subject to the modified formula, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. For retirement allowances with respect to service subject to the full or supplemental formula, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is referred to as post-retirement survivor allowance (PRSA) or simply as survivor continuance.

In other words, 25% or 50% of the allowance, the continuance portion, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried child (ren) until they attain age 18; or, if no eligible child(ren), to a qualifying dependent parent) for the rest of his or her lifetime. This benefit will not be discontinued in the event the spouse remarries.

The remaining 75% or 50% of the retirement allowance, which may be referred to as the option portion of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this option portion to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

Pre-Retirement Death Benefits

Basic Death Benefit

This is a standard benefit.

Eligibility

An employee's beneficiary (or estate) may receive the basic death benefit if the member dies while actively employed. A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this basic death benefit.

Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited annually at the greater of 6% or the prevailing discount rate through the date of death, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

1957 Survivor Benefit

This is a standard benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for classic and PEPRA Safety members and age 52 for PEPRA Miscellaneous members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried child(ren) under age 18. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this 1957 Survivor benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified service retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to dependent child(ren), the benefit will be discontinued upon death or attainment of age 18, unless the child(ren) is disabled. The total amount paid will be at least equal to the basic death benefit.

Optional Settlement 2 Death Benefit

This is an optional benefit.

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2 Death benefit if the member dies while actively employed, has attained at least age 50 for classic and PEPRA Safety members and age 52 for PEPRA Miscellaneous members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this Optional Settlement 2 Death benefit.

Benefit

The Optional Settlement 2 Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected 100% to continue to the eligible survivor after the member's death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Special Death Benefit

This is a standard benefit for Safety members except those described in Section 20423.6. For excluded Safety members and all Miscellaneous members, employers have the option of providing this benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the special death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The special death benefit is a monthly allowance equal to 50% of final compensation and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving child(ren) (*eligible* means unmarried child(ren) under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- if 1 eligible child: 12.5% of final compensation
- if 2 eligible children: 20.0% of final compensation
- if 3 or more eligible children: 25.0% of final compensation

Alternate Death Benefit for Local Fire Members

This is an optional benefit available only to local fire members.

Eligibility

An employee's *eligible survivor(s)* may receive the alternate death benefit in lieu of the basic death benefit or the 1957 Survivor benefit if the member dies while actively employed and has at least 20 years of total CalPERS service. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 18.

Benefit

The Alternate Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2. (A retiree who elects Optional Settlement 2 receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) If the member has not yet attained age 50, the benefit is equal to that which would be payable if the member had retired at age 50, based on service credited at the time of death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Cost-of-Living Adjustments (COLA)

Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of price inflation. The resulting increase is divided by the total increase provided in prior years. For any given year, the COLA adjustment may be less than 2% (when the rate of price inflation is low), may be greater than the rate of price inflation (when the rate of price inflation is low after several years of high price inflation) or may even be greater than 2% (when price inflation is high after several years of low price inflation).

Improved Benefit

Employers have the option of providing a COLA of 3%, 4%, or 5%, determined in the same manner as described above for the standard 2% COLA. An improved COLA is not available with the 1.5% at 65 formula.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against price inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 80% of the initial allowance at retirement adjusted for price inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

Employee Contributions

Each employee contributes toward his or her retirement based upon the retirement formula. The standard employee contribution is as described below.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is $0 for full and supplemental formula members and $133.33 for employees covered by the modified formula.
- The percent contributed above the monthly compensation breakpoint depends upon the benefit formula, as shown in the table below.

Benefit Formula	Percent Contributed above the Breakpoint
Miscellaneous, 1.5% at 65	2%
Miscellaneous, 2% at 60	7%
Miscellaneous, 2% at 55	7%
Miscellaneous, 2.5% at 55	8%
Miscellaneous, 2.7% at 55	8%
Miscellaneous, 3% at 60	8%
Miscellaneous, 2% at 62	50% of the Total Normal Cost
Miscellaneous, 1.5% at 65	50% of the Total Normal Cost
Safety, Half Pay at 55	Varies by entry age
Safety, 2% at 55	7%
Safety, 2% at 50	9%
Safety, 3% at 55	9%
Safety, 3% at 50	9%
Safety, 2% at 57	50% of the Total Normal Cost
Safety, 2.5% at 57	50% of the Total Normal Cost
Safety, 2.7% at 57	50% of the Total Normal Cost

The employer may choose to "pick-up" these contributions for classic members (Employer Paid Member Contributions or EPMC). EPMC is prohibited for new PEPRA members.

An employer may also include Employee Cost Sharing in the contract, where employees agree to share the cost of the employer contribution. These contributions are paid in addition to the member contribution.

Auxiliary organizations of the CSU system may elect reduced contribution rates, in which case the offset is $317 and the contribution rate is 6% if members are not covered by Social Security. If members are covered by Social Security, the offset is $513 and the contribution rate is 5%.

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6% interest compounded annually.

1959 Survivor Benefit

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 is required to provide this benefit if the members are not covered by Social Security. The benefit is optional for agencies joining CalPERS prior to 1994. Levels 1, 2, and 3 are now closed. Any new agency or any agency wishing to add this benefit or increase the current level may only choose the 4^{th} or Indexed Level.

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website.

Appendix C

Participant Data

- **Summary of Valuation Data**
- **Active Members**
- **Transferred and Terminated Members**
- **Retired Members and Beneficiaries**

Summary of Valuation Data

	June 30, 2020	June 30, 2021
1. **Active Members**		
a) Counts	3,404	3,370
b) Average Attained Age	40.07	40.11
c) Average Entry Age to Rate Plan	28.56	28.39
d) Average Years of Credited Service	11.52	11.74
e) Average Annual Covered Pay	$92,892	$96,045
f) Annual Covered Payroll	316,205,748	323,672,580
g) Projected Annual Payroll for Contribution Year	343,016,690	351,629,460
h) Present Value of Future Payroll	3,011,365,119	3,070,262,325
2. **Transferred Members**		
a) Counts	701	689
b) Average Attained Age	40.67	40.71
c) Average Years of Credited Service	3.78	3.69
d) Average Annual Covered Pay	$94,036	$96,306
3. **Terminated Members**		
a) Counts	717	786
b) Average Attained Age	41.68	41.79
c) Average Years of Credited Service	3.41	3.64
d) Average Annual Covered Pay	$53,263	$54,630
4. **Retired Members and Beneficiaries**		
a) Counts	2,999	3,126
b) Average Attained Age	63.71	64.04
c) Average Annual Benefits	$53,284	$54,695
5. **Active to Retired Ratio** [(1a) / (4a)]	1.14	1.08

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Average Annual Benefits represents benefit amounts payable by this plan only. Some members may have service with another agency and would therefore have a larger total benefit than would be included as part of the average shown here.

Active Members

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Active Members by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**
15-24	175	5	0	0	0	0	180
25-29	253	94	0	0	0	0	347
30-34	170	263	105	7	0	0	545
35-39	73	172	247	89	3	0	584
40-44	35	71	212	232	73	1	624
45-49	22	27	143	181	190	40	603
50-54	11	21	57	70	94	59	312
55-59	8	14	23	36	23	16	120
60-64	5	4	7	19	5	9	49
65 and Over	0	0	2	3	0	1	6
All Ages	**752**	**671**	**796**	**637**	**388**	**126**	**3,370**

Distribution of Average Annual Salaries by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Average Salary**
15-24	$55,740	$68,272	$0	$0	$0	$0	$56,088
25-29	62,035	73,471	0	0	0	0	65,133
30-34	66,075	77,903	94,766	101,495	0	0	77,765
35-39	75,035	78,442	104,099	112,129	128,030	0	94,256
40-44	89,794	84,040	106,434	112,801	124,944	139,511	107,538
45-49	84,305	89,676	106,564	112,921	125,087	138,151	114,835
50-54	115,656	81,234	107,183	119,689	125,152	148,241	121,719
55-59	94,834	105,787	101,457	105,012	121,231	161,035	114,321
60-64	78,984	88,869	96,266	104,401	85,116	135,617	103,143
65 and Over	0	0	103,350	73,572	0	22,160	74,929
Average	**$65,935**	**$79,223**	**$104,006**	**$112,498**	**$124,355**	**$144,691**	**$96,045**

Transferred and Terminated Members

Distribution of Transfers to Other CalPERS Plans by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	5	0	0	0	0	0	5	$58,181
25-29	52	4	0	0	0	0	56	74,975
30-34	112	21	2	0	0	0	135	88,997
35-39	117	29	11	0	0	0	157	101,526
40-44	86	22	10	4	0	0	122	100,185
45-49	84	14	4	2	0	0	104	111,385
50-54	49	8	4	7	0	0	68	96,716
55-59	16	8	3	1	0	0	28	92,217
60-64	10	0	2	0	0	0	12	71,413
65 and Over	1	1	0	0	0	0	2	44,432
All Ages	**532**	**107**	**36**	**14**	**0**	**0**	**689**	**$96,306**

Distribution of Terminated Participants with Funds on Deposit by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	31	0	0	0	0	0	31	$42,438
25-29	46	3	0	0	0	0	49	45,373
30-34	100	23	8	0	0	0	131	55,697
35-39	101	41	11	1	0	0	154	57,648
40-44	87	28	21	7	2	0	145	61,308
45-49	71	16	11	15	3	0	116	62,954
50-54	52	12	2	2	0	0	68	49,662
55-59	46	6	4	0	0	0	56	42,944
60-64	20	2	0	0	0	0	22	36,335
65 and Over	13	1	0	0	0	0	14	32,323
All Ages	**567**	**132**	**57**	**25**	**5**	**0**	**786**	**$54,630**

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	0	3	13	16
30-34	0	1	7	0	0	3	11
35-39	0	0	19	0	1	4	24
40-44	0	3	39	0	2	1	45
45-49	0	5	47	1	1	2	56
50-54	300	8	75	0	2	9	394
55-59	439	4	93	2	6	25	569
60-64	454	3	89	2	5	30	583
65-69	432	4	99	3	4	31	573
70-74	300	2	86	3	1	50	442
75-79	139	1	49	1	1	39	230
80-84	56	0	23	1	1	22	103
85 and Over	33	0	12	0	1	34	80
All Ages	**2,153**	**31**	**638**	**13**	**28**	**263**	**3,126**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 30	$0	$0	$0	$0	$29,366	$9,434	$13,171
30-34	0	28,919	23,527	0	0	4,463	18,818
35-39	0	0	39,799	0	34,588	22,320	36,669
40-44	0	7,917	30,552	0	64,638	4,663	29,983
45-49	0	18,755	41,127	53,601	50,574	10,841	38,439
50-54	75,543	17,862	38,030	0	34,678	30,599	65,997
55-59	73,059	18,286	39,147	26,877	53,417	36,238	65,144
60-64	62,863	22,434	36,398	10,393	50,574	44,512	57,385
65-69	59,074	13,419	28,893	55,089	45,333	30,640	51,885
70-74	58,834	12,461	30,699	29,186	21,771	43,115	51,087
75-79	53,471	25,354	40,371	22,012	24,144	31,089	46,498
80-84	45,362	0	33,663	49,812	28,546	34,998	40,416
85 and Over	32,840	0	34,315	0	38,360	27,922	31,040
All Ages	**$63,865**	**$17,217**	**$35,176**	**$34,830**	**$44,265**	**$33,482**	**$54,695**

Retired Members and Beneficiaries (continued)

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Yrs	705	4	125	2	4	110	950
5-9	469	9	92	2	1	70	643
10-14	496	7	66	2	4	37	612
15-19	324	3	73	5	12	17	434
20-24	101	6	88	1	2	14	212
25-29	46	2	75	0	1	9	133
30 and Over	12	0	119	1	4	6	142
All Years	**2,153**	**31**	**638**	**13**	**28**	**263**	**3,126**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 5 Yrs	$72,396	$3,023	$46,826	$49,549	$39,202	$37,457	$64,506
5-9	61,401	25,175	37,037	37,095	55,799	35,986	54,557
10-14	64,266	16,823	37,898	53,474	53,773	28,519	58,615
15-19	58,124	13,432	40,166	27,617	46,681	28,273	52,957
20-24	42,363	15,821	31,497	12,461	52,234	29,331	36,193
25-29	46,749	21,045	29,095	0	34,259	17,901	34,361
30 and Over	43,980	0	23,484	22,012	28,205	9,816	24,761
All Years	**$63,865**	**$17,217**	**$35,176**	**$34,830**	**$44,265**	**$33,482**	**$54,695**

* Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the total counts may not match information on C-1 of the report. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D

Glossary of Actuarial Terms

Glossary of Actuarial Terms

Accrued Liability *(Actuarial Accrued Liability)*
The portion of the Present Value of Benefits allocated to prior years. Based on CalPERS funding policies, the accrued liability is the target level of assets on any valuation date.

Actuarial Assumptions
Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability, and retirement rates. Economic assumptions include discount rate, salary growth, and inflation.

Actuarial Methods
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include an actuarial cost method, an amortization policy, and an asset valuation method.

Actuarial Valuation
The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change in plan provisions.

Amortization Bases
Separate payment schedules for different portions of the Unfunded Accrued Liability (UAL). The total UAL of a rate plan can be segregated by cause. The impact of such individual causes on the UAL are quantified at the time of their occurrence, resulting in new amortization bases. Each base is separately amortized and paid for over a specific period of time. Generally, in an actuarial valuation, the separate bases consist of changes in UAL due to contract amendments, actuarial assumption changes, method changes, and/or gains and losses.

Amortization Period
The number of years required to pay off an Amortization Base.

Classic Member (under PEPRA)
A member who joined a public retirement system prior to January 1, 2013 and who is not defined as a new member under PEPRA. (See definition of New Member below.)

Discount Rate
This is the rate used to discount the expected future benefit payments to the valuation date to determine the Projected Value of Benefits. The discount rate is based on the assumed long-term rate of return on plan assets, net of investment and administrative expenses. This rate is called the "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law.

Entry Age
The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Actuarial Cost Method
An actuarial cost method designed to fund a member's total plan benefit evenly over the course of his or her career. This method yields a total normal cost rate, expressed as a percentage of payroll, which is designed to remain level throughout the member's career.

Fresh Start
A Fresh Start is when multiple amortization bases are combined into a single base and amortized over a new Amortization Period.

Funded Ratio
Defined as the Market Value of Assets divided by the Accrued Liability. It is a measure of how well funded a rate plan is. A ratio greater than 100% means the rate plan has more assets than the target established by CalPERS

funding policies on the valuation date and the employer need only contribute the Normal Cost. A ratio less than 100% means assets are less than the funding target and contributions in addition to Normal Cost are required.

GASB 68
Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions.

New Member (under PEPRA)
A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

Normal Cost
The portion of the Present Value of Benefits allocated to the upcoming fiscal year for active employees. The normal cost plus the required amortization of the UAL, if any, make up the required contributions.

Pension Actuary
A business professional proficient in mathematics and statistics who performs the calculations necessary to properly fund a pension plan and allow the plan sponsor to disclose its liabilities. A pension actuary must satisfy the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

PEPRA
The California Public Employees' Pension Reform Act of 2013

Present Value of Benefits (PVB)
The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

Unfunded Accrued Liability (UAL)
The Accrued Liability minus the Market Value of Assets. If the UAL for a rate plan is positive, the employer is required to make contributions in excess of the Normal Cost.

Actuarial Valuation Report

County of Riverside

County of Riverside Postretirement Benefits Plan

As of June 30, 2022

Empower Results®

Executive Summary

Background

The County of Riverside provides retiree medical benefits for eligible retirees enrolled in County sponsored plans. The benefits are provided in the form of:

- Monthly County contributions toward the retiree's premium,
- Access to CalPERS health plan coverage at subsidized premium levels, and
- $25 per month to the RSA Trust for RSA law enforcement retirees.

County Contributions

The County of Riverside makes contributions to eligible retirees for their medical plan premiums when the retiree enrolls in a County sponsored health plan. The current monthly amount paid by the County ranges from $25 – $256, depending on the retiree's bargaining unit at retirement. The County provided amounts are detailed in the Summary of Principal Plan Provisions and outlined as follows:

- **CalPERS Health Benefits program retirees** (includes all bargaining units except RSA) are eligible for the greater of the stated Public Employees' Medical and Hospital Care Act (PEMHCA) amounts and the bargaining unit's negotiated amount. The PEMHCA monthly amounts are $149.00 and $151.00 in 2022 and 2023, respectively, and increase annually thereafter by Medical CPI. The negotiated benefit amounts are not inflation-indexed.
- **RSA Law Enforcement retirees** are eligible for benefits from the RSA Benefit Trust to which the County contributes $25.00 per month (does not increase in future years to account for inflation). The County contribution is included in Plan liabilities.

As described above, the majority of participants are eligible to receive CalPERS health benefits, including PEMHCA benefits that are subject to inflation adjustments. The long-term benefit under PEMHCA could be more than 10 times greater than certain fixed benefit amounts in 15 years, as illustrated in Appendix A.

Implicit Subsidy

Under CalPERS health plans, retirees receive benefits prior to age 65 by paying premiums that are developed by blending active and retiree costs. Since retirees are older and generally cost more than actives, the premium paid by the retiree is less than the "true cost" of coverage for retirees. For example, under the Blue Shield Access Plus, the estimated "true cost" for an age 60 retiree is $1,085.29 per month, while the required premium is only $738.29 per month in 2023. Subsidization can also occur for post 65 benefits due to demographic differences between the County retirees and the CalPERS population used to develop premiums. This implicit subsidy is considered an employer obligation under the Actuarial Standards of Practice (ASOP) No. 6 requirements (see below) and is included in this valuation.

ASOP 6

The Actuarial Standards Board (ASB) amended Actuarial Standards of Practice (ASOP) No. 6 – Measuring Retiree Group Benefit Obligations, effective for measurement dates after March 31, 2015. This amendment requires plans to recognize certain additional healthcare costs (i.e., implicit subsidy) for pooled health plans. Since CalPERS plans are considered pooled health plans, the implicit subsidy is reflected in this actuarial valuation.

GASB 75

In June 2015, GASB released Statement 75, which was initially effective for the FYE June 30, 2018. This July 1, 2022 valuation is based on census data provided as of July 1, 2022 for the purpose of providing GASB 75 financial statement information, including final expense, for FYE June 30, 2023.

The measurement date for results shown in this valuation report is June 30, 2022.

It is important to note that only current active and retired participants are valued in this actuarial study. Future new entrants or any projected growth in the County's employee population are not considered.

Summary of Results

Liabilities

There are a few terms to understand related to the Plan's liabilities. The Present Value of Benefits (PVB) represents the actuarial present value of all future benefits expected to be paid to current employees and retirees. The Actuarial Accrued Liability (AAL) is the portion of the PVB attributable to past service. The Normal Cost is the portion of the PVB that is allocated to the current plan year for active employees.

Each liability is a present value calculated by using a selected discount rate.

Funding results in this report are shown using a 7.00% discount rate and ignore Implicit Subsidy. The table below summarizes the liability results as of July 1, 2022:

	County Contribution
Present Value of Benefits (PVB)	$194,781,998
Actuarial Accrued Liability (AAL)	$147,985,399
Normal Cost	$5,577,628

Accounting results in this report are shown using a 7.70% discount rate and includes Implicit Subsidy. The table below summarizes the liability results as of July 1, 2022:

	County Contribution	**Implicit Subsidy**	**Total Liability**
Present Value of Benefits (PVB)	$174,366,548	$148,010,670	$322,377,218
Actuarial Accrued Liability (AAL)	$136,014,925	$111,496,047	$247,510,972
Normal Cost	$4,802,616	$4,320,426	$9,123,042

Discount Rate

The discount rate can have a considerable impact on the magnitude of the liabilities, with lower discount rates resulting in higher liabilities.

The County's funding policy is based on a discount rate of 7.00%. GASB 75 prescribes the discount rate methodology to be used. Based on the County's current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate for GASB disclosures can be based entirely on the assumed asset return, as illustrated in the GASB 75 section of the report. For GASB purposes, the discount rate is 7.70%.

Development of Funding Contribution [1]

The funding contribution is developed on a projected basis using prior year valuation results. For example, the funding contribution for Fiscal Year Ending (FYE) 2023 is $14,108,781 and was developed based on the 2021 valuation.

The funding contribution development is determined using liabilities **excluding the implicit subsidy**. This valuation develops the funding contribution for FYE 2024, which is $18,029,300 and is based on a projection of the normal cost, amortization of the 2017 initial Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, and amortization of the subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods.

The table below shows the contributions for Safety and Miscellaneous for FYE 2023, 2024 and an estimate for FYE 2025.

	2022-2023	2023-2024	2024-2025 [2]
Contribution for Safety	$138,628	$1,704,652	$1,752,382
Contribution for Miscellaneous	13,970,153	$4,732,569	4,865,082
Total Funding Contribution	**$14,108,781**	**$6,437,221**	**$6,617,464**

The funding contribution decreased for FYE 2024 due to the reflection of the current funded status in the asset amortization base. The allocation of the contribution was updated based on the liability split as of July 1, 2021. Although the plan experienced poor asset performance for the measurement period ending June 30, 2022, the impact is muted due to asset smoothing. The projected FYE 2025 contribution has been developed based on the same eligibility basis used for all groups as of June 30, 2022.

The current policy amortizes assets and liabilities experience over different periods, which results in a much smaller amortization amount for the next few years, increasing by approximately $10M after 2028.

An alternative amortization of the UAAL, which uses a single 15-year amortization period would address the volatility in the 5-year/15-year amortization amounts under the current policy and address the plan's current funded status. Application of the 15-year amortization period leads to a contribution of approximately $10M for 2023-2024 versus $6.4M shown above.

GASB 75 Expense

The OPEB expense for FYE June 30, 2023 is $40,708,764 and is developed using the valuation results in this report, including a Valuation Date of July 1, 2022, Measurement Period of July 1, 2021 to June 30, 2022, and a Measurement Date of June 30, 2022. Although higher than the prior year, the final FYE June 30, 2023 expense is relatively consistent with what was estimated in the prior valuation due to the offsetting impacts of a large asset loss during FYE 2022, experience gains and, updates to demographic and financial assumptions.

[1] Funding contributions are assumed to be in addition to Pay-as-you-go
[2] Estimated assuming funding policy discussed in the report.

Comparison to Prior Valuation

The following table summarizes the prior valuation results using a 7.00% discount rate for both accounting and funding and the current valuation using a 7.70% discount rate for accounting and 7.00% for funding:

	July 1, 2021	July 1, 2022
Funding Contribution[1]		
Funding Discount Rate	7.0%	7.0%
Present Value of Benefits (PVB)	$189,168,133	$194,781,998
Actuarial Accrued Liability (AAL)	144,317,027	147,985,399
Normal Cost	5,393,764	5,577,628
Smoothed Value of Assets	68,130,272	86,083,333
Unfunded AAL	76,186,755	61,902,066
Funded Status	47.2%	58.2%
Funding Contribution for FYE 2023 / 2024	14,108,781	6,437,221
% of pay	0.92%	0.40%
Alternative Contribution	N/A	0.64%
GASB 75 Accounting		
Funding Discount Rate	7.0%	7.7%
Present Value of Benefits (PVB)	$348,230,998	$322,377,218
Actuarial Accrued Liability (AAL)	260,209,245	247,510,972
Normal Cost	10,290,320	9,123,042
Market Value of Assets	73,625,008	76,411,793
Net OPEB Liability	$186,584,237	$171,099,179
Plan Fiduciary Net Position as a percentage of the OPEB Liability	28.3%	30.9%
GASB Annual Expense for FYE 2022 / 2023	$38,628,779	$40,708,764
GASB Annual Expense for FYE 2023 / 2024 (Estimate)	$40,117,000	$39,499,000

[1] ignoring Implicit Subsidy

Overall, the funded status improved compared to the prior valuation. These net results are primarily due to the following factors:

- (GASB only) Expected return on assets was changed from 7.00% to 7.70%, reflecting higher expectations for CERBT Asset Allocation Strategy 1. As a result, the discount rate similarly increased, resulting in a liability decrease.
- Investment return was lower than expected (-14.4% compared to 7.0% assumed), resulting in an asset loss.
- Large prefunding contributions reduced the Unfunded AAL
- Healthcare cost increases were lower than projected from the prior year, resulting in a liability gain.
- Updated retirement rates that assume slightly older assumed retirement aged resulted in a liability gain.
- Demographic experience resulted in an actuarial gain. This was primarily due to more terminations and fewer deferred elections than expected.

RCA liabilities are included within this valuation, however, it should be noted that employee groups from Special Districts (Waste, Parks, and Flood) and active Court members were not included in the valuation results presented in this report.

Projected Funding Status

All valuation and projection results on the following pages are based on the assumptions and plan provisions stated in the appendices. Specifically, they only include health plan eligibility (i.e., CalPERS or County plans) for bargaining groups as specified as of June 30, 2022. Changes to such associated plan participation assumptions may result in higher liabilities, funding costs, and accounting expense than shown in this report.

80% Funded Status (excluding implicit subsidy)

The County requested a review of maintaining an 80% funded status for the OPEB Plan excluding the implicit subsidy liability. The valuation shows the plan is projected to be below 80% funded for such County Contribution liability as of June 30, 2022.

Projected Actuarial Accrued Liability (AAL), 6/30/2023	$ 157,363,448
Projected Smoothed Value of Assets, 6/30/2023	104,453,172
Projected Shortfall, 6/30/2023	52,910,276
Projected Funded Status, 6/30/2023	66.4%
Shortfall for 80% funding, 6/30/2023	21,437,586
Additional funding in FYE 2023 to achieve 80% as of 6/30/2023	$ 20,724,497

[1] Assumes funding on 1/1/2022 and is in addition to the proposed FYE 2023 contribution of $14,108,781.

The table below summarizes the estimated additional annual contribution projected to attain a funded status of 80% at various future dates. The total contribution % shown below includes the Actuarially Determined Contribution (ADC) as developed in this report plus the additional amount to attain 80% funded status by the target funding date.

	Additional Payment to Fund 80% by Target Date		**Total Contribution to Fund 80% by Target Date**	
80% Target Funding Date	**Annual Payment in FYE 2024[1]**	**% of Pay**	**Annual Payment in FYE 2024[1,2]**	**% of pay[2]**
6/30/2024	$23,985,549	1.49%	$30,422,770	1.90%
6/30/2025	12,963,482	0.81%	19,400,702	1.21%
6/30/2026	9,679,395	0.60%	16,116,616	1.00%
6/30/2027	7,257,523	0.45%	13,694,743	0.85%
6/30/2028	5,813,873	0.36%	12,251,093	0.76%
6/30/2029	3,518,927	0.22%	9,956,148	0.62%
6/30/2030	1,886,794	0.12%	8,324,015	0.52%
6/30/2031	668,485	0.04%	7,105,706	0.44%
6/30/2032	0	0.00%	6,437,221	0.40%

[1] Contributions shown for FYE 2024 are assumed to be made throughout the year based on a level percent of pay and are therefore assumed to increase at 2.80% per year from FYE 2024 to the target funding date.
[2] Includes current FYE 2024 contribution of $6,437,221 (0.40% of pay).

The plan is not projected to be less than 80% after 6/30/2031.

For example, to attain 80% funded (excluding implicit subsidy) by FYE 2025, the County would need to contribute approximately $13.0M in FYE 2024 and $13.3M in FYE2025 in addition to the current ADC contributions of $6.4M in FYE 2024 and $6.6M in FYE 2025.

Note: The breakdown of results between Safety and Miscellaneous funded status may vary from above.

80% Funded Status (including implicit subsidy)

For illustrative purposes of comparing a contribution policy utilizing total liability (i.e., including the implicit subsidy), we also performed a review of maintaining an 80% funded status for the OPEB Plan, including the implicit subsidy liability. The valuation shows the plan continues to be under 80% funded as of June 30, 2023, as shown below:

Projected Actuarial Accrued Liability (AAL), 6/30/2023	$ 283,286,198
Projected Smoothed Value of Assets, 6/30/2023	104,453,172
Projected Shortfall, 6/30/2023	178,833,026
Projected Funded Status, 6/30/2023	36.9%
Shortfall for 80% funding, 6/30/2023	122,175,786
Additional funding in FYE 2022 to achieve 80% as of 6/30/2023	$ 118,111,791

[1] Assumes funding on 1/1/2023 and is in addition to the proposed FYE 2023 contribution of $14,108,781.

Effect of Asset Allocation Strategy Selection and the Discount Rate Impact

CalPERS offers three asset allocation strategies for selection by employers who contract to pre-fund their future OPEB costs through CERBT.

The asset allocation and associated expected asset return, and thus the assumed discount rate, have a considerable impact on valuation results and the magnitude of liabilities. CalPERS periodically reviews the expected asset returns and the rates shown below are based on CalPERS revised guidance adopted in October 2021.

A recent review of the long-term expected return rates, based on Aon's 2022 Q3 Capital Market Assumptions and the CERBT target asset allocation for Strategy 1, resulted in a range of reasonable return assumptions below the published CERBT expected return assumptions. More details of the expected return assumption are included in the 2022 assumption rationale document.

The following table summarizes financial characteristics of each of CERBT's Strategies:

	Strategy 1	Strategy 2	Strategy 3
CERBT Expected Return Rate	6.30%	5.90%	5.50%
CERBT Standard Deviation of Expected Returns	12.10%	9.90%	8.40%
Aon's Reasonable Range of Expected Returns	6.04%-7.75%	5.69%-7.04%	5.29%-6.40%%
Hypothetical Expected Return Assumptions	7.70%	7.00%	6.40%

Strategy 1 invests in each of the five asset classes (Global Equity, Domestic Fixed Income, U.S. Inflation Linked Bonds, Global Public Real Estate and Commodities). The portion of assets allocated to each asset class impacts the long term expected rate of return and level of risk of the strategy.

Effective July 1, 2022, all assets have been transferred to Strategy 1. The County selected a 7.70% long term expected return assumption under Strategy 1 for purposes of this valuation and should continue to monitor the return versus risk balance and maintain an asset allocation strategy appropriate for the County's funding and overall financial policies.

In order to understand the impact of strategy selection, we compared valuation results under each Asset Allocation Strategy

	Strategy 1	**Strategy 2**	**Strategy 3**
	7.70%	**7.00%**	**6.40%**
Liabilities			
Present Value of Benefits (PVB)	$322,377,218	$358,218,351	$394,301,164
Actuarial Accrued Liability (AAL)	$247,510,972	$267,642,237	$287,076,017
Normal Cost	$9,123,044	$10,507,400	$11,900,802

Under GASB 75, the expected return will be considered along with the municipal bond index to determine a blended discount rate.

* * *

The following report shows the details of results by participant status and benefits provided, based on a 7.70% discount rate.

Table of Contents

Actuarial Valuation Certificate

This report documents the results of the July 1, 2022 actuarial valuation for the County of Riverside Postretirement Medical Benefits. The information provided in this report is intended strictly for documenting:

- Disclosure items under Governmental Accounting Standards Board (GASB) Statement 75 for Fiscal Year Ending June 30, 2023.
- Funding contribution amounts and the Actuarial Determined Contribution (ADC) for Fiscal Year Ending June 30, 2024.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75 (GASB 75) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors. Additional disclosures may be required under GASB 74.

A valuation model was used to develop the liabilities for the June 30, 2022 valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the Postretirement Health Benefits.

A model was used to develop the appropriate GASB discount rate. The undersigned relied on experts within Aon for the development of the capital market assumptions and the model underlying the expected rate of return.

The valuation model outputs various cost scenarios. The "1% increase" and "1% decrease" interest rate scenarios vary only the discount rate assumption, in order to illustrate the impact of a change in that assumption in isolation. In practice, certain other assumptions, such as the expected or realized asset returns, would also be expected to vary when the discount rate changes. Therefore, the output from these scenarios should be used solely for assessing the impact of the discount rate in isolation and may not represent a realistic set of results for other purposes.

The "1% increase" and "1% decrease" healthcare cost trend scenarios vary only the healthcare cost trend assumption, in order to illustrate the impact of a change in that assumption in isolation. Therefore, the output from these scenarios should be used solely for assessing the impact of the healthcare cost trend in isolation and may not represent a realistic set of results for other purposes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

Funded status measurements shown in this report are determined based on various measures of plan assets and liabilities. For entity and plan disclosure and reporting purposes, funded status is determined using plan assets measured at market value. Plan liabilities are measured based on the interest rates and other assumptions summarized in the Actuarial Assumptions and Methods section of this report.

These funded status measurements may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for County of Riverside and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions. In conducting the valuation, we have relied on personnel, plan design, health care claim cost, and asset information supplied by County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. County of Riverside selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of OPEB valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to County of Riverside has any material direct or indirect financial interest in County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for County of Riverside.

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November 2022

Plan Liabilities (Accounting)

The liabilities shown in this exhibit were calculated using a 7.70% discount rate.

The **Present Value of Benefits (PVB)** represents the actuarial present value of all benefits ever to be paid to current employees and retirees. The PVB is as follows:

	Safety Employees	Miscellaneous Employees	Total
PVB			
County Contribution			
Retirees	$14,904,520	$56,707,014	$71,611,534
Actives	$8,771,702	$93,983,312	$102,755,014
Subtotal	$23,676,222	$150,690,326	$174,366,548
Implicit Subsidy			
Retirees	$12,307,610	$31,180,706	$43,488,316
Actives	$9,576,695	$94,945,659	$104,522,354
Subtotal	$21,884,305	$126,126,365	$148,010,670
All Benefits			
Retirees	$27,212,130	$87,887,720	$115,099,850
Actives	$18,348,397	$188,928,971	$207,277,368
Total PVB	**$45,560,527**	**$276,816,691**	**$322,377,218**
Number of Retirees as of 7/1/2022[1]	841	2,187	3,028
Number of Actives as of 7/1/2022	3,476	16,572	20,048
PVB Per Retiree[2]	$20,850	$27,413	$25,590
PVB Per Active	$5,279	$11,400	$10,339

[1] Deferred retirees (former employees who did not elect medical benefits at the time of their retirement and are eligible to elect the benefits at a later date) are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021 and reviewed in 2022.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,300.

The **Actuarial Accrued Liability (AAL)** is a portion of the PVB attributable to past service. For retirees and fully eligible active employees, the AAL is equal to the PVB. For other active employees, the AAL is the portion of the PVB deemed to be accrued to date. The **Normal Cost** is the portion of the PVB that is allocated to the current plan year for only active employees.

The AAL in this report is based on the Entry Age Normal cost method and has been developed by spreading costs as a level percentage of payrolls.

	Safety Employees	Miscellaneous Employees	Total
AAL			
County Contribution			
Retirees	$14,904,520	$56,707,014	$71,611,534
Actives	$6,187,295	$58,216,096	$64,403,391
Subtotal	$21,091,815	$114,923,110	$136,014,925
Implicit Subsidy			
Retirees	$12,307,610	$31,180,706	$43,488,316
Actives	$7,497,754	$60,509,977	$68,007,731
Subtotal	$19,805,364	$91,690,683	$111,496,047
All Benefits			
Retirees	$27,212,130	$87,887,720	$115,099,850
Actives	$13,685,049	$118,726,073	$132,411,122
Total AAL	**$40,897,179**	**$206,613,793**	**$247,510,972**
Number of Retirees as of 7/1/2022 [1]	841	2,187	3,028
Number of Actives as of 7/1/2022	3,476	16,572	20,048
AAL Per Retiree [2]	$20,850	$27,413	$25,590
AAL Per Active	$3,937	$7,164	$6,605
Normal Cost			
County Contribution	$334,023	$4,468,593	$4,802,616
Implicit Subsidy	$269,143	$4,051,283	$4,320,426
Total Normal Cost	**$603,166**	**$8,519,876**	**$9,123,042**
Normal Cost per Active	$174	$514	$455

[1] Deferred retirees (former employees who did not elect medical benefits at the time of their retirement and are eligible to elect the benefits at a later date) are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021 and reviewed in 2022.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,300.

Plan Liabilities (Funding)

The liabilities shown in this exhibit were calculated using a 7.00% discount rate and ignoring Implicit Subsidy.

	Safety Employees	Miscellaneous Employees	Total
PVB			
County Contribution			
Retirees	$15,974,382	$60,318,276	$76,292,658
Actives	$9,915,180	$108,574,160	$118,489,340
Total PVB	**$25,889,562**	**$168,892,436**	**$194,781,998**
Number of Retirees as of 7/1/2022[1]	841	2,187	3,028
Number of Actives as of 7/1/2022	3,476	16,572	20,048
PVB Per Retiree[2]	$12,528	$19,518	$17,576
PVB Per Active	$2,852	$6,552	$5,910

	Safety Employees	Miscellaneous Employees	Total
AAL			
County Contribution			
Retirees	$15,974,382	$60,318,274	$76,292,656
Actives	$6,801,962	$64,890,781	$71,692,743
Total AAL	**$22,776,344**	**$125,209,055**	**$147,985,399**
Number of Retirees as of 7/1/2022[1]	841	2,187	3,028
Number of Actives as of 7/1/2022	3,476	16,572	20,048
AAL Per Retiree[2]	$12,528	$19,518	$17,576
AAL Per Active	$1,957	$3,916	$3,576
Normal Cost			
County Contribution	**$385,817**	**$5,191,811**	**$5,577,628**
Normal Cost per Active	$111	$313	$278

[1] Deferred retirees (former employees who did not elect medical benefits at the time of their retirement and are eligible to elect the benefits at a later date) are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021 and reviewed in 2022.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees (excluding the implicit subsidy) is approximately $5,700.

Plan Assets

The County of Riverside participates in CalPERS' CERBT trust fund. The following table shows the development of assets since the prior valuation.

Reconciliation of Plan Assets	**July 1, 2021 to June 30, 2022**
Market Value of Assets, Beginning of Year	$73,625,008
Contributions	
Retiree Premiums	$5,480,915
Reimbursement from CERBT	$0
Implicit Subsidy	$5,093,783
Pre-Funding	$14,490,000
Total Contributions	$25,064,698
Investment Earnings	($11,664,593)
Administrative Expense	($38,622)
Benefit Payments	
Retiree Premiums	($5,480,915)
Implicit Subsidy	($5,093,783)
Total Benefit Payments	($10,574,698)
Market Value of Assets at Valuation Date	$76,411,793
Return on Assets	(14.43%)
Development of (Gain)/Loss	
Expected Investment Earnings (assumed 7.00%)	$5,650,994
Actual Investment Earnings	($11,664,593)
(Gain)/Loss on Assets	$17,315,587
Smoothed Value of Assets at Valuation Date	
Market Value of Assets at Valuation Date	$76,411,793
Unrecognized (Gain)/Loss[1]	$9,671,540
Preliminary Smoothed Value of Assets at Valuation Date	$86,083,333
Lower Corridor (80% of Market Value)	$61,129,434
Upper Corridor (120% of Market Value)	$91,694,152
Smoothed Value of Assets	$86,083,333

[1] Schedule of the Current and Prior Asset (Gain)/Losses as of June 30, 2022.

Date Established	**Original (Gain)/Loss**	**Years Remaining As of 6/30/2022**	**Amount Recognized**	**Total Amount Unrecognized**
6/30/2019	($55,790)	1	($44,632)	($11,158)
6/30/2020	$813,300	2	$487,980	$325,320
6/30/2021	($7,491,819)	3	($2,996,728)	($4,495,091)
6/30/2022	$17,315,587	4	$3,463,117	$13,852,470
Total			$909,737	$9,671,541

Plan Funded Status

The Plan's funded status as of July 1, 2022 is developed based on the Actuarial Accrued Liability (excluding implicit subsidy) and the smoothed value of Plan assets.

The following table shows the development of the Plan's funded status as of July 1, 2022:

Funding Methodology	Entry Age Normal
Discount Rate	7.00%
Actuarial Accrued Liability	$147,985,399
Smoothed Value of Plan Assets	86,083,333
Unfunded Liability	$61,902,066
Funded Percentage	58.2%

Development of Funding Contribution

Effective July 1, 2020 (contributions developed for FYE June 30, 2022), the County's funding policy ignores implicit subsidy liabilities and determines amounts on a level percentage of pay based on the sum of:

a) Normal Cost with interest, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated liability changes (i.e., actuarial gains / losses and changes in assumptions) over 15-year period, plus
d) Amortization of subsequent unanticipated asset changes (i.e., unexpected gains / losses on assets) over 5-year period.

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

The following table shows the development of the funding contribution as a level percentage of pay, assuming middle of year payment, for FYE June 30, 2024:

	Safety	Miscellaneous	Total
Funding Contribution, FYE June 30, 2024 [1]			
Normal Cost, plus interest	$410,267	$5,520,824	$5,931,091
Amortization of UAAL, plus interest [2]	1,294,385	(788,255)	506,130
Funding Contribution	$1,704,652	$4,732,569	$6,437,221
% of Pay			0.40%

The following table shows the development of the liability (gain)/loss as of June 30, 2022

	Safety	Miscellaneous	Total
Liability as of June 30, 2021	$22,271,682	$122,045,345	$144,317,027
Service Cost	356,435	5,037,329	5,393,764
Interest on Liability	1,549,966	8,741,202	10,291,168
Plan Change	0	0	0
Assumption Changes	**14,381**	**(892,776)**	**(878,395)**
Benefit Payments	(988,207)	(4,492,708)	(5,480,915)
Expected Liability as of June 30, 2022	23,204,257	130,438,392	153,642,649
Actual Liability as of June 30, 2022	22,776,343	125,209,056	147,985,399
Liability (Gain)/Loss	**($427,914)**	**($5,229,336)**	**($5,657,250)**

The following table shows the development of the asset (gain)/loss as of June 30, 2022

	Safety	Miscellaneous	Total
Market Value of Assets (MVA) as of June 30, 2021 [3]	$11,362,157	$62,262,851	$ 73,625,008
Total Expected Contributions [4]	2,373,792	13,965,815	16,339,607
Administrative Expense	(5,960)	(32,662)	(38,622)
Benefit Payments [3]	(988,207)	(4,492,708)	(5,480,915)
Expected Investment Earnings	842,821	4,683,227	5,526,048
Expected MVA as of June 30, 2022	13,584,603	76,386,523	89,971,126
Expected Unrecognized (gain)/loss	(645,221)	(3,535,709)	(4,180,930)
Expected Smoothed Value as of June 30, 2022	12,939,382	72,850,814	85,790,196
Actual Smoothed Value as of June 30, 2022	13,157,265	72,926,068	86,083,333
Asset (Gain)/Loss	**(217,882)**	**(75,255)**	**(293,137)**

[1] Excludes the implicit subsidy liability/service cost. Prior to July 1, 2020, funding was based on liabilities including the implicit subsidy
[2] Amortization allocation shown on next page.
[3] Re-allocation based on liability weighting as of June 30, 2021
[4] County contributions only, excluding the implicit subsidy.

Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability excluding the implicit subsidy as of July 1, 2023. Amortization of bases is first recognized in the fiscal year subsequent to the date established.

Date Established	Type of Base	Original Period	Remaining Period as of June 30, 2023	Original Balance	Balance Remaining as of June 30, 2023	Total Amortization Recognized in FYE June 30, 2024	Safety Amortization Recognized in FYE June 30, 2024[1]	Miscellaneous Amortization Recognized in FYE June 30, 2024[1]
7/1/2022	Liability (Gain)/Loss	15	15	($5,657,250)	$(6,053,258)	$(526,202)	$(39,802)	$(486,400)
7/1/2022	Assets (Gain)/Loss[2]	5	5	(37,826,512)	(40,474,368)	(8,755,788)	655,507	(9,411,295)
7/1/2022	Assumptions	15	15	(878,395)	(939,883)	(81,703)	1,338	(83,041)
7/1/2021	Liability (Gain)/Loss	15	14	1,830,883	1,913,405	175,015	(4,179)	179,194
7/1/2021	Assumptions	15	14	(8,136,380)	(8,503,104)	(777,760)	(915,168)	137,408
7/1/2020	Liability (Gain)/Loss	15	13	3,731,444	3,747,400	362,466	(43,306)	405,772
7/1/2020	Assumptions	15	13	74,063,338	74,380,039	7,194,380	329,135	6,865,245
7/1/2019	Liability (Gain)/Loss	15	12	115,351	112,839	11,609	11,742	(133)
7/1/2019	Assumptions	15	12	10,726,730	10,493,041	1,079,512	145,603	933,909
7/1/2018	Liability (Gain)/Loss	15	11	2,657,510	2,482,842	273,547	168,032	105,515
7/1/2018	Assumptions	15	11	5,348,501	4,996,963	550,541	338,182	212,359
7/1/2017	7/1/2017 UAAL[3]	20	14	11,733,484	10,754,360	983,677	604,245	379,432
	Total Charges			$57,708,704	$52,910,276	$489,294	$1,251,329	$(762,035)

[1] Amortization allocation by classification is based on proportionate share of AAL prior to 7/1/2018 and estimated safety/miscellaneous gain/loss since 7/1/2018.
[2] Re-established amount includes prior outstanding Asset (Gain)/Loss bases established prior to 6/30/2022 (gain of $6,138,463), FYE 2022 AVA Asset (Gain)/Loss developed above ($293,137 gain) plus other adjustments to reflect funded status.
[3] Includes Asset (Gain)/Loss as of 6/30/2017.

Projected Benefit Payments[1]

The following table shows the estimated projected net County benefit payments based on the current plan provisions, current plan participants, and the valuation assumptions used in this report. The County Contributions would be equivalent to funding the liabilities on a pay-as-you-go basis.

Fiscal Year Ending June 30	Safety		Miscellaneous		Total
	County Contribution	Implicit Subsidy	County Contribution	Implicit Subsidy	
2023	$1,201,027	$1,106,425	$5,516,817	$4,925,490	$12,749,759
2024	$1,290,585	$1,327,937	$6,027,413	$5,666,514	$14,312,450
2025	$1,390,415	$1,501,712	$6,555,906	$6,125,535	$15,573,568
2026	$1,493,161	$1,606,315	$7,084,667	$6,748,746	$16,932,889
2027	$1,590,194	$1,786,696	$7,602,039	$7,092,510	$18,071,439
2028	$1,684,874	$1,874,986	$8,130,169	$7,321,340	$19,011,369
2029	$1,773,416	$1,979,703	$8,653,758	$7,596,865	$20,003,743
2030	$1,853,482	$2,055,581	$9,176,354	$8,171,074	$21,256,491
2031	$1,924,828	$2,137,799	$9,707,562	$8,549,701	$22,319,890
2032	$1,992,102	$2,044,086	$10,248,550	$9,168,563	$23,453,301
2033	$2,047,742	$1,992,657	$10,791,036	$9,764,179	$24,595,614
2034	$2,092,853	$1,933,770	$11,335,478	$10,382,683	$25,744,784
2035	$2,131,874	$1,954,285	$11,884,565	$10,976,643	$26,947,366
2036	$2,161,787	$1,920,009	$12,437,159	$11,304,566	$27,823,521
2037	$2,182,134	$1,898,741	$13,020,760	$11,604,148	$28,705,783
2038	$2,197,624	$1,936,469	$13,666,343	$12,099,334	$29,899,771
2039	$2,206,115	$1,901,573	$14,317,278	$12,812,286	$31,237,252
2040	$2,209,622	$1,916,801	$14,952,522	$13,318,958	$32,397,903
2041	$2,207,706	$1,884,156	$15,580,929	$13,927,511	$33,600,302
2042	$2,203,520	$1,822,753	$16,179,701	$14,612,299	$34,818,272
2043	$2,196,960	$1,769,175	$16,769,879	$15,062,875	$35,798,889
2044	$2,191,173	$1,708,143	$17,331,986	$15,461,800	$36,693,102
2045	$2,182,508	$1,650,443	$17,872,777	$15,525,712	$37,231,440
2046	$2,174,186	$1,605,165	$18,394,828	$15,611,314	$37,785,493
2047	$2,165,222	$1,576,639	$18,886,472	$15,691,110	$38,319,442
2048	$2,153,346	$1,521,850	$19,349,070	$15,428,547	$38,452,812
2049	$2,134,602	$1,519,144	$19,769,151	$15,488,173	$38,911,070
2050	$2,112,190	$1,459,337	$20,133,152	$15,288,350	$38,993,029
2051	$2,084,324	$1,403,823	$20,453,714	$15,078,662	$39,020,523
2052	$2,052,257	$1,385,971	$20,696,670	$14,814,692	$38,949,590

[1] Include the estimated benefit payments for the deferred retirees.

GASB 75 Reporting and Disclosure Information for Fiscal Year Ending June 30, 2023

Calculation Details

The following table illustrates the Net OPEB Liability under GASB 75.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) OPEB Liability		
(a) Retired Participants and Beneficiaries Receiving Payment	$ 110,948,587	$ 115,099,850
(b) Active Participants	149,260,658	132,411,122
(c) Total	$ 260,209,245	$ 247,510,972
(2) Plan Fiduciary Net Position	(73,625,008)	(76,411,793)
(3) Net OPEB Liability	$ 186,584,237	$ 171,099,179
(4) Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	28.29%	30.87%
(5) Deferred Outflow of Resources for Contributions Made After Measurement Date	$ 25,064,698	TBD

Expense

The following table illustrates the OPEB expense under GASB 75.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) Service Cost	$ 10,521,825	$ 10,290,320
(2) Interest Cost	14,891,381	18,571,115
(3) Expected Investment Return	(3,549,305)	(5,650,994)
(4) Employee Contributions	0	0
(5) Administrative Expense	30,288	38,622
(6) Plan Changes	0	0
(7) Amortization of Unrecognized		
(a) Liability (Gain)/Loss	1,006,971	56,065
(b) Asset (Gain)/Loss	(1,546,559)	2,149,310
(c) Assumption Change (Gain)/Loss	17,274,178	15,254,326
(8) Total Expense	$ 38,628,779	$ 40,708,764

Shown below are details regarding the calculation of Service, Interest Cost and Expected Investment Return components of the Expense.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) Development of Service Cost:		
(a) Normal Cost at Beginning of Measurement Period	$ 10,521,825	$ 10,290,320
(2) Development of Interest Cost:		
(a) Total OPEB Liability at Beginning of Measurement Period	$ 235,343,271	$ 260,209,245
(b) Normal Cost at Beginning of Measurement Period	10,521,825	10,290,320
(c) Actual Benefit Payments	(7,570,569)	(10,574,698)
(d) Discount Rate	6.15%	7.00%
(e) Interest Cost	$ 14,891,381	$ 18,571,115
(3) Development of Expected Investment Return:		
(a) Plan Fiduciary Net Position at Beginning of Measurement Period	$ 53,014,172	$ 73,625,008
(b) Actual Contributions—Employer	17,170,569	25,064,698
(c) Actual Contributions—Employee	0	0
(d) Actual Benefit Payments	(7,570,569)	(10,574,698)
(e) Administrative Expenses	(30,288)	(38,622)
(f) Other	0	0
(g) Expected Return on Assets	6.15%	7.00%
(h) Expected Return	$ 3,549,305	$ 5,650,994

Reconciliation of Net OPEB Liability

Shown below are details regarding the Total OPEB Liability, Plan Fiduciary Net Position, and Net OPEB Liability for the Measurement Period from June 30, 2021 to June 30, 2022:

	Increase (Decrease)		
	Total OPEB Liability (a)	**Plan Fiduciary Net Position (b)**	**Net OPEB Liability (c) = (a) – (b)**
Balance Recognized at 6/30/2022 (Based on 6/30/2021 Measurement Date)	$ 260,209,245	$ 73,625,008	$ 186,584,237
Changes Recognized for the Fiscal Year:			
Service Cost	$ 10,290,320	N/A	$ 10,290,320
Interest on the Total OPEB Liability	18,571,115	N/A	18,571,115
Changes of Benefit Terms	0	N/A	0
Differences Between Expected and Actual Experience	(9,917,949)	N/A	(9,917,949)
Changes of Assumptions	(21,067,061)	N/A	(21,067,061)
Benefit Payments	(10,574,698)	(10,574,698)	0
Contributions From the Employer	N/A	25,064,698	(25,064,698)
Contributions From the Employee	N/A	0	0
Net Investment Income	N/A	(11,664,593)	11,664,593
Administrative Expense	N/A	(38,622)	38,622
Net Changes	$ (12,698,273)	$ 2,786,785	$ (15,485,058)
Balance Recognized at 6/30/2023 (Based on 6/30/2022 Measurement Date)	$ 247,510,972	$ 76,411,793	$ 171,099,179

Liability (Gain)/Loss

The following table illustrates the liability gain/loss under GASB 75.

		Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1)	OPEB Liability at Beginning of Measurement Period	$ 235,343,271	$ 260,209,245
(2)	Service Cost	10,521,825	10,290,320
(3)	Interest on the Total OPEB Liability	14,891,381	18,571,115
(4)	Changes of Benefit Terms	0	0
(5)	Changes of Assumptions	2,506,034	(21,067,061)
(6)	Benefit Payments	(7,570,569)	(10,574,698)
(7)	Expected OPEB Liability at End of Measurement Period	$ 255,691,942	$ 257,428,921
(8)	Actual OPEB Liability at End of Measurement Period	260,209,245	247,510,972
(9)	OPEB Liability (Gain)/Loss	$ 4,517,303	$ (9,917,949)
(10)	Average Future Working Life Expectancy	10.48	10.43
(11)	OPEB Liability (Gain)/Loss Amortization	$ 431,040	$ (950,906)

Asset (Gain)/Loss

The following table illustrates the asset gain/loss under GASB 75.

		Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1)	OPEB Asset at Beginning of Measurement Period	$ 53,014,172	$ 73,625,008
(2)	Contributions—Employer	17,170,569	25,064,698
(3)	Contributions—Employee	0	0
(4)	Expected Investment Income	3,549,305	5,650,994
(5)	Benefit Payments	(7,570,569)	(10,574,698)
(6)	Administrative Expense	(30,288)	(38,622)
(7)	Other	0	0
(8)	Expected OPEB Asset at End of Measurement Period	$ 66,133,189	$ 93,727,380
(9)	Actual OPEB Asset at End of Measurement Period	73,625,008	76,411,793
(10)	OPEB Asset (Gain)/Loss	$ (7,491,819)	$ 17,315,587
(11)	Amortization Factor	5.00	5.00
(12)	OPEB Asset (Gain)/Loss Amortization	$ (1,498,364)	$ 3,463,117

Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2023 under GASB 75.

	Deferred Outflows	**Deferred Inflows**
(1) Difference Between Actual and Expected Experience	$ 9,260,528	$ 14,309,043
(2) Net Difference Between Expected and Actual Earnings on OPEB Plan Investments	9,671,541	0
(3) Assumption Changes	122,834,998	19,047,209
(4) Sub Total	$ 141,767,067	$ 33,356,252
(5) Contributions Made in Fiscal Year Ending 6/30/2023 After Measurement Date	TBD	N/A
(6) Total	$ TBD	$ 33,356,252

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2023.

Date		Period		Balance		Annual
Established	Type of Base	Original	Remaining	Original	Remaining	Payment
6/30/2022	Liability (Gain)/Loss	10.43	9.43	($9,917,949)	($8,967,043)	(950,906)
6/30/2022	Asset (Gain)/Loss	5.00	4.00	17,315,587	13,852,470	3,463,117
6/30/2022	Assumptions	10.43	9.43	(21,067,061)	(19,047,209)	(2,019,852)
6/30/2021	Liability (Gain)/Loss	10.48	8.48	4,517,303	3,655,223	431,040
6/30/2021	Asset (Gain)/Loss	5.00	3.00	(7,491,819)	(4,495,091)	(1,498,364)
6/30/2021	Assumptions	10.48	8.48	2,506,034	2,027,784	239,125
6/30/2020	Liability (Gain)/Loss	10.54	7.54	(7,467,464)	(5,342,000)	(708,488)
6/30/2020	Asset (Gain)/Loss	5.00	2.00	813,300	325,320	162,660
6/30/2020	Assumptions	10.54	7.54	133,909,170	95,794,605	12,704,855
6/30/2019	Liability (Gain)/Loss	10.63	6.63	2,528,861	1,577,269	237,898
6/30/2019	Asset (Gain)/Loss	5.00	1.00	(55,790)	(11,158)	(11,158)
6/30/2019	Assumptions	10.63	6.63	29,685,609	18,515,109	2,792,625
6/30/2018	Liability (Gain)/Loss	9.45	4.45	4,062,300	1,912,935	429,873
6/30/2018	Asset (Gain)/Loss	5.00	0.00	165,275	0	33,055
6/30/2018	Assumptions	9.45	4.45	11,336,502	5,338,352	1,199,630
6/30/2017	Liability (Gain)/Loss	9.43	3.43	5,814,989	2,115,101	616,648
6/30/2017	Assumptions	9.43	3.43	3,186,806	1,159,148	337,943
	Total Charges				108,410,815	17,459,701

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in the OPEB expense as follows:

Year End June 30:

2024	$ 17,426,646
2025	$ 17,437,804
2026	$ 17,275,145
2027	$ 18,229,395
2028	$ 13,459,572
Thereafter	$ 24,582,253
Total	$108,410,815

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2023.

($ in thousands)

Year Ending June 30 [2]	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Administrative Expenses (d)	Investment Earnings (e)	Ending Fiduciary Net Position [1] (f)
2023	$76,412	$26,859	$12,750	$39	$6,435	$96,916
2024	96,916	20,252	14,312	41	7,700	110,515
2025	110,515	21,258	15,574	43	8,738	124,895
2026	124,895	22,395	16,933	45	9,838	140,150
2027	140,150	23,333	18,071	47	11,005	156,369
2028	156,369	24,065	19,011	49	12,247	173,619
2029	173,619	34,908	20,004	52	13,955	202,426
2030	202,426	36,250	21,256	55	16,177	233,542
2031	233,542	37,416	22,320	58	18,578	267,158
2032	267,158	38,663	23,453	61	21,171	303,479
2033	303,479	39,928	24,596	64	23,973	342,720
2034	342,720	41,205	25,745	67	27,001	385,114
2035	385,114	41,432	26,947	70	30,228	429,757
2036	429,757	40,907	27,824	73	33,612	476,379
2037	476,379	31,062	28,706	76	36,790	515,449
2038	515,449	31,494	29,900	79	39,769	556,734
2039	556,734	33,540	31,237	82	42,976	601,931
2040	601,931	34,525	32,398	85	46,450	650,422
2041	650,422	35,555	33,600	88	50,178	702,468
2042	702,468	36,607	34,818	91	54,180	758,345
2043	758,345	37,428	35,799	94	58,477	818,358
2044	818,358	38,168	36,693	96	63,093	882,830
2045	882,830	38,559	37,231	99	68,052	952,110
2046	952,110	38,970	37,785	102	73,381	1,026,574
2047	1,026,574	39,368	38,319	105	79,110	1,106,628
2048	1,106,628	39,372	38,453	108	85,269	1,192,708
2049	1,192,708	39,709	38,911	111	91,893	1,285,288
2050	1,285,288	39,677	38,993	115	99,017	1,384,874
2051	1,384,874	39,600	39,021	119	106,681	1,492,016
2052	1,492,016	39,432	38,950	123	114,927	1,607,303

[1] (f)=(a) + (b) – (c) – (d) + (e)
[2] Years later than 2052 were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2121.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 7.70% per annum was applied to all periods of projected benefit payments to determine the total OPEB liability as of June 30, 2023 shown earlier in this report, pursuant to paragraph 48 of GASB Statement No. 74 and paragraph 36 of GASB Statement No. 75.

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 7.70% per annum.

2. Projected total contributions are Actuarially Determined Contribution (ADC) and pay-as-you-go. Contributions are assumed to be paid mid-year.

3. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy of normal cost plus 20-year closed period amortization of the 2017 unfunded liability and amortization of subsequent unanticipated changes in actuarial accrued liability over the 15-year period from date established and 5-years for any unexpected asset gains/losses. For funding purposes, implicit subsidy liability and normal cost are not considered.

4. The County has a history of contributing more than the Actuarially Determined Contribution (ADC). We have not recognized contributions in excess of the ADC in the above projection. Allowance for any such contributions would not result in a different discount rate.

5. Projected benefit payments have been determined in accordance with Paragraphs 30-35 of GASB Statement No. 75, and are based on the closed group of active, retired members and beneficiaries as of June 30, 2023. Benefit payments are assumed to be paid mid-year.

6. Administrative expenses are $39,000 for 2023 and are projected with 2.30% inflation. Expenses are assumed to be paid mid-year.

7. Projected investment earnings are based on the assumed investment rate of return of 7.70% per annum.

Discount Rate Sensitivity

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2022:

	1% Decrease (6.00%)	Current Rate (7.00%)	1% Increase (8.00%)
(1) Total OPEB Liability	$ 293,805,430	$ 260,209,245	$ 232,336,700
(2) Plan Fiduciary Net Position	(73,625,008)	(73,625,008)	(73,625,008)
(3) Net OPEB Liability (Asset)	$ 220,180,422	$ 186,584,237	$ 158,711,692

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2023:

	1% Decrease (6.70%)	Current Rate (7.70%)	1% Increase (8.70%)
(1) Total OPEB Liability	$ 277,087,564	$ 247,510,972	$ 222,733,216
(2) Plan Fiduciary Net Position	(76,411,793)	(76,411,793)	(76,411,793)
(3) Net OPEB Liability (Asset)	$ 200,675,771	$ 171,099,179	$ 146,321,423

Healthcare Cost Trend Sensitivity

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2022:

	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	$ 228,588,306	$ 260,209,245	$ 299,177,839
(2) Plan Fiduciary Net Position	(73,625,008)	(73,625,008)	(73,625,008)
(3) Net OPEB Liability (Asset)	$ 154,963,298	$ 186,584,237	$ 225,552,831

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2023:

	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	$ 219,527,294	$ 247,510,972	$ 281,600,147
(2) Plan Fiduciary Net Position	(76,411,793)	(76,411,793)	(76,411,793)
(3) Net OPEB Liability (Asset)	$ 143,115,501	$ 171,099,179	$ 205,188,354

Disclosure—Changes in the Net OPEB Liability and Related Ratios

Changes in the Net OPEB Liability and Related Ratios[1]

	Fiscal Year Ending 2019	2020	2021	2022	2023
Total OPEB Liability					
Service Cost	$ 882,148	$ 1,433,883	$ 2,966,332	$ 10,521,825	$ 10,290,320
Interest Cost	3,446,096	4,583,381	7,282,813	14,891,381	18,571,115
Changes of Benefit Terms	0	0	0	0	0
Differences Between Expected and Actual Experiences	4,062,300	2,528,861	(7,467,464)	4,517,303	(9,917,949)
Changes of Assumptions	11,336,502	29,685,609	133,909,170	2,506,034	(21,067,061)
Benefit Payments	(3,263,258)	(3,500,687)	(4,470,321)	(7,570,569)	(10,574,698)
Net Change in Total OPEB Liability	$ 16,463,788	$ 34,731,047	$ 132,220,530	$ 24,865,974	$ (12,698,273)
Total OPEB Liability (Beginning)	51,927,906	68,391,694	103,122,741	235,343,271	260,209,245
Total OPEB Liability (Ending)	$ 68,391,694	$ 103,122,741	$ 235,343,271	$ 260,209,245	$ 247,510,972
Plan Fiduciary Net Position					
Contributions—Employer	$ 4,263,258	$ 5,500,687	$ 10,070,321	$ 17,170,569	$ 25,064,698
Contributions—Member	0	0	0	0	0
Net Investment Income	2,342,895	2,820,756	2,526,296	11,041,124	(11,664,593)
Benefit Payments	(3,263,258)	(3,500,687)	(4,470,321)	(7,570,569)	(10,574,698)
Administrative Expense	(18,325)	(19,822)	(23,282)	(30,288)	(38,622)
Other	0	0	0	0	0
Net Change in Plan Fiduciary Net Position	$ 3,324,570	$ 4,800,934	$ 8,103,014	$ 20,610,836	$ 2,786,785
Plan Fiduciary Net Position (Beginning)	36,785,654	40,110,224	44,911,158	53,014,172	73,625,008
Plan Fiduciary Net Position (Ending)	$ 40,110,224	$ 44,911,158	$ 53,014,172	$ 73,625,008	$ 76,411,793
Net OPEB Liability (Ending)	$ 28,281,470	$ 58,211,583	$ 182,329,099	$ 186,584,237	$ 171,099,179
Net Position as a Percentage of OPEB Liability	58.65%	43.55%	22.53%	28.29%	30.9%
Covered-Employee Payroll	$ 1,374,752,875	$ 1,399,892,784	$ 1,445,184,896	$1,487,523,641	$ 1,561,286,528
Net OPEB Liability as a Percentage of Payroll	2.06%	4.16%	12.62%	12.54%	10.96%

[1] GASB 75 was effective first for employer fiscal years beginning after June 15, 2017.

Disclosure—Contribution Schedule

Contributions

	2019	2020	2021	2022	2023
Actuarially Determined Contribution [1]	$ 2,141,196	$ 4,254,133	$ 9,061,596	$ 16,339,607	$ 14,108,781
Contributions Made in Relation to the Actuarially Determined Contribution	5,500,687	10,070,321	17,170,569	25,064,698	TBD
Contribution Deficiency (Excess)	$ (3,246,554)	$ (5,816,188)	$ (8,108,973)	$ (8,7,25,091)	TBD
Covered-Employee Payroll	$ 1,399,892,784	$ 1,445,184,896	$ 1,487,523,641	$ 1,561,286,528	TBD
Contributions as a Percentage of Payroll	0.39%	0.70%	1.15%	1.61%	TBD

Notes to Schedule:

Valuation Date: Actuarially Determined Contribution rates are calculated as of June 30, one year prior to the beginning of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

Actuarial Cost Method	Entry Age Normal with amortization of 7/1/2017 unfunded liability over a period ending 6/30/2037 and amortization of subsequent unanticipated changes in liability over 15-year periods and any asset gain/loss over 5-year periods. For funding purposes, implicit subsidy liability and normal cost are not considered.
Asset Valuation Method	Smoothed Market Value
Salary Increases	2.80%
Investment Rate of Return	7.70%, net of OPEB plan investment expense, including inflation.
Retirement Age	Retirement rates developed in the 2021 CalPERS Experience Study
Mortality	Pub-2010 Headcount-Weighted Public Retirement Plans Mortality Tables using Scale MP-2021

[1] Developed based on the prior valuation.

Participant Information

These exhibit summaries contain participant demographic information.

Active Employee Age/Service Distribution

	Years of Service								
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**>35**	**Total**
<25	571	3	0	0	0	0	0	0	574
25-29	1,652	206	6	0	0	0	0	0	1,864
30-34	1,545	937	206	24	0	0	0	0	2,712
35-39	1,193	885	637	415	15	0	0	0	3,145
40-44	856	691	633	812	255	3	0	0	3,250
45-49	634	486	494	665	574	105	4	0	2,962
50-54	470	431	380	495	467	207	50	0	2,500
55-59	308	306	269	324	325	114	95	17	1,758
60-64	147	196	171	190	176	50	29	14	973
>65	45	71	67	56	43	9	10	9	310
Total	7,421	4,212	2,863	2,981	1,855	488	188	40	20,048

Participant Statistics [1]

	Safety Employees	**Miscellaneous Employees**	**Total**
Retirees			
Number of retirees	841	2,187	3,028
Average age	65.2	69.0	67.9
Number of retiree spouses	459	532	991
Actives			
Number of actives	3,476	16,572	20,048
Average age	39.7	43.8	43.1
Average past service (years)	11.6	9.3	9.7

[1] As of July 1, 2022, there are approximately 4,000 deferred retirees are eligible to elect benefits, although are not explicitly included in the participant counts.

Development of GASB 75 Amortization Period for Changes in Liability

	July 1, 2021		July 1, 2022	
Status	2021 Count	Average Future Working Life	2022 Count	Average Future Working Life[1]
Actives	19,750	11.90	20,048	11.81
Retirees[2]	2,781	0.00	3,028	0.00
Total/Weighted Average	22,531	10.43	23,076	10.26

Active Participant Benefit Summary

The table below summarizes the number of participants by bargaining units and the benefits valued. As described in the plan summary and actuarial assumptions sections, certain groups are eligible for PEMHCA benefits not shown in this summary.

Union Code	Description	Bargaining Unit (used to determine contribution)	# Records	2022 Monthly County Contribution*	Health Plan**	CalPERS Retirement Program
CNF	Confidential	Confidential	251	$ 256.00	CalPERS	Misc
LEM	Law Enforcement Management	LEMU	456	$ 149.00	CalPERS	Safety
MGT	Management (General)	Management	1,055	$ 256.00	CalPERS	Misc
MLX	Law Enforcement Exec Staff	LE Exec Staff	15	$ 256.00	CalPERS	Safety
PD7	Public Defender, Prosecution (District Attorney's)	DDAA	403	$ 256.00	CalPERS	Misc
RSA	RSA Law Enforcement	RSA	2,505	$ 25.00	RSA	Safety
RSP	RSA Public Safety	RSA Public Safety	500	$ 149.00	CalPERS	Safety
SE2	SEIU Professional	SEIU	3,439	$ 149.00	CalPERS	Misc
SE8	SEIU Registered Nurses	SEIU	1,275	$ 149.00	CalPERS	Misc
SE9	SEIU Para Professional	SEIU	1,137	$ 149.00	CalPERS	Misc
SES	SEIU Supervisory	SEIU	1,659	$ 149.00	CalPERS	Misc
SPD	SEIU Temporary Assistant	SEIU	2	$ 149.00	CalPERS	Misc
UNC	Unrepresented Confidential	Confidential	139	$ 256.00	CalPERS	Misc
UNR	Unrepresented Management	Management	14	$ 256.00	CalPERS	Misc
UP4	LIUNA Inspection and Technical	LIUNA	1,467	$ 149.00	CalPERS	Misc
UP5	LIUNA Trades, Crafts and Labor	LIUNA	887	$ 149.00	CalPERS	Misc
UP6	LIUNA Supporting Services	LIUNA	4,844	$ 149.00	CalPERS	Misc
		County Total	20,048			

* Other than RSA Law Enforcement, all Bargaining Units are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, DDAA, Management (General), Law Enforcement Executive Staff, Unrepresented Confidential, and Unrepresented management are above the PEMHCA amount, LEMU, RSA Public Safety, SEIU, and LIUNA are at the PEMHCA amount.

** CalPERS designated groups are also eligible to participate in County plans.

Special District (Waste, Parks, and Flood) employees are not included in this valuation.

[1] Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report.
[2] Excludes deferred retirees. Including this group would decrease the Average Future Working Life by 0.5.

Retired Participant Benefit Summary

The table below summarizes the number of current retirees receiving various monthly County contribution amounts:

Age	$25.00	$149.00	$256.00	Total
<40	1	1	1	3
40-44	3	1	0	4
45-49	7	2	2	11
50-54	36	95	20	151
55-59	54	226	83	363
60-64	88	482	140	710
65-69	71	369	194	634
70-74	30	320	171	521
75-79	15	229	106	350
80-84	10	115	43	168
85-89	3	53	11	67
90-95	1	21	17	39
>95	0	5	2	7
Total	319	1,919	790	3,028

Summary of Principal Plan Provisions

The following plan provisions are the basis for the calculations in this actuarial valuation.

1. **Benefit Eligibility**
All employees who retire from active employment within 120 days of separation are eligible for participation. Participants are eligible for service retirement at or after age 50, or disability retirement at an age younger than 50, with at least 5 years of service. Former employees who become eligible for CalPERS pension benefits more than 120 days after separation are not eligible for retiree health benefits.

2. **Benefits / Plans Covered**
The County contributes a portion of an eligible retiree's medical plan premium under a County sponsored health plan (either at retirement or during a subsequent annual enrollment) for the retiree's lifetime. Contributions are based on the employee's bargaining unit at the time of retirement; as follows:

Bargaining Unit at Retirement	***Monthly Contribution***				
	2019	**2020**	**2021**	**2022**	**2023**
Confidential**	$256.00	$256.00	$256.00	$256.00	$256.00
LEMU (Management)*	$136.00	$139.00	$143.00	$149.00	$151.00
MLX (Executive Staff)**	$256.00	$256.00	$256.00	$256.00	$256.00
LIUNA	$25.00	$25.00	$25.00	$149.00	$151.00
Management**	$256.00	$256.00	$256.00	$256.00	$256.00
District Attorneys (DDAA)*	$256.00	$256.00	$256.00	$256.00	$256.00
RSA Law Enforcement	$25.00	$25.00	$25.00	$25.00	$25.00
RSA Public Safety*	$136.00	$139.00	$143.00	$149.00	$151.00
SEIU	$25.00	$139.00	$143.00	$149.00	$151.00
Unrepresented**	$256.00	$256.00	$256.00	$256.00	$256.00

* Other than RSA Law Enforcement, all Bargaining units are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, MLX (Executive Staff), Management, Prosecution (Deputy DAs), and Unrepresented are above the PEMHCA amount, LEMU, RSA Public Safety, SEIU, and LIUNA are at the PEMHCA amount.

** Confidential, MLX (Executive Staff), Management and Unrepresented retired before 11/1/2005 receive a monthly contribution of $128 and after 11/1/2005 receive a monthly contribution of $256.

Future PEMHCA amounts increase at the same rate as Medical CPI. See Appendix A for a projection of the monthly PEMHCA contribution amounts.

RSA – The County contributes $25.00 per month to the RSA Benefit Trust for RSA Law Enforcement retirees. Although the Trust is responsible for providing a benefit with a much larger premium, the County is responsible for the $25.00 monthly contribution and this benefit is included in Plan liabilities.

Implicit Subsidy – Under CalPERS plans, retirees can receive coverage at premium rates that are subsidized due to demographic differences between those receiving benefits and the population used to develop premiums (e.g., blended active and retiree premiums.)

3. **Survivor Coverage Benefits**
Upon the death of the retiree, the eligible surviving spouse receives the same monthly benefit amount for their lifetime.

Actuarial Assumptions and Methods

1. Actuarial Cost Method

The costs shown in the report were developed using the Entry Age Normal cost method.

The Entry Age Normal (EAN) cost method spreads plan costs for each participant from entry date (assuming the plan existed on the employee's hire date) to the expected retirement date. Under the EAN cost method, the plan's normal cost is developed as a level percentage of pay spread over the participants' working lifetime. For this purpose, pay is assumed to increase 2.80% per annum. The AAL is the cumulative value, on the valuation date, of prior service costs. For retirees, the AAL is the present value of all projected benefits.

The Plan costs are derived by making certain specific assumptions as to the rates of interest, mortality, turnover and other demographic events, which are assumed to hold for many years into the future. Actual experience may differ somewhat from the assumptions and the effect of such differences is spread over all periods. Due to these differences, the costs determined by the valuation must be regarded as estimates of the true Plan costs.

2. Funding Policy and Actuarially Determined Contribution (ADC)

The County's funding policy is to contribute the normal cost plus the amortization of unfunded liability based on the following:

- Amortization of the 2017 unfunded liability over the period ending June 30, 2037, plus
- 15-year amortization of subsequent unanticipated changes in liability (i.e., actuarial gains/losses and assumption changes), plus
- 5-year amortization of subsequent unanticipated changes in assets (i.e., asset gains/losses).

The amortization is calculated based on a level percentage of future payroll amounts

Effective July 1, 2020 (ADC for Fiscal Year Ending June 30, 2022), the County elected to exclude the implicit subsidy liability in the funding contribution development.

3. GASB Discount Rate

7.70% - as of 7/1/2022
7.00% - as of 7/1/2021

Under GASB 75, the discount rate is based on a single equivalent rate that reflects a blend of:

- Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants; and
- 20-year, municipal bond yields / index for periods beyond the depletion of the assets.

Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the expected asset return.

4. Funding Discount Rate

7.00% - Funding policy selected by the County

5. Expected Return on Assets

7.70% - Selected by the County based on CalPERS CERBT Asset Allocation Strategy 1.

6. Payroll Increases

2.80% - This is the annual rate at which total payroll is expected to increase and is used in the funding method to calculate the funding contribution as a level percent of payroll.

7. Inflation

2.30% - This is the assumed annual rate of inflation for future years.

For demographic assumptions:

Public Agency Police consists of Law Enforcement Management and Law Enforcement Executive Staff;

Public Agency County Peace Officer consists of RSA Law Enforcement and RSA Public Safety, and;

Miscellaneous consists of all other bargaining units.

8. Mortality

Mortality rates are based on the Pub-2010 headcount-weighted tables for general employees of all income levels, with generational future improvement scale MP-2021. Sample rates for the 2010 base year mortality are as follows:

Age	Male	Female
30	0.05%	0.02%
40	0.08%	0.04%
50	0.18%	0.10%
60	0.38%	0.21%
70	0.82%	0.53%
80	2.03%	1.41%
90	15.78%	12.12%

9. Termination

Termination rates developed in the 2021 CalPERS Experience Study were used in the valuation. The following sample rates are based on age and service:

Public Agency Police and County Peace Officer - Male

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	12.98%	2.69%	1.45%	0.83%	0.00%	0.00%	0.00%
35	12.98%	2.69%	1.45%	0.83%	0.60%	0.00%	0.00%
40	12.98%	2.69%	1.45%	0.83%	0.60%	0.42%	0.00%
45	12.98%	2.69%	1.45%	0.83%	0.60%	0.42%	0.21%
50	12.98%	2.69%	1.45%	0.83%	0.60%	0.42%	0.21%
55	12.98%	1.13%	0.32%	0.00%	0.00%	0.00%	0.00%

Termination (cont.)

Public Agency Police and County Peace Officer - Female

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	13.89%	4.00%	2.46%	1.44%	0.00%	0.00%	0.00%
35	13.89%	4.00%	2.46%	1.44%	1.05%	0.00%	0.00%
40	13.89%	4.00%	2.46%	1.44%	1.05%	0.73%	0.00%
45	13.89%	4.00%	2.46%	1.44%	1.05%	0.73%	0.37%
50	13.89%	4.00%	2.46%	1.44%	1.05%	0.73%	0.37%
55	13.89%	1.28%	0.47%	0.00%	0.00%	0.00%	0.00%

Miscellaneous - Male

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	16.31%	8.04%	3.77%	1.80%	0.00%	0.00%	0.00%
35	14.93%	7.15%	3.66%	1.80%	1.41%	0.00%	0.00%
40	14.90%	6.27%	3.37%	1.80%	1.41%	0.84%	0.00%
45	14.87%	5.62%	3.09%	1.66%	1.41%	0.84%	0.47%
50	15.09%	4.97%	2.45%	1.52%	1.10%	0.84%	0.47%
55	15.30%	4.61%	1.81%	1.19%	0.79%	0.64%	0.47%

Miscellaneous - Female

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	18.24%	10.41%	5.02%	2.52%	0.00%	0.00%	0.00%
35	17.49%	9.25%	4.91%	2.52%	1.75%	0.00%	0.00%
40	17.31%	8.09%	4.46%	2.52%	1.75%	1.08%	0.00%
45	17.13%	7.30%	4.01%	2.13%	1.75%	1.08%	0.56%
50	17.41%	6.50%	3.08%	1.74%	1.31%	1.08%	0.56%
55	17.69%	5.80%	2.15%	1.32%	0.87%	0.76%	0.56%

10. Disability

Disability rates developed in the 2021 CalPERS Experience Study were used in the valuation. Sample rates are as follows:

	Public Agency Police & County Peace Officer		CalPERS Miscellaneous	
Age	Male	Female	Male	Female
25	0.17%	0.17%	0.01%	0.01%
30	0.49%	0.49%	0.02%	0.03%
35	0.81%	0.81%	0.04%	0.07%
40	1.12%	1.12%	0.09%	0.12%
45	1.44%	1.44%	0.15%	0.19%
50	0.00%	0.00%	0.15%	0.19%
55	0.00%	0.00%	0.14%	0.13%

11. Retirement Age

Retirement rates developed in the 2021 CalPERS Experience Study are used in the valuation. Sample rates are provided below.

- Hire date prior to August 24, 2012:
  - Police 3% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 3% @ 60 rates were used for all other employees.
- Hire date August 24, 2012 to December 31, 2012:
  - Police 2% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 60 rates were used for all other employees.
- Hire date post December 31, 2012:
  - Police 2.7% @ 57 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 62 rates were used for all other employees.

Miscellaneous 3% @ 60

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	1.50%	2.00%	2.50%	3.90%	4.00%	4.40%	4.40%
55	13.70%	4.30%	5.10%	6.50%	7.60%	10.80%	13.60%
60	8.10%	8.50%	13.30%	21.50%	28.00%	33.30%	37.80%
65	15.20%	20.10%	26.20%	29.90%	32.30%	32.30%	32.30%
70	24.50%	24.50%	24.50%	24.50%	24.50%	24.50%	24.50%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Miscellaneous 2% @ 60

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	1.00%	1.10%	1.40%	1.40%	1.70%	1.70%	1.70%
55	1.20%	1.60%	2.40%	3.20%	3.60%	3.60%	3.60%
60	6.30%	6.90%	7.40%	9.00%	13.70%	11.60%	12.50%
65	13.80%	16.00%	21.40%	21.60%	23.70%	28.30%	31.30%
70	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Miscellaneous 2% @ 62

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55	1.00%	1.90%	2.80%	3.60%	6.10%	9.60%	15.20%
60	3.10%	5.10%	7.10%	9.10%	11.10%	13.80%	18.30%
65	10.80%	14.10%	17.30%	20.60%	23.90%	30.00%	34.80%
70	12.00%	15.60%	19.30%	22.90%	26.50%	33.30%	38.70%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 3% @ 50

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	12.40%	10.30%	11.30%	14.30%	24.40%	37.60%	43.80%
55	6.90%	7.40%	8.10%	11.30%	20.90%	30.50%	33.60%
60	34.30%	18.00%	15.90%	18.80%	24.70%	24.70%	24.70%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 2% @ 50

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	1.80%	7.70%	5.60%	4.60%	4.30%	4.60%	4.60%
55	0.90%	4.00%	9.90%	15.70%	18.60%	18.60%	18.60%
60	17.70%	17.70%	17.70%	17.70%	17.70%	17.70%	17.70%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 2.7% @ 57

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	11.00%
55	6.80%	6.80%	6.80%	9.10%	13.40%	24.20%	38.80%
60	15.00%	15.00%	15.00%	15.00%	15.00%	22.80%	35.00%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

12. Annual Medical Inflation ("Trend")

County Contribution: PEMHCA amounts have been determined through 2023 ($151.00). After 2023, the PEMHCA amounts will increase at the same rate as the Medical CPI. For valuation purposes, this is assumed to be 4% for all years. This applies to RSA Public Safety, Deputy District Attorney, Law Enforcement Management, Confidential, Management, Executive Staff, and Unrepresented who were assumed to participate in CalPERS Health Benefits programs and receive the PEMHCA amounts.

All other County contributions are assumed to remain at their current level.

For purposes of calculating the implicit subsidy, a medical trend rate assumption was used to develop the projected future medical claim amounts. The medical trend rate represents the long-term expected growth of medical benefits paid by the plan, due to non-age-related factors such as general medical inflation, utilization, new technology, and the like. The following table sets forth the trend assumptions used for the valuation:

Year	Medical	
	Pre Medicare	**Post Medicare**
2021	Actual	Actual
2022	6.45%	1.16%
2023	6.66%	7.44%
2024	6.40%	7.07%
2025	6.13%	6.71%
2026	5.86%	6.35%
2027	5.59%	5.98%
2028	5.32%	5.61%
2029	5.05%	5.24%
2030	4.77%	4.87%
2031+	4.50%	4.50%

The rates shown above for 2022 are the actual increase in premium rates from 2022 to 2023 based on the published 2023 premiums shown below.

13. Monthly Medical Costs (for Implicit Subsidy calculations)

The table below shows 2023 premiums as of the valuation date based on Region 3 (Los Angeles, Riverside, San Bernardino).

Plan	HMO/PPO	Employee Only	Employee & 1 Dep.
Basic			
Anthem Select	HMO	$737.91	$1,475.82
Anthem Traditional	HMO	942.73	1,885.46
Blue Shield Access +	HMO	738.29	1,476.58
Blue Shield Trio	HMO	661.49	1,322.98
Health Net Salud y Más	HMO	606.34	1,212.68
Health Net SmartCare	HMO	755.29	1,510.58
Kaiser	HMO	754.64	1,509.28
PERS Gold	PPO	680.37	1,360.74
PERS Platinum	PPO	992.59	1,985.18
PORAC	PPO	820.00	1,600.00
United Healthcare Alliance	HMO	790.46	1,580.92
United Healthcare Harmony	HMO	713.55	1,427.10
Supplemental/Managed Medicare			
Anthem	HMO	413.59	827.18
Blue Shield	HMO	361.90	723.80
Kaiser	HMO	283.25	566.50
PERS Gold	PPO	392.71	785.42
PERS Platinum	PPO	420.02	840.04
PORAC	PPO	465.00	1,030.00
United Healthcare	PPO	299.68	599.36

Monthly Medical costs were developed by applying age adjustments to the above premiums to reflect the implicit subsidy. These age adjustments are based on statewide information provided by CalPERS (updated in 2020). Single rate age adjustment factors are used for retirees and spouses. A sampling of the factors used is included below:

Aging Factors

Age	HMO Plans	PPO Plans
20	0.32	0.27
30	0.51	0.45
40	0.67	0.60
50	0.99	0.89
60	1.47	1.32
64	1.71	1.54
65	0.78	0.73
70	0.90	0.86
80	1.17	1.14
90+	1.20	1.25

14. Retiree Contributions

Retirees pay the premiums in excess of the County contributions.

15. Dental Benefits

Retirees are eligible for dental benefits if they pay the entire premium. Since dental claims are not assumed to vary with age, costs are expected to be fully paid by retirees and no County liabilities exist.

16. Lapse Rates

The lapse rate represents the annual rate at which retirees elect not to renew coverage. Assumed lapse rates of future and current retirees are included below:

Age	Lapse Rate
50-59	6.5%
60-64	6.5%
65-69	5.0%
70-74	4.0%
75-79	3.5%
80-84	3.0%
85+	0.0%

17. Participants Valued

Only current active and retired participants are directly valued. No future entrants are considered in this valuation except for the participants listed below.

Certain employees who do not immediately elect coverage at retirement are eligible to elect retiree coverage at a later date. Currently, there are approximately 4,000 such deferred retirees. These deferred retirees' liabilities are estimated using recent experience and July 1, 2022 census data. Future deferred election rates are included below:

Age	Election Rate
50-54	3.5%
55-59	6.0%
60-64	10.5%
65-69	4.0%
70+	0.0%

For RSA, it is anticipated that a significant number of retirees will defer benefits to later years. The RSA retiree liability was loaded 15% to account for such current "deferred" retirees that are not included in the census data.

18. Plan Participation

Assumed plan participation rates of future retirees is as set out in the following table:

Health Plan / Benefit Eligibility	Assumed Participation Rate
CalPERS health plans	60% immediate - 95% (57% of total) elect CalPERS Health Plans - 5% (3% of total) elect County Health Plans 20% deferred to age 68
RSA health plans	60% immediate / 20% defer to age 65
County health plans	
$25 per month benefit	10%

These percentages were developed based on a review of the County's recent experience.

Future retirees are assumed to elect health plans in the same proportions as the current allocation

19. Spousal Coverage Assumption

50% of future eligible retirees are assumed to cover their spouses. Males are assumed to be three years older than their female spouses. Current spousal coverage is used for current retirees.

20. Participants Excluded

Special District (Waste, Parks, and Flood) employees, along with active Court members, were not included in this valuation.

21. Changes in Valuation Assumptions

The following assumptions were changed from the prior valuation:

1) Expected return on assets was updated from 7.00% to 7.70%.
2) GASB discount rate was updated from 7.00% to 7.70%, in light of change in expected return assumption. No change in the funding discount rate, 7.00%.
3) Payroll increase was updated from 2.75% to 2.80% per the 2021 CalPERS Experience Study.
4) Inflation rate was updated from 2.50% to 2.30% per the 2021 CalPERS Experience Study.
5) Reflected changes to the Termination Rates, Disability Rates, and Retirement Rates per the 2021 CalPERS Experience Study.
6) The claims table and trend rates were updated to reflect most recent CalPERS monthly premiums available for 2023.

COVID-19 Impacts

Given the events related to COVID-19, we reviewed participant information, as available, including terminations, retirements, and deaths over the year to compare plan experience against the assumptions used in the valuation to determine whether a modification to future assumptions may be warranted. Evaluation of the information provided did not suggest a significant impact to the plan or justify a change to assumptions other than those already used.

Additional assumption analysis is included in the 2022 assumption rationale document.

Appendix A—Comparison of County Contribution to PEMHCA

The following table compares the projected monthly benefit per participant under the current plan to the projected monthly benefit per participant under PEMHCA. The PEMHCA amounts are assumed to increase at the same rate as medical inflation each year after 2023.

	Current Benefits		
Year	**Low - $25/month**	**High - $256/month**	**PEMHCA Benefit**
2022	$25.00	$256.00	$150.00
2023	$25.00	$256.00	$154.02
2024	$25.00	$256.00	$160.18
2025	$25.00	$256.00	$166.59
2026	$25.00	$256.00	$173.25
2027	$25.00	$256.00	$180.18
2028	$25.00	$256.00	$187.39
2029	$25.00	$256.00	$194.88
2030	$25.00	$256.00	$202.68
2031	$25.00	$256.00	$210.79
2032	$25.00	$256.00	$219.22
2033	$25.00	$256.00	$227.99
2034	$25.00	$256.00	$237.11
2035	$25.00	$256.00	$246.59
2036	$25.00	$256.00	$256.45
2037	$25.00	$256.00	$266.71
2038	$25.00	$256.00	$277.38
2039	$25.00	$256.00	$288.48
2040	$25.00	$256.00	$300.02
2041	$25.00	$256.00	$312.02
2042	$25.00	$256.00	$324.50
2043	$25.00	$256.00	$337.48

Appendix B—GASB 75 Expense Estimate for Fiscal Year Ending June 30, 2024

The following table illustrates the estimated OPEB expense under GASB 75 for the Fiscal Year ending June 30, 2024. The amounts shown are estimates based on the results of the July 1, 2022 actuarial valuation and a 7.70% discount rate.

	Fiscal Year Ending 6/30/2024[1]
(1) Service Cost	$ 9,123,000
(2) Interest Cost	19,279,000
(3) Expected Investment Return	(6,424,000)
(4) Employee Contributions	0
(5) Administrative Expense	39,000
(6) Plan Changes	0
(7) Amortization of Unrecognized	
(a) Liability (Gain)/Loss	56,000
(b) Asset (Gain)/Loss	2,116,000
(c) Assumption Change (Gain)/Loss	15,254,000
(8) Total Estimated Expense	$ 39,443,000
(9) Total Expense as a Percentage of Payroll[2]	2.46%

[1] Final FYE 2024 expense information will be provided in the actuarial valuation based on a June 30, 2023 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2022 to June 30, 2023.
[2] Based on estimated payroll.

Appendix C—Pre-65 / Post-65 Breakdown

Alternate breakdown of AAL is shown below to help understand the source of costs. The liabilities shown in this exhibit were calculated using a 7.70% discount rate.

	Pre-65	**Post-65**	**Total**
All Benefits			
County Contribution - Flat Dollar (County & RSA)			
Retirees	$257,638	$576,517	$834,155
Actives	$501,870	$323,441	$825,311
Subtotal	$759,508	$899,958	$1,659,466
County Contribution - CalPERS Benefits			
Retirees	$12,113,308	$58,664,071	$70,777,379
Actives	$20,133,598	$43,444,482	$63,578,080
Subtotal	$32,246,906	$102,108,553	$134,355,459
CalPERS - Implicit Subsidy			
Retirees	$38,726,720	$4,761,596	$43,488,316
Actives	$67,778,301	$229,430	$68,007,731
Subtotal	$106,505,021	$4,991,026	$111,496,047
Total AAL	**$139,511,435**	**$107,999,537**	**$247,510,972**
Number of Retirees as of 7/1/2022 [1]	1,242	3,028	3,028
Number of Actives as of 7/1/2022[1]	19,738	20,048	20,048
AAL Per Retiree [2]	$23,575	$15,920	$25,590
AAL Per Active	$4,479	$2,195	$6,605
Normal Cost			
Flat Dollar (County & RSA)	$47,151	$19,251	66,402
CalPERS Benefits	$1,356,901	$3,379,313	4,736,214
CalPERS - Implicit Subsidy	$4,211,457	$108,969	4,320,426
Total Normal Cost	**$5,615,508**	**$3,507,533**	**$9,123,042**

[1] For purpose of illustrating per participant AAL, counts reflect number of participants eligible for pre-65 and post-65 benefits, respectively. Deferred retirees are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021 and reviewed in 2022.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,300.

Actuarial Valuation Report

County of Riverside

Part-time and Temporary Employees' Retirement Plan

As of July 1, 2022

Empower Results®

Executive Summary

Background

The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under OBRA '90. The Plan is an IRS Section 401(a) defined benefit plan.

The County's current funding policy is to contribute a level percentage of pay based on the sum of

Ongoing accruals

a) Normal Cost with interest and administrative expense, less
b) Expected Employee Contributions

Plus, Amortization of unfunded liabilities

c) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
d) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods.

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

Summary of Results

Funding Contribution

The funding contribution for Fiscal Year Ending (FYE) 2023 is $0 and was developed based on the prior year valuation. The funding contribution for FYE 2024 is $0 and is developed based on the funding policy described in the Background section above and reflecting the funded status of the plan.

Although the funding contribution methodology results in a current and near term $0 contribution amount, the plan has a shortfall and hence, the County may wish to consider an alternative funding amount.

The current policy amortizes assets and liabilities experience over different periods, which results in a negative net amortization in the next few years, switching to highly positive net amortization amounts after 2028. This negative amortization is larger than the cost of accruals, resulting in a $0 contribution.

An alternative amortization of the UAAL, which uses a single 15-year amortization period would address the volatility in the 5-year/15-year amortization amounts under the current policy and address the plan's current funded status. In addition, due to the high turnover of this plan's participants, the County may want to base the contribution amount (as a % of pay) on the total expected payroll for the year, rather than just a snapshot of the compensation earned for the active population as of the valuation date.

Application of the 15-year amortization period leads to a contribution of 3.21% of total expected payroll. More information regarding both the standard and alternative funding scenarios is provided in the Development of Funding Contribution section of the report.

GASB 68

This valuation is based on census data provided as of July 1, 2022 for the purpose of providing GASB 68 financial statement information, including expense, for FYE June 30, 2023. The final FYE June 30, 2023 expense/(income) is $2,297,369, which is higher than that estimated in the prior valuation due to a large asset loss during FYE 2022 offset by higher than expected employee contributions.

The estimated FYE 2024 expense is $4,676,000. The increase from FYE 2023 expense is a result of higher service cost, lower expected return on assets (due to the lower asset value) and a higher employee contribution. The final FYE 2024 expense will be updated to reflect actual cash flows, actual employee contributions and any unexpected gains or losses on the assets and liability during the measurement period ending June 2023.

The measurement date for results shown in this valuation report is June 30, 2022.

ASOP 51

In September 2017, the Actuarial Standards Board (ASB) introduced Actuarial Standard of Practice (ASOP) No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*, which is effective for any actuarial work product with a measurement date on or after November 1, 2018. This ASOP provides guidance to actuaries with regard to the assessment and disclosure of the risk that actual future measurements may differ significantly from expected future measurements. Examples of future measurements include pension liabilities, actuarially determined contributions, and funded status. A report that addresses the requirements of ASOP 51 will be provided in a report separate to these valuation results.

Comparison to Prior Valuation

The purpose of the actuarial valuation of the Plan is to:

- Determine the Plan's funded status and annual costs; and
- Provide information for Government Accounting Standards Board financial statement disclosure.

The following table summarizes the current valuation results as of July 1, 2022, compared to prior year results:

	July 1, 2021	July 1, 2022
Active participant count	1,809	2,282
Funding Contribution		
Discount Rate	6.00%	6.00%
Actuarial accrued liability (Projected Unit Credit):	$ 64,932,752	$ 68,929,174
Actuarial Value of Assets	52,938,998	56,250,845
Unfunded liability	$ 11,993,754	$ 12,678,329
Funded percentage	81.5%	81.6%
Actuarially Determined Contribution (ADC), FYE 2023 / 2024	$ 0	$ 0
Expected Total Participant Compensation FYE 2023/2024	$ 63,865,680	$ 59,401,603
Contribution as a Percentage of Compensation	0.00%	0.00%
Alternative Contribution	N/A	3.21%
GASB 68 Expense		
Discount Rate	6.00%	6.00%
Total Pension Liability (Entry Age Normal):	$ 59,915,382	$ 61,184,393
Plan Fiduciary Net Position	61,424,642	51,015,884
Net Pension Liability	$ (1,509,260)	$ 10,168,509
GASB 68 Annual Pension Expense/(Income), FYE 2023 final / 2024 estimate	$ 2,297,369	$ 4,676,000

Overall, the plan's funded status for funding purposes was relatively similar to last year; however, the GASB 68 funded status deteriorated, and Net Pension Liability increased significantly from the prior valuation. The primary reason for these differing results is the asset loss, which gets spread over five years with the asset smoothing under the funding method but recognized immediately for GASB accounting purposes. Overall, the following offsetting factors impacted plan results:

- Assets were lower than expected due to unfavorable investment return on plan assets (-17.4% actual compared to 6.0% assumed);
- Demographic experience was different than expected, primarily due to fewer active terminations than expected and a large number of actives transferring to full-time, resulting in a net liability gain;
- Retirement and Termination assumptions were updated to reflect results from the 2021 CalPERS Assumption study, resulting in small increases in liabilities;

- Large number of lump sum payments made in FYE 2022 at a lower interest rate than the long term assumed rate, resulting in a liability loss;
- The salary increase assumption was updated from 2.75% to 2.80%, resulting in a small increase in liabilities.

Projected Funding Status

80% Funded Status

The County's target is to maintain an 80% funded status for the plan. The funded status as of July 1, 2022 is above 80% and is projected to be above 80% in future years.

Projected Actuarial Accrued Liability (AAL), 6/30/2023	$ 70,192,248
Projected Actuarial Value of Assets, 6/30/2023	55,095,958
Funding Shortfall, 6/30/2023	$ 10,478,689
Projected Funded Status, 6/30/2023	85.1%

90% Funded Status

The County also requested review of maintaining an alternative 90% funded status for the Plan. The valuation projects the Plan to be under 90% funded based on the cost method used for funding, as shown below.

Projected Actuarial Accrued Liability (AAL), 6/30/2023	$ 70,192,248
Projected Smoothed Value of Assets, 6/30/2023	59,713,559
Funding Shortfall, 6/30/2023	$ 10,478,689
Projected Funded Status, 6/30/2023	85.1%
Shortfall to achieve 90% as of 6/30/2023	$ 3,459,464
Additional funding in FYE 2023 to achieve 90% as of 6/30/2023[1]	$ 3,360,128

[1] Assumes funding on 1/1/2023 and is in addition to the FYE 2023 County contribution of 0% of pay.

The table below summarizes the estimated contribution projected in order to attain 90% at various future dates. The total contributions include the fiscal year ending June 30, 2023 contribution rate of 0%, the June 30, 2024 ADC rate plus the additional amount to attain 90% funded status by the target funding date.

	Additional Payment to Fund 90% by Target Date		Total Contribution to Fund 90% by Target Date	
90% Target Funding Date	**Annual Payment in FYE 2024[1]**	**% of Pay**	**Annual Payment in FYE 2024[1,2]**	**% of Pay[2]**
6/30/2024	$10,274,906	17.30%	$10,274,906	17.30%
6/30/2025	$6,894,718	11.61%	$6,894,718	11.61%
6/30/2026	$6,834,164	11.51%	$6,834,164	11.51%
6/30/2027	$5,442,171	9.16%	$5,442,171	9.16%
6/30/2028	$4,600,033	7.74%	$4,600,033	7.74%
6/30/2029	$3,315,679	5.58%	$3,315,679	5.58%
6/30/2030	$2,412,474	4.06%	$2,412,474	4.06%
6/30/2031	$1,746,164	2.94%	$1,746,164	2.94%
6/30/2032	$1,236,989	2.08%	$1,236,989	2.08%
6/30/2033	$838,225	1.41%	$838,225	1.41%

[1] Contributions shown for FYE 2024 are assumed to be made throughout the year based on a level percent of pay and are therefore assumed to increase at 2.80% per year from FYE 2024 to the target funding date.
[2] Includes current FYE 2024 contribution of $0 (0% of pay).

For example, to attain 90% funded by FYE 2025 the County would need to contribute approximately $6.9M in FYE 2024 in addition to the current ADC contributions of $0M in FYE 2024, plus $7.3M ($6.9M with interest) in FYE 2025.

* * *

This July 1, 2022 valuation is based on census data provided as of June 30, 2022 for the purpose of providing GASB 68 financial statement information, including final expense for the fiscal year ending June 30, 2023, estimated expense for fiscal year ending June 30, 2024 and the funding contribution amount for the fiscal year ending June 30, 2024.

The following report provides details of the results summarized above and the disclosure information for fiscal year ending 2023.

Table of Contents

Actuarial Valuation Certification

This report documents the results of the July 1, 2022 actuarial valuation for the County of Riverside Part-time and Temporary Employee's Retirement Plan. The information provided in this report is intended strictly for documenting the development of the Funding Contribution and disclosure items under Governmental Accounting Standards Board (GASB) Statements No. 68.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 68 (GASB 68) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors.

A valuation model was used to develop the liabilities for the June 30, 2022 valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the County of Riverside Part-time and Temporary Employee's Retirement Plan.

A model was used to develop the appropriate GASB discount rate. The undersigned relied on experts within Aon for the development of the capital market assumptions and the model underlying the expected rate of return.

The valuation model outputs various cost scenarios. The "1% increase" and "1% decrease" interest rate scenarios vary only the discount rate assumption, in order to illustrate the impact of a change in that assumption in isolation. In practice, certain other assumptions, such as the expected or realized asset returns, would also be expected to vary when the discount rate changes. Therefore, the output from these scenarios should be used solely for assessing the impact of the discount rate in isolation and may not represent a realistic set of results for other purposes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to (but not limited to) such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions
- Changes in actuarial methods or in economic or demographic assumptions
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period)
- Changes in plan provisions or applicable law

Due to the limited scope of this valuation report, we have not included an analysis of the potential range of such future measurements. However, an assessment and disclosure of risks pertaining to the funding valuation as required by the actuarial standards of practice is being provided in a separate report.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results. We have relied on actual and expected contributions as summarized within this report.

Actuarial computations under GASB are for purposes of fulfilling plan and employer accounting requirements. The calculations reported herein have been made on a basis consistent with our understanding of these accounting standards. Determinations for purposes other than meeting Employer financial accounting requirements may be different from these results.

This report is intended for the sole use of the County of Riverside. It is intended only to supply information for the County of Riverside to comply with the stated purpose of the report and may not be appropriate for other business purposes. Reliance on information contained in this report by anyone for other than the intended purposes, puts the relying entity at risk of being misled because of confusion or failure to understand applicable assumptions, methodologies, or limitations of the report's conclusions. Accordingly, no person or entity, including the County of Riverside, should base any representations or warranties in any business agreement on any statements or conclusions contained in this report without the written consent of Aon.

Funded status measurements shown in this report may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for the employer and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions.

In determining the annual expense and Funding Contribution for the County of Riverside Part-time and Temporary Employees' Retirement Plan and information relating to plan disclosure and reporting requirements, Aon may be assisting the appropriate plan fiduciary as it performs tasks that are required for the administration of an employee benefit plan. Aon also may be consulting with the employer/plan sponsor (County of Riverside) as it considers alternative strategies for funding the plan, or as it evaluates information relating to employer reporting requirements. Thus, Aon potentially will be providing assistance to County of Riverside (and/or certain of its employees) acting in a fiduciary capacity (for the benefit of plan participants and beneficiaries) and to County of Riverside (and/or its executives) acting in a settlor capacity (for the benefit of the employer sponsoring the County of Riverside Part-time and Temporary Employees' Retirement Plan).

The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to the County of Riverside has any material direct or indirect financial interest in the County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for the County of Riverside.

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November 2022

Summary of Liabilities

This exhibit shows the plan liabilities as of July 1, 2022 based on census data provided by the County as of June 30, 2022 and the Summary of Plan Provisions and Summary of Actuarial Assumptions described in this report.

The Actuarial Accrued Liability (AAL) is the portion of the actuarial present value of all future benefits to be paid to current plan participants that is attributable to past service.

GASB 68 prescribes use of the Entry Age Normal (EAN) cost method for development of expense and disclosure information. For funding contributions, the Projected Unit Credit (PUC) cost method is used to maintain a more stable contribution level for this plan that experiences high turnover rates.

	Funding Contributions	GASB 68
Cost Method	PUC	EAN
Discount Rate	6.00%	6.00%
Actuarial Accrued Liability (AAL), as of July 1, 2022		
Retirees and Beneficiaries	$ 15,248,318	$ 15,248,319
Deferred Vested Terminated	24,003,797	24,003,797
Active Participants		
Part-Time Actives	7,668,682	7,490,720
Full-Time Actives[1]	22,008,377	14,441,557
Subtotal Actives	29,677,059	21,932,277
Total	$ 68,929,174	$ 61,184,393
Normal (Service) Cost, as of July 1, 2022	$ 980,814	$ 2,012,827

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

Summary of Plan Assets

This exhibit develops the asset values used in the valuation.

Statement of Invested Plan Assets as of June 30, 2022	**2022**
1. Mutual Funds – Equity	$ 34,805,949
2. Mutual Funds – Fixed Income	15,473,887
3. Cash and Equivalents (including receivables)	736,048
4. Total Assets held in Trust for Pension Benefits	$ 51,015,884
Reconciliation of Plan Assets	
1. Market Value of Assets at beginning of Plan Year	$ 61,424,642
2. Employer Contributions	3,140,160
3. Employee Contributions	2,107,867
4. Net Investment Income	(10,678,121)
5. Benefit Payments	(4,553,205)
6. Administrative Expenses	(425,459)
7. Market Value of Assets at end of Plan Year	$ 51,015,884
Rate of Return for 2021/2022 Plan year (net of expenses)	(17.35%)
Development of (Gain)/Loss	
1. Expected Investment Earnings (assumed 6.00%)	$ 3,693,443
2. Actual Investment Earnings	(10,678,121)
3. (Gain)/Loss on Assets (1)-(2)	$ 14,371,564
Actuarial Value of Assets as of June 30, 2022	
1. Market Value of Assets at end of Plan Year	$ 51,015,884
2. Unrecognized (Gain)/Loss[1]	5,234,961
3. Preliminary Actuarial Value of Assets at end of Plan Year (1)+(2)	$ 56,250,845
4. Lower Corridor (80% of Market Value)	$ 40,812,707
5. Upper Corridor (120% of Market Value)	$ 61,219,061
6. Actuarial Value of Assets	$ 56,250,845

[1] Schedule of the Current and Prior Asset (Gains)/Losses as of June 30, 2022.

Date Established	**Original (Gain)/Loss**	**Years Remaining as of 06/30/2022**	**Amount Recognized**	**Total Amount Unrecognized**
7/1/2022	$ 14,371,564	4	$ 2,874,313	$ 11,497,251
7/1/2021	(11,287,727)	3	(4,515,090)	(6,772,637)
7/1/2020	997,436	2	598,461	398,975
7/1/2019	556,864	1	445,492	111,372
Total	$ 4,638,137		$ (596,824)	$ 5,234,961

Summary of Funded Status

The Plan's funded status as of July 1, 2022 is developed based on the Actuarial Accrued Liability determined using the Projected Unit Credit methodology and the smoothed value of Plan assets.

The following table shows the development of the Plan's funded status as of July 1, 2022:

Funding Methodology	Projected Unit Credit
Discount Rate	6.00%
Actuarial Accrued Liability	$ 68,929,174
Actuarial Value of Plan Assets	56,250,845
Unfunded Liability	$ 12,678,329
Funded Percentage	81.6%

Development of Funding Contribution

The County's current funding policy is to contribute an amount equal to a level percentage of pay. Note the determination developed below assumes a constant active population over which the unfunded liabilities are amortized. The funding contribution is based on the sum of:

Ongoing accruals

a) Normal Cost with interest and administrative expense, less
b) Expected Employee Contributions

Plus, Amortization of unfunded liabilities

c) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
d) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods.

The following table shows the development of the funding contribution as a level percentage of payroll, assuming middle of year payment, for the FYE June 30, 2024:

Funding Contribution, FYE June 30, 2024	Total Amount	% of Pay
Ongoing Accruals[1]		
Projected Normal Cost (including expense), plus interest	$ 1,370,398	5.52%
Expected Employee Contributions During Plan Year ending 6/30/2024	(931,578)	(3.75%)
Ongoing Accrual Contribution	$ 438,820	1.77%
Amortization of Unfunded Liabilities[1]		
7/1/2017 Unfunded Actuarial Accrued Liabilities, plus interest	$ 609,180	2.45%
Subsequent Unfunded Actuarial Accrued Liabilities, plus interest	(1,067,340)	(4.30%)
Amortization Contribution	$ (458,160)	(1.84%)
Funding Policy Contribution (Ongoing plus Amortization)	**$ 0**	**0.00%**
Considerations for % of Pay Alternatives		
Ongoing Accrual Contribution		1.77%
Alternative Amortization of UAAL over 15 years	$ 858,228	1.44%
Alternative Funding Contribution		**3.21%**

[1]Developed based on estimated compensation for FYE 2022 active population, $24,842,082

We understand the County makes plan contributions based on the percentage of pay determined above. To the extent actual funding differs from dollar ***amount*** anticipated, the variation will be reflected in future contribution levels through amortization of unexpected changes in the UAAL.

Discussion of % of Pay Alternatives

Due to the high turnover of this plan's participants, a snapshot of the compensation earned for the active population as of the valuation date does not:

a) reflect a full year of compensation for those hired in the last year, and
b) account for any participants who join and leave the plan during the same plan year.

For example, in 2022 the total compensation earned by all active participants at any time in FYE 2022 was $56,209,787, whereas the total compensation earned by those that were still active as of July 1, 2022 was only $23,507,247. Since the County will apply this % of pay to all earnings next year, it may be appropriate to calculate the funding % as a % of the total payroll.

The ongoing funding contribution of 1.77% represents the cost of benefits accruing in the next year for current actives but may be appropriate for the cost of accruals for any new hires. Any variation will be reflected in future contribution levels.

The Alternative Amortization of the UAAL, 1.44%, is based on the % of pay reflecting the total expected earnings for all participants in FYE 2023 (i.e., expected payroll of $59.4M). In addition, the alternative applies a single 15-year amortization period to the UAAL as a threshold to address potential volatility in the 5-year/15-year amounts under the current policy (e.g., current policy: $460K loss in FYE 2024 and $2.3M gain in FYE 2028).

Liability (Gain)/ Loss

The following table shows the development of the liability (gain)/loss as of June 30, 2022.

Liability as of June 30, 2021	$	64,932,752
Service Cost		1,212,570
Interest on Liability		3,832,123
Plan Change		0
Assumption Changes		45,224
Benefit Payments		(4,553,205)
Expected Liability as of June 30, 2022	$	65,469,464
Actual Liability as of June 30, 2022		68,929,174
FYE 2022 Liability (gain)/loss	$	3,459,710

Asset (Gain)/Loss

The following table shows the development of the asset (gain)/loss as of June 30, 2022.

Market Value of Assets (MVA) as of June 30, 2021	$	61,242,642
Expected Contributions		2,588,487
Expected Expenses		(425,459)
Benefit Payments		(4,553,205)
Expected Return on Assets (based on 6%)		3,618,527
Expected MVA as of June 30, 2022	$	62,778,451
Projected Unrecognized (gain)/loss as of June 30, 2022[1]		(6,262,290)
Expected Actuarial Value of Assets (AVA) as of June 30, 2022		56,516,161
Actual Actuarial Value of Assets as of June 30, 2022		56,250,845
FYE 2022 AVA Asset (gain)/loss[2]	$	265,316

[1] Projected based on 2019, 2020 and 2021 unrecognized (gain)/loss for 2022, see page 5

[2] Includes investment performance, differences in contributions and expenses from expected, and interest

Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability as of July 1, 2023. Amortization of bases is first recognized in the fiscal year subsequent to the year established.

Date Established	Type of Base	Original Period	Remaining Period as of June 30, 2023	Original Balance	Balance Remaining as of June 30, 2023	Amortization Recognized in FYE June 30, 2024
6/30/2022	Liability (Gain)/Loss	15	15	$ 3,459,710	$ 3,667,292	$ 300,360
6/30/2022	Assets (Gain)/Loss[1]	5	5	(10,555,896)	(11,189,250)	(2,377,106)
6/30/2022	Assumptions	15	15	45,224	47,937	3,926
6/30/2021	Liability (Gain)/Loss	15	14	4,020,672	4,146,465	358,734
6/30/2021	Assumptions	15	14	124,057	127,938	11,069
6/30/2020	Liability (Gain)/Loss	15	13	645,612	644,520	59,199
6/30/2020	Assumptions	15	13	(273,516)	(273,054)	(25,080)
6/30/2019	Liability (Gain)/Loss	15	12	2,675,755	2,570,734	252,155
6/30/2019	Assumptions	15	12	2,564,505	2,463,846	241,671
6/30/2018	Liability (Gain)/Loss	15	11	1,628,720	1,495,575	157,740
6/30/2018	Assumptions	15	11	(67,964)	(62,410)	(6,582)
6/30/2017	7/1/2017 UAAL	20	14	8,013,534	6,839,095	591,688
				$12,280,412	$10,478,689	$ (432,226)

[1] Re-established amount includes prior outstanding Asset (Gain)/Loss bases established prior to 6/30/2022 (gain of $9,374,852), FYE 2022 AVA Asset (Gain)/Loss developed above ($265,316 loss) plus other adjustments to reflect funded status.

Development of GASB 68 Net Pension Expense

Calculation Details

The expense amounts shown below have been prepared for GASB 68 reporting purposes for the fiscal year ending June 30, 2023 based on a Valuation Date of July 1, 2022 and Measurement period of July 1, 2021 to June 30, 2022.

The following table illustrates the Net Pension Liability under GASB 68.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) Pension Liability		
(a) Retired Participants and Beneficiaries Receiving Payment	$ 13,096,908	$ 15,248,319
(b) Terminated Vested	24,250,164	24,003,797
(c) Active Participants		
(i) Part-time Actives	12,723,806	7,490,720
(ii) Full-time Actives	9,844,504	14,441,557
(iii) Active Subtotal	$ 22,568,309	$ 21,932,277
(f) Total	$ 59,915,382	$ 61,184,393
(2) Plan Fiduciary Net Position	61,424,642	51,015,884
(3) Net Pension Liability	$ (1,509,260)	$ 10,168,509
(4) Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	102.52%	83.38%
(5) Deferred Outflow of Resources for Contributions Made After Measurement Date	$ 3,140,160	TBD

Expense

The following table illustrates the Pension expense under GASB 68.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) Service Cost	$ 1,099,119	$ 1,621,033
(2) Interest Cost	3,289,615	3,557,579
(3) Expected Investment Return	(2,780,799)	(3,693,443)
(4) Employee Contributions	(2,268,481)	(2,107,867)
(5) Administrative Expense	290,416	425,459
(6) Other	0	0
(7) Plan Changes	0	0
(8) Amortization of Unrecognized		
(a) Liability (Gain)/Loss	1,395,869	1,344,429
(b) Asset (Gain)/Loss	(2,694,075)	650,959
(c) Assumption Change (Gain)/Loss	506,623	499,220
(9) Total Expense	$ (1,161,713)	$ 2,297,369

Shown below are details regarding the calculation of Service Cost, Interest Cost and Expected Investment Return components of the Expense.

	Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1) Development of Service Cost:		
(a) Normal Cost at Beginning of Measurement Period	$ 1,099,119	$ 1,621,033
(2) Development of Interest Cost:		
(a) Total Pension Liability at Beginning of Measurement Period	$ 54,846,295	$ 59,915,382
(b) Normal Cost at Beginning of Measurement Period	1,099,119	1,621,033
(c) Actual Benefit Payments	(2,270,047)	(4,553,205)
(d) Discount Rate	6.00%	6.00%
(e) Interest Cost	$ 3,289,615	$ 3,557,579
(3) Development of Expected Investment Return:		
(a) Plan Fiduciary Net Position at Beginning of Measurement Period	$ 45,366,169	$ 61,424,642
(b) Actual Contributions—Employer	2,281,929	3,140,160
(c) Actual Contributions—Employee	2,268,481	2,107,867
(d) Actual Benefit Payments	(2,270,047)	(4,553,205)
(e) Administrative Expenses	(290,416)	(425,459)
(f) Other	0	0
(g) Expected Return on Assets	6.00%	6.00%
(h) Expected Return	$ 2,780,799	$ 3,693,443

Reconciliation of Net Pension Liability

Shown below are details regarding the Total Pension Liability, Plan Fiduciary Net Position, and Net Pension Liability for the Measurement Period from July 1, 2021 to July 1, 2022:

	Increase (Decrease)		
	Total Pension Liability (a)	**Plan Fiduciary Net Position (b)**	**Net Pension Liability (c) = (a) – (b)**
Balance Recognized at 6/30/2022 (Based on 7/1/2021 Measurement Date)	$ 59,915,382	$ 61,424,642	$ (1,509,260)
Changes Recognized for the Fiscal Year:			
Service Cost	$ 1,621,033	N/A	$ 1,621,033
Interest on the Total Pension Liability	3,557,579	N/A	3,557,579
Changes of Benefit Terms	0	N/A	0
Differences Between Expected and Actual Experience	704,676	N/A	704,676
Changes of Assumptions	(61,072)	N/A	(61,072)
Benefit Payments	(4,553,205)	(4,553,205)	0
Contributions From the Employer	N/A	3,140,160	(3,140,160)
Contributions From the Employee	N/A	2,107,867	(2,107,867)
Net Investment Income	N/A	(10,678,121)	10,678,121
Administrative Expense	N/A	(425,459)	425,459
Other	N/A	0	0
Net Changes	$ 1,269,011	$ (10,408,758)	$ 11,677,769
Balance Recognized at 6/30/2023 (Based on 7/1/2022 Measurement Date)	$ 61,184,393	$ 51,015,884	$ 10,168,509

Liability (Gain)/Loss

The following table illustrates the liability gain/loss under GASB 68.

		Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1)	Pension Liability at Beginning of Measurement Period	$ 54,846,295	$ 59,915,382
(2)	Service Cost	1,099,119	1,621,033
(3)	Interest on the Total Pension Liability	3,289,615	3,557,579
(4)	Changes of Benefit Terms	0	0
(5)	Changes of Assumptions	118,669	(61,072)
(6)	Benefit Payments	(2,270,047)	(4,553,205)
(7)	Expected Pension Liability at End of Measurement Period	$ 57,083,651	$ 60,479,717
(8)	Actual Pension Liability at End of Measurement Period	59,915,382	61,184,393
(9)	Pension Liability (Gain)/Loss	$ 2,831,731	$ 704,676
(10)	Average Future Working Life Expectancy	9.04	8.25
(11)	Pension Liability (Gain)/Loss Amortization	$ 313,245	$ 85,415

Asset (Gain)/Loss

The following table illustrates the asset gain/loss under GASB 68.

		Fiscal Year Ending 6/30/2022	Fiscal Year Ending 6/30/2023
(1)	Pension Asset at Beginning of Measurement Period	$ 45,366,169	$ 61,424,642
(2)	Contributions—Employer	2,281,929	3,140,160
(3)	Contributions—Employee	2,268,481	2,107,867
(4)	Expected Investment Income	2,780,799	3,693,443
(5)	Benefit Payments	(2,270,047)	(4,553,205)
(6)	Administrative Expense	(290,416)	(425,459)
(7)	Other	0	0
(8)	Expected Pension Asset at End of Measurement Period	$ 50,136,915	$ 65,387,448
(9)	Actual Pension Asset at End of Measurement Period	61,424,642	51,015,884
(10)	Pension Asset (Gain)/Loss	$ (11,287,727)	$ 14,371,564
(11)	Amortization Factor	5.00	5.00
(12)	Pension Asset (Gain)/Loss Amortization	$ (2,257,545)	$ 2,874,313

Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2023 under GASB 68.

	Deferred Outflows	Deferred Inflows
(1) Difference Between Actual and Expected Experience	$ 5,523,605	$ 247,684
(2) Net Difference Between Expected and Actual Earnings on Pension Plan Investments	5,234,961	0
(3) Assumption Changes	1,915,230	485,697
(4) Sub Total	$ 12,673,796	$ 733,381
(5) Contributions Made in Fiscal Year Ending 6/30/2023 After Measurement Date	TBD	N/A
(6) Total	$ TBD	$ 733,381

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2023.

Date		Period		Balance		Annual
Established	Type of Base	Original	Remaining	Original	Remaining	Payment
6/30/2022	Liability (Gain)/Loss	8.25	7.25	$ 704,676	$ 619,261	$ 85,415
6/30/2022	Asset (Gain)/Loss	5.00	4.00	14,371,564	11,497,251	2,874,313
6/30/2022	Assumption Change	8.25	7.25	(61,072)	(53,669)	(7,403)
6/30/2021	Liability (Gain)/Loss	9.04	7.04	2,831,731	2,205,241	313,245
6/30/2021	Asset (Gain)/Loss	5.00	3.00	(11,287,727)	(6,772,637)	(2,257,545)
6/30/2021	Assumption Change	9.04	7.04	118,669	92,415	13,127
6/30/2020	Liability (Gain)/Loss	9.31	6.31	(365,443)	(247,684)	(39,253)
6/30/2020	Asset (Gain)/Loss	5.00	2.00	997,436	398,975	199,487
6/30/2020	Assumption Change	9.31	6.31	(258,607)	(175,276)	(27,777)
6/30/2019	Liability (Gain)/Loss	8.78	4.78	2,732,087	1,487,399	311,172
6/30/2019	Asset (Gain)/Loss	5.00	1.00	556,864	111,372	111,373
6/30/2019	Assumption Change	8.78	4.78	2,985,149	1,625,173	339,994
6/30/2018	Liability (Gain)/Loss	8.07	3.07	1,620,937	616,637	200,860
6/30/2018	Asset (Gain)/Loss	5.00	0.00	(1,383,353)	0	(276,669)
6/30/2018	Assumption Change	8.07	3.07	39,510	15,030	4,896
6/30/2017	Liability (Gain)/Loss	7.97	1.97	1,456,980	360,132	182,808
6/30/2017	Assumption Change	7.97	1.97	(746,218)	(184,450)	(93,628)
6/30/2016	Liability (Gain)/Loss	7.97	0.97	1,524,469	185,537	191,276
6/30/2016	Assumption Change	7.97	0.97	(594,082)	(72,302)	(74,540)
6/30/2015	Liability (Gain)/Loss	8.53	0.53	795,023	49,398	93,203
6/30/2015	Assumption Change	8.53	0.53	2,939,020	182,612	344,551
6/30/2014	Liability (Gain)/Loss	8.04	0.00	1,146,168	0	5,703
	Total Charges			$ 20,123,781	$ 11,940,415	$ 2,494,608

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to Pension will be recognized in the Pension expense as follows:

Year End June 30:

2024	$ 2,556,328
2025	2,097,034
2026	1,811,042
2027	3,877,231
2028	845,262
Thereafter	753,518
Total	$ 11,940,415

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2023.

($ in thousands)

Year Ending June 30[2]	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Administrative Expenses (d)	Investment Earnings (e)	Ending Fiduciary Net Position[1] (f)
2023	$51,147	$1,832	$3,235	$309	$3,019	$52,454
2024	52,454	1,730	3,190	318	3,095	53,771
2025	53,771	1,558	3,231	327	3,168	54,939
2026	54,939	1,486	3,410	335	3,230	55,911
2027	55,911	1,470	3,527	343	3,284	56,795
2028	56,795	2,701	3,704	352	3,369	58,809
2029	58,809	2,753	3,846	361	3,487	60,843
2030	60,843	2,817	3,939	370	3,608	62,958
2031	62,958	2,888	3,999	379	3,735	65,202
2032	65,202	2,963	4,112	389	3,868	67,533
2033	67,533	3,043	4,197	399	4,007	69,987
2034	69,987	2,915	4,341	410	4,146	72,296
2035	72,296	2,287	4,436	421	4,263	73,988
2036	75,681	2,300	4,536	433	4,361	75,681
2037	75,681	1,868	4,662	444	4,446	76,889
2038	76,889	1,929	4,733	456	4,518	78,147
2039	78,147	2,001	4,821	468	4,592	79,451
2040	79,451	2,022	4,896	481	4,669	80,765
2041	80,765	2,130	5,085	494	4,745	82,062
2042	82,062	2,215	5,138	507	4,823	83,456
2043	83,456	2,212	5,186	520	4,905	84,867
2044	84,867	2,390	5,232	533	4,993	86,485
2045	86,485	2,403	5,319	547	5,088	88,109
2046	88,109	2,491	5,348	562	5,187	89,877
2047	89,877	2,572	5,499	577	5,290	91,664
2048	91,664	2,657	5,528	593	5,399	93,599
2049	93,599	2,724	5,563	609	5,515	95,666
2050	95,666	2,811	5,670	626	5,638	97,818
2051	97,818	2,884	5,717	643	5,768	100,110
2052	100,110	2,985	5,796	659	5,905	102,546

[1] (f)=(a) + (b) – (c) – (d) + (e)
[2] Years later than 2052 were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2120.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 6.00% per annum was applied to all periods of projected benefit payments to determine the total Pension liability as of June 30, 2023 shown earlier in this report, pursuant to paragraph 30 of GASB Statement No. 68.

Asset Projection Basis

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 6.00% per annum.

2. Projected total contributions are employer and employee contributions to the unfunded actuarial accrued liability and normal cost (for the current active population only). Contributions are assumed to be paid mid-year.

3. Projected employee contributions to the plan are 3.75% of compensation.

4. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy.

5. Projected benefit payments have been determined in accordance with Paragraph 39 of GASB Statement No. 67, and are based on the closed group of active, inactive vested, retired members and beneficiaries as of June 30, 2022. Benefit payments are assumed to be paid mid-year.

6. Administrative expenses are assumed to be $300,000 per year increased with inflation at 2.5% per year and pro-rated based on projected proportion of headcount that relates to current population.

Interest Rate Sensitivity

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2022:

	1% Decrease (5.00%)	Current Rate (6.00%)	1% Increase (7.00%)
(1) Total Pension Liability	$ 69,914,791	$ 59,915,382	$ 52,088,067
(2) Plan Fiduciary Net Position	61,424,642	61,424,642	61,424,642
(3) Net Pension Liability	$ 8,490,149	$ (1,509,260)	$ (9,336,575)

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2023:

	1% Decrease (5.00%)	Current Rate (6.00%)	1% Increase (7.00%)
(1) Total Pension Liability	$ 71,135,113	$ 61,184,393	$ 53,346,979
(2) Plan Fiduciary Net Position	51,015,884	51,015,884	51,015,884
(3) Net Pension Liability	$ 20,119,229	$ 10,168,509	$ 2,331,095

Disclosure—Changes in the Net Pension Liability and Related Ratios

Changes in the Net Pension Liability and Related Ratios[1]

	Fiscal Year Ending 2014	2015	2016	2017	2018
Total Pension Liability					
Service Cost	N/A	$ 1,556,594	$ 1,511,755	$ 1,717,422	$ 1,913,998
Interest Cost	N/A	1,800,053	1,983,322	2,186,254	2,358,408
Changes of Benefit Terms	N/A	0	0	0	0
Differences Between Expected and Actual Experiences	N/A	1,146,168	795,023	1,524,469	1,456,980
Changes of Assumptions	N/A	0	2,939,020	(594,082)	(746,218)
Benefit Payments	N/A	(1,761,676)	(1,511,284)	(1,506,614)	(1,757,166)
Net Change in Total Pension Liability	N/A	$ 2,741,139	$ 5,717,836	$ 3,327,449	$ 3,226,002
Total Pension Liability (Beginning)	N/A	27,003,504	29,744,643	35,462,479	38,789,928
Total Pension Liability (Ending)	N/A	$ 29,744,643	$ 35,462,479	$ $38,789,928	$ 42,015,930
Plan Fiduciary Net Position					
Contributions—Employer	N/A	$ 955,554	$ 606,694	$ 667,952	$ 1,341,340
Contributions—Member	N/A	1,394,450	1,266,962	1,399,254	1,674,410
Net Investment Income	N/A	4,437,066	131,206	(116,966)	4,288,900
Benefit Payments	N/A	(1,761,676)	(1,511,284)	(1,506,614)	(1,757,166)
Administrative Expense	N/A	(227,581)	(217,041)	(188,657)	(127,973)
Other	N/A	0	0	0	0
Net Change in Plan Fiduciary Net Position	N/A	$ 4,797,813	$ 276,537	$ 254,969	$ 5,419,511
Plan Fiduciary Net Position (Beginning)	N/A	26,804,528	31,602,341	31,878,878	32,133,847
Plan Fiduciary Net Position (Ending)	N/A	$ 31,602,341	$ 31,878,878	$ 32,133,847	$ 37,553,358
Net Pension Liability (Ending)	N/A	$ (1,857,698)	$ 3,583,601	$ 6,656,081	$ 4,462,572
Net Position as a Percentage of Pension Liability	N/A	106.25%	89.89%	82.84%	89.38%
Covered-Employee Payroll[2]	N/A	$ 29,516,733	$ 23,120,653	$ 33,058,770	$ 34,610,720
Net Pension Liability as a Percentage of Payroll	N/A	(6.29%)	15.50%	20.13%	12.89%

[1] GASB 68 was effective first for employer fiscal years beginning after June 15, 2014.
[2] Covered-Employee Payroll represents the compensation over the Measurement Period for actives as of the Valuation Date

Disclosure—Changes in the Net Pension Liability and Related Ratios

Changes in the Net Pension Liability and Related Ratios[1]

	Fiscal Year Ending 2019	2020	2021	2022	2023
Total Pension Liability					
Service Cost	$ 1,299,918	$ 1,082,026	$ 1,255,013	$ 1,099,119	$ 1,621,033
Interest Cost	2,547,913	2,747,097	3,200,332	3,289,615	3,557,579
Changes of Benefit Terms	0	0	0	0	0
Differences Between Expected and Actual Experiences	1,620,937	2,732,087	(365,443)	2,831,731	704,676
Changes of Assumptions	39,510	2,985,149	(258,607)	118,669	(61,072)
Benefit Payments	(1,726,399)	(2,222,152)	(2,107,016)	(2,270,047)	(4,553,205)
Net Change in Total Pension Liability	$ 3,781,879	$ 7,324,207	$ 1,724,279	$ 5,069,087	$ 1,269,011
Total Pension Liability (Beginning)	42,015,930	45,797,809	53,122,016	54,846,295	59,915,382
Total Pension Liability (Ending)	$ 45,797,809	$ 53,122,016	$ 54,846,295	$ 59,915,382	$ 61,184,393
Plan Fiduciary Net Position					
Contributions—Employer	$ 815,531	$ 831,825	$ 811,519	$ 2,281,929	$ 3,140,160
Contributions—Member	1,632,926	1,701,351	1,722,324	2,268,481	2,107,867
Net Investment Income	3,647,640	1,939,447	1,622,054	14,068,526	(10,678,121)
Benefit Payments	(1,726,399)	(2,222,152)	(2,107,016)	(2,270,047)	(4,553,205)
Administrative Expense	(347,081)	(251,756)	(257,402)	(290,416)	(425,459)
Other	0	0	0	0	0
Net Change in Plan Fiduciary Net Position	$ 4,022,617	$ 1,998,715	$ 1,791,479	$ 16,058,473	$ (10,408,758)
Plan Fiduciary Net Position (Beginning)	37,553,358	41,575,975	43,574,690	45,366,169	61,424,642
Plan Fiduciary Net Position (Ending)	$ 41,575,975	$ 43,574,690	$ 45,366,169	$ 61,424,642	$ 51,015,884
Net Pension Liability (Ending)	$ 4,221,834	$ 9,547,326	$ 9,480,126	$ (1,509,260)	$ 10,168,509
Net Position as a Percentage of Pension Liability	90.78%	82.03%	82.72%	102.52%	83.38%
Covered-Employee Payroll[2]	$ 29,381,080	$ 32,096,397	$ 27,012,910	$ 32,217,343	$ 23,507,247
Net Pension Liability as a Percentage of Payroll	14.37%	29.75%	35.09%	-4.68%	43.26%

[1] GASB 68 was effective first for employer fiscal years beginning after June 15, 2014.
[2] Covered-Employee Payroll represents the compensation over the Measurement Period for actives as of the Valuation Date

Disclosure—Contribution Schedule

Contributions

	Fiscal Year Ending 2014		2015		2016		2017		2018
Actuarially Determined Contribution	N/A	$	252,273	$	122,127	$	727,119	$	656,930
Contributions Made in Relation to the Actuarially Determined Contribution	N/A	$	606,694	$	667,952	$	1,341,340	$	815,531
Contribution Deficiency (Excess)	N/A	$	(354,421)	$	(545,825)	$	(585,457)	$	(158,601)
Covered-Employee Payroll[1]	N/A	$	37,918,375	$	41,747,000	$	44,650,933	$	43,544,693
Contributions as a Percentage of Payroll			1.60%		1.60%		3.00%		1.87%

		Fiscal Year Ending 2019		2020		2021		2022	2023
Actuarially Determined Contribution	$	610,522	$	474,617	$	1,325,770	$	1,547,637	0
Contributions Made in Relation to the Actuarially Determined Contribution	$	831,825	$	811,519	$	2,281,929	$	3,140,160	TBD
Contribution Deficiency (Excess)	$	(221,303)	$	(336,902)	$	(956,159)	$	(1,592,523)	TBD
Covered-Employee Payroll[1]	$	50,109,940	$	53,040,458	$	56,764,403	$	56,275,269	TBD
Contributions as a Percentage of Payroll		1.66%		1.53%		4.02%		5.58%	TBD

Schedule of Investment Returns

The follow exhibit is a 10-year history of Investment Returns.

Year Ending June 30,	2015	2016	2017	2018	2019	2020	2021	2022	2023
Annual Money-Weighted Rate of Return, Net of Investment Expense	16.5%	0.41%	(0.36%)	13.12%	9.66%	4.66%	3.72%	30.35%	(17.35%)

These schedules are presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, pension plans should present information for those years for which information is available

[1] Covered-Employee Payroll represents the total compensation over the Measurement Period

Disclosure—Contribution Schedule

Notes to Schedule:

Valuation Date:	Actuarially determined contribution rates are calculated as of June 30, one year prior to the end of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

Actuarial Cost Method	Projected Unit Credit with amortization of 7/1/2017 unfunded liability over a period ending 6/30/2037 and amortization of subsequent unanticipated changes in liability over 15-year periods and any asset gain/loss over 5-year periods.
Asset Valuation Method	Smoothed market value
Salary Increases	2.80% per annum
Investment Rate of Return	6.00%, net of Pension plan investment expense, including inflation.
Retirement Age	See assumption section
Mortality	Pub-2010 amount-weighted tables for General employees of all income levels, projected using improvement scale MP2021 from 2010

Participant Information

The below exhibits summarize participant demographic information as of June 30, 2022.

Number of Participants:	
Actives	2,282
Full-time Actives (not accruing benefits) [1]	5,810
Deferred Vested	3,367
Retirees	495
Total	11,954
Participant Compensation – Active Participants Currently Accruing Benefits	
Compensation (prior year)	$23,507,247
Number of Active Participants below assumed retirement age	2,091
Average Compensation	$10,301
Actives	
Average Age	38.91
Average Benefit Service (years)	1.58
Full-time Actives	
Average Age	42.91
Average Accrued Annual Benefit	$705
Deferred Vested	
Average Age	45.74
Average Accrued Annual Benefit	$1,376
Retired	
Average Age	73.26
Average Annual Benefit	$3,297

Reconciliation of Participants from Prior Valuation

	Actives	Full-time Actives	Terminated Vesteds	Retirees and Beneficiaries	Totals
As of July 1, 2021	1,809	5,364	3,459	381	11,013
Classification Change	(443)	443	0	0	0
New Entrants	1,691	608	247	0	2,546
Vested Terminations	(498)	(293)	791	0	0
Rehires	28	104	(131)	(1)	0
Retired	(5)	(20)	(96)	121	0
Deaths	0	0	(5)	(11)	(16)
Lump Sum Cashouts	(300)	(396)	(899)	0	(1,595)
Data Correction	0	0	1	5	6
Net Change	473	446	(92)	114	941
As of July 1, 2022	**2,282**	**5,810**	**3,367**	**495**	**11,954**

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

Active Age Distribution as of July 1, 2022

Age	Number of Participants
15-19	46
20-24	387
25-29	454
30-34	294
35-39	236
40-44	153
45-49	142
50-54	128
55-59	133
60-64	118
65-69	112
70-74	54
75 +	25
Total	2,282

Active Career Earnings Distribution as of July 1, 2022

Career Earnings	Number of Participants
Under $5,000	1,169
$5,000 - $10,000	362
$10,000 - $25,000	362
$25,000 - $50,000	117
$50,000 - $100,000	109
Over $100,000	163
Total	2,282

Development of GASB 68 Amortization Period for Changes in Liability

	July 1, 2021		July 1, 2022	
Status	Count	Average Future Working Life	Count	Average Future Working Life[1]
1. Actives	1,809	0.91	2,282	0.84
2. Actives not accruing benefits	5,364	16.63	5,810	16.26
3. Deferred Vested Terminated	3,459	0.00	3,367	0
4. Retirees	381	0.00	495	0
5. Total/Weighted Average	11,013	8.25	11,954	8.06

[1] Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report.

Summary of Principal Plan Provisions

1. Membership Requirements

All employees of the County not covered by another retirement plan as provided by Code Section 3121(b)(7)(F).

2. Career Compensation

Total amount of compensation, limited annually by the Social Security Wage Base.

3. Normal or Late Retirement Benefit

Eligibility: Age 65

Benefit: 2% times Career Compensation, payable as a single life annuity.

4. Pre-Retirement Death Benefit

Refund of contributions accumulated with interest at 5% per annum.

5. Death after Retirement

None. Benefits are payable for the life of the employee only.

6. Termination Benefit

Normal retirement benefit accrued to date of termination.

A lump sum distribution is paid if the actuarial equivalent benefit is less than $5,000. Actuarial Equivalence for this purpose is based on the greater of the factor produced under the UP1984 unisex mortality table at 6% or the applicable mortality table and interest rate under 417(e).

7. Vesting

Benefits are 100% vested immediately.

8. Member Contributions

3.75% of compensation per pay period.

Actuarial Assumptions and Methods

1. Actuarial Cost Method

Actuarially Determined Contributions – Projected Unit Credit

GASB 68 – Entry Age Normal

2. Funding Contribution Methodology

Funding contributions are based on the sum of:

<u>Ongoing accruals</u>

a) Normal Cost with interest and administrative expense, less
b) Expected Employee Contributions

<u>Plus, Amortization of unfunded liabilities</u>

c) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
d) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods.

3. Interest Rates

Funding Interest Rate – 6.00%
Used as the asset return assumption and based on the long term expected return on plan assets.

GASB 68 Discount Rate – 6.00%
The discount rate is based on a single equivalent rate that reflects a blend of:

- Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants (6.00%); and
- Municipal bond index for periods beyond the depletion of assets (3.54%).

Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the 6.00% asset return.

4. Salary Increases

2.80% per year

5. Payroll Growth (used for amortization of unfunded liability)

2.80% per year (same as CalPERS assumption)

6. Mortality

Pub-2010 amount-weighted tables for General employees of all income levels, projected using improvement scale MP-2021 from 2010.

Sample rates for the 2010 base year are as follows:

Age	Male	Female
30	0.04%	0.02%
40	0.07%	0.04%
50	0.30%	0.02%
60	0.61%	0.38%
70	0.70%	0.49%
80	1.73%	1.33%
90	14.67%	11.49%

7. Termination Rates

Actives (accruing benefits)

	Years of Service	
Attained Age	0-2	2+
20-24	65%	65%
25-29	65%	55%
30-34	65%	50%
35-39	65%	50%
40-44	65%	40%
45-49	65%	40%
50-54	55%	40%
55-59	50%	35%
60-64	50%	30%

Full-time Actives (no longer accruing benefits)

Turnover rates for male and female active participants developed in the 2021 CalPERS Experience Study for Miscellaneous were used in the valuation.

The following sample rates for male actives are based on age and service:

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	16.31%	8.04%	3.77%	1.80%	0.00%	0.00%	0.00%
35	14.93%	7.15%	3.66%	1.80%	1.41%	0.00%	0.00%
40	14.90%	6.27%	3.37%	1.80%	1.41%	0.84%	0.00%
45	14.87%	5.62%	3.09%	1.66%	1.41%	0.84%	0.47%
50	15.09%	4.97%	2.45%	1.52%	1.10%	0.84%	0.47%
55	15.30%	4.61%	1.81%	1.19%	0.79%	0.64%	0.47%

The following sample rates for female actives are based on age and service:

Attained Age	Years of Service 0 – 1	5	10	15	20	25	30
30	18.24%	10.41%	5.02%	2.52%	0.00%	0.00%	0.00%
35	17.49%	9.25%	4.91%	2.52%	1.75%	0.00%	0.00%
40	17.31%	8.09%	4.46%	2.52%	1.75%	1.08%	0.00%
45	17.13%	7.30%	4.01%	2.13%	1.75%	1.08%	0.56%
50	17.41%	6.50%	3.08%	1.74%	1.31%	1.08%	0.56%
55	17.69%	5.80%	2.15%	1.32%	0.87%	0.76%	0.56%

8. Retirement Rates

Actives (accruing benefits)

Attained Age	Probability of Retirement
65-66	60%
67-74	50%
75+	100%

Full-time Actives (no longer accruing benefits)

Retirement rates developed in the 2021 CalPERS Experience Study for Miscellaneous were used in the valuation. Applicable retirement rate table is based on employee date of hire, as summarized below:

- Hire date prior to August 24, 2012: Miscellaneous 3% @ 60 rates
- Hire date August 24, 2012 to December 31, 2012: Miscellaneous 2% @ 60 rates
- Hire date post December 31, 2012: Miscellaneous 2% @ 62 rates

Sample rates from the 'Miscellaneous 3% @ 60 table' are as follows:

Attained Age	Years of Service 5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	15.20%	20.10%	26.20%	29.90%	32.30%	32.30%	32.30%
70	24.50%	24.50%	24.50%	24.50%	24.50%	24.50%	24.50%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Sample rates from the 'Miscellaneous 2% @ 60 table' are as follows:

Attained Age	Years of Service 5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	13.80%	16.00%	21.40%	21.60%	23.70%	28.30%	31.30%
70	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Sample rates from the 'Miscellaneous 2% @ 62 table' are as follows:

Attained Age	Years of Service						
	5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	10.80%	14.10%	17.30%	20.60%	23.90%	30.00%	34.80%
70	12.00%	15.60%	19.30%	22.90%	26.50%	33.30%	38.70%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

9. Value of Assets

Funding – Effective June 30, 2014, smoothed asset value, with differences between actual and expected earnings recognized over a 5-year period (with the first year of recognition being the period in which the Gain/(Loss) occurred), subject to an 80%-120% corridor around market value.

GASB 68 – Market value

10. Form of Benefit Paid

Lump sums paid immediately at termination for benefits with a present value less than $5,000. Single life annuities deferred to normal retirement age paid for benefits with a present value greater than $5,000.

11. Lump Sum Conversion Assumptions

Mortality – Current IRC section 417(e) table

Lump Sum Interest Rate – 4.00%
Used to estimate lump sum benefit amounts and based on the long term expected effective rate used for determining lump sums under plan provisions. Generally, this is based on high quality corporate bonds.

12. Administrative Expenses

Assumed $300,000 per year

13. Participants Valued

Only current active, full time active, terminated vested, retirees and beneficiaries of the plan as of June 30, 2022 are included in the valuation.

Changes in Assumptions and Methods Since the Prior Valuation

1) The salary increase and payroll growth assumptions were updated from 2.75% to 2.80%.
2) Termination and retirement rate assumptions were updated to reflect the assumptions developed in the 2021 CalPERS Experience Study.

COVID-19 Impacts

Given the events related to COVID-19, we reviewed participant information, as available, including terminations, retirements, and deaths over the year to compare plan experience against the assumptions used in the valuation to determine whether a modification to future assumptions may be warranted. We noted a larger number of new entrants to the plan than normal, however, we do not expect items like this to continue, so did not make further adjustments. Evaluation of the information provided did not suggest any other significant impact to the plan or justify a change to assumptions other than those already used.

Additional assumption analysis is included in the 2022 assumption rationale document.

Appendix A – Estimated Annual Expense for FYE 2024

Development of Annual Expense FYE 2024 under GASB 68 (Estimate)

The estimated expense amount shown below has been prepared for GASB 68 for the fiscal year ending June 30, 2024.

The Actuarial Accrued Liability as of July 1, 2022 has been prepared using the Entry Age Normal cost method, as required by GASB 68. The following estimated expense amounts have been prepared based on a Valuation Date of July 1, 2022, Measurement Date of July 1, 2023 and interest rate of 6.00%.

The expense shown below will be updated in next year's report to reflect actual administrative costs, employee contributions, and any gains or losses with respect to assets and liabilities.

Unfunded Actuarial Accrued Liability, as of July 1, 2022		
Actuarial Accrued Liability as of 7/1/2022	$	61,184,393
Value of Plan Assets as of 7/1/2022		51,015,884
Unfunded Actuarial Accrued Liability (UAAL)	$	(10,168,509)
Estimated Annual Expense, FYE June 30, 2024[1]		
1. Service Cost	$	2,013,000
2. Interest Cost		3,679,000
3. Expected Return on Assets		(2,967,000)
4. Employee Contributions[2]		(906,000)
5. Administrative Expense		300,000
6. Plan Changes		-
7. Amortization of Unrecognized		
(a) Liability (Gain)/Loss		1,289,000
(b) Asset (Gain)/Loss		928,000
(c) Assumption Changes		340,000
(d) Total		2,557,000
8. Annual Expense	$	4,676,000

[1] Final FYE 2024 expense information will be provided in the actuarial valuation based on a June 30, 2023 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2022 to June 30, 2023
[2] Employee contribution was developed assuming a constant active population

Maxwell, Sue

From: cob@rivco.org
Sent: Monday, February 27, 2023 4:56 PM
To: COB; mary.beth.redding@foster-foster.com
Subject: Board comments web submission

CAUTION: This email originated externally from the **Riverside County** email system. **DO NOT** click links or open attachments unless you recognize the sender and know the content is safe.

First Name:	Mary Beth
Last Name:	Redding
Address (Street, City and Zip):	Foster & Foster, 411 Borel Ave # 620, San Mateo CA 94402
Phone:	6268082157
Email:	mary.beth.redding@foster-foster.com
Agenda Date:	02/28/2023
Agenda Item # or Public Comment:	3.10
State your position below:	Neutral
Comments:	Only if this item is pulled for discussion, and only if I am requested to speak by Don Kent.

Thank you for submitting your request to speak. The Clerk of the Board office has received your request and will be prepared to allow you to speak when your item is called. To attend the meeting, please call (669) 900-6833 and use Meeting ID # 864 4411 6015 . Password is 20230228. You will be muted until your item is pulled and your name is called. Please dial in at 9:00 am with the phone number you provided in the form so you can be identified during the meeting.

Riverside County Board of Supervisors
Request to Speak

Submit request to Clerk of Board (right of podium), Speakers are entitled to three (3) minutes, subject to Board Rules listed on the reverse side of this form.

SPEAKER'S NAME: Ray Bucci

Address: ____________________

City: ____________________ **Zip:** ____________________

Phone #: ____________________

Date: ____________________ **Agenda #** 3:10

PLEASE STATE YOUR POSITION BELOW:

Position on "Regular" (non-appealed) Agenda Item:

________Support **________Oppose** **________Neutral**

Note: If you are here for an agenda item that is filed for "Appeal", please state separately your position on the appeal below:

________Support **________Oppose** **________Neutral**

I give my 3 minutes to: ____________________

BOARD RULES

Requests to Address Board on "Agenda" Items:

You may request to be heard on a published agenda item. Requests to be heard must be submitted to the Clerk of the Board before the scheduled meeting time.

Requests to Address Board on items that are " NOT" on the Agenda/Public Comment:

Notwithstanding any other provisions of these rules, a member of the public shall have the right to address the Board during the mid-morning "Oral Communications" segment of the published agenda. Said purpose for address must pertain to issues which are under the direct jurisdiction of the Board of Supervisors. YOUR TIME WILL BE LIMITED TO THREE (3) MINUTES. Donated time is not permitted during Public Comment.

Power Point Presentations/Printed Material:

Speakers who intend to conduct a formalized Power Point presentation or provide printed material must notify the Clerk of the Board's Office by 12 noon on the Monday preceding the Tuesday Board meeting, insuring that the Clerk's Office has sufficient copies of all printed materials and at least one (1) copy of the Power Point CD. Copies of printed material given to the Clerk (by Monday noon deadline) will be provided to each Supervisor. If you have the need to use the overhead "Elmo" projector at the Board meeting, please ensure your material is clear and with proper contrast, notifying the Clerk well ahead of the meeting, of your intent to use the Elmo.

Individual Speaker Limits:

Individual speakers are limited to a maximum of three (3) minutes. Please step up to the podium when the Chairman calls your name and begin speaking immediately. Pull the microphone to your mouth so that the Board, audience, and audio recording system hear you clearly. Once you start speaking, the "green" podium light will light. The "yellow" light will come on when you have one (1) minute remaining. When you have 30 seconds remaining, the "yellow" light will begin to flash, indicating you must quickly wrap up your comments. Your time is up when the "red" light flashes. The Chairman adheres to a strict three (3) minutes per speaker. ***Note: If you intend to give your time to a "Group/Organized Presentation", please state so clearly at the very bottom of the reverse side of this form.***

Group/Organized Presentations:

Group/organized presentations with more than one (1) speaker will be limited to nine (9) minutes at the Chairman's discretion. The organizer of the presentation will automatically receive the first three (3) minutes, with the remaining six (6) minutes relinquished by other speakers, as requested by them on a completed "Request to Speak" form, and clearly indicated at the bottom of the form.

Addressing the Board & Acknowledgement by Chairman:

The Chairman will determine what order the speakers will address the Board, and will call on all speakers in pairs. The first speaker should immediately step to the podium and begin addressing the Board. The second speaker should take up a position in one of the chamber aisles in order to quickly step up to the podium after the preceding speaker. This is to afford an efficient and timely Board meeting, giving all attendees the opportunity to make their case. Speakers are prohibited from making personal attacks, and/or using coarse, crude, profane or vulgar language while speaking to the Board members, staff, the general public and/or meeting participants. Such behavior, at the discretion of the Board Chairman, may result in removal from the Board Chambers by Sheriff Deputies.