Terminated Agency Risk Pool

Actuarial Valuation

as of June 30, 2023

CalPERS

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Actuarial Certification

September 2024

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 Terminated Agency Risk Pool and satisfies the actuarial valuation requirement of Government Code section 7504. This valuation and related validation work was performed by the CalPERS Actuarial Office and is based on the member and financial data as of June 30, 2023 provided by the various CalPERS databases and the benefits under the California Public Employees' Retirement Law 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, as prescribed by the CalPERS Board of Administration, are internally consistent and reasonable for the valuation.

The undersigned are actuaries who satisfy the *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* with regard to pensions.

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Highlights and Executive Summary

Highlights and Executive Summary

Introduction

This report presents the result of the June 30, 2023 actuarial valuation for the Terminated Agency Risk Pool. The Terminated Agency Risk Pool (TAP) provides benefit payments to members and their beneficiaries who were employees of public agencies that have terminated their contract with CalPERS. This report shows that the Terminated Agency Risk Pool continues to be well funded as of June 30, 2023.

Purpose of Report

This report documents the results of the actuarial valuation prepared by the CalPERS Actuarial Office using data as of June 30, 2023. The purpose of the valuation is to:

- Set forth the assets and accrued liabilities of this risk pool as of June 30, 2023
- Provide actuarial information as of June 30, 2023, to the CalPERS Board of Administration (board) and other interested parties.

Use of this report for other purposes may be inappropriate.

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; and changes in plan provisions and applicable law.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and No.4 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document. Risk disclosures include "Sensitivity Analysis" on the inflation rate and mortality rates. As the terminated agencies do not pay contributions to the pool, the basic disclosure requirements related to contributions are not relevant.

Funded Status of the Risk Pool

	June 30, 2022	June 30, 2023
1) Present Value of Projected Benefits		
a) Active Members	$0	$0
b) Transferred Members	23,278,191	18,256,166
c) Separated Members	21,392,248	19,526,383
d) Members and Beneficiaries Receiving Benefits	136,881,209	133,318,512
e) Total	$181,551,648	$171,101,061
2) Market Value of Assets (MVA)	$361,574,892	$358,832,436
3) Unfunded Liability/(Surplus) [(1e) - (2)]	($180,023,244)	($187,731,375)
4) Funded Ratio [(2) / (1e)]	199.2%	209.7%

Highlights and Executive Summary

Changes Since the Prior Year's Valuation

This report reflects a change in both the discount rate and inflation assumption. The discount rate changed from 3.10% to 3.75%, while the inflation assumption changed from 2.20% to 2.07%.

These assumptions change each year as the yields on the underlying US Treasury securities fluctuate each year. See Appendix A for details on how these assumptions are set.

Two terminated agencies were added to the TAP in the June 30, 2023 valuation:

- Samoa Peninsula Fire Protection District
- Twentynine Palms Water District safety employee category

The total liabilities and assets associated with these terminations are approximately $7.6 million.

Subsequent Events

This report reflects events impacting the Terminated Agency Pool through June 30, 2023.

One agency terminated FY 2023-24 with accrued liabilities of $0.3 million.

- Plumas Local Agency Formation Commission

One agency terminated its miscellaneous employee category in FY 2023-24 with accrued liabilities of $1.1 million.

- Coastside Fire Protection District

Assets

Assets

Reconciliation of the Market Value of Assets

1) Market Value of Assets as of June 30, 2022 Including Receivables	$361,574,892
2) Change in Receivables for Service Buybacks as of June 30, 2022	-
3) Benefit Payments to Retirees and Beneficiaries	(8,668,610)
4) Refunds	(22,456)
5) Lump Sum Payments	-
6) Transfers and Miscellaneous Adjustments	(260,438)
7) Investment Return	2,173,102
8) Market Value of Assets as of June 30, 2023 (w/o Pool Transfers) [(1) + (2) + (3) + (4) + (5) + (6) + (7)]	354,796,490
9) Net Transfers into and out of the Risk Pool	4,035,946
10) Market Value of Assets as of June 30, 2023 Including Receivables [(8) + (9)]	**$358,832,436**

Asset Allocation

CalPERS Board has adopted an investment strategy for the Terminated Agency Risk Pool with the objective of minimizing funding risk and immunizing projected future benefit payments.

The assets of the Pool are invested as two independent segments:

- The Immunized Segment is invested in a blend of US Treasury Separate Trading of Registered Interest and Principal of Securities (STRIPS), US Treasury Inflation Protected Securities (TIPS) and cash or cash equivalents.
- The Non-immunized Segment is invested in the Public Employees' Retirement Fund (PERF).

The assets in the Immunized Segment are rebalanced annually to reflect new agencies entering the pool and updated future benefits projections. The rebalancing exercise is normally executed in the February/March period. This strategy is designed to minimize underfunding risk, and balance other risks including reinvestment risk, inflation risk, and implementation risk. In addition, a higher return is expected to be generated from the Non-immunized Segment that is invested in the PERF. The table below shows the allocation of each segment for the current and previous valuation.

	June 30, 2022 Allocation	$Millions	June 30, 2023 Allocation	$Millions
Immunized Segment	54.7%	198.0	56.0%	200.9
Non-immunized Segment	45.3%	163.6	44.0%	157.9
Total	**100.0%**	**$361.6**	**100.0%**	**$358.8**

Asset Returns

The rate of return by segment for the following periods:

Asset Type	FY 2021-22	FY 2022-23
Immunized Segment	-12.4%	-3.1%
Non-immunized Segment	-6.1%	6.1%
Total	**-9.8%**	**0.61%**

Liabilities

Liabilities

Development of Accrued and Unfunded Liabilities

The following table shows the development of the accrued liabilities and the unfunded liabilities.

	June 30, 2022	June 30, 2023
1) Present Value of Benefits		
a) Active Members	$0	$0
b) Transferred Members	23,278,191	18,256,166
c) Separated Members	21,392,248	19,526,383
d) Members and Beneficiaries Receiving Payments	136,881,209	133,318,512
e) Total	$181,551,648	$171,101,061
2) Present Value of Future Employer Normal Costs	0	0
3) Present Value of Future Employee Contributions	0	0
4) Accrued Liability		
a) Active Members	$0	$0
b) Transferred Members	23,278,191	18,256,166
c) Separated Members	21,392,248	19,526,383
d) Members and Beneficiaries Receiving Payments	136,881,209	133,318,512
e) Total	$181,551,648	$171,101,061
5) Market Value of Assets (MVA)	$361,574,892	$358,832,436
6) Unfunded Liability/(Surplus) [(4e) – (5)]	($180,023,244)	($187,731,375)
7) Funded Status [(5) / (4e)]	199.2%	209.7%

Liabilities

(Gain)/Loss Analysis

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) Liability (Gain)/Loss for the Year	
a) Accrued Liability as of 6/30/2022	$181,551,648
b) Benefit Payments to Retirees & Beneficiaries	(8,668,610)
c) Refunds	(22,456)
d) Interest[1]	5,677,068
e) Expected Accrued Liability as of 6/30/2023[(1a) + (1b) + (1c) + (1d)]	178,537,650
f) Effect of Data Changes	-
g) Effect of Method Changes	-
h) Effect of New Entrants to the Pool	7,550,662
i) Changes due to Assumption Changes	(15,877,379)
j) Actual Accrued Liability as of 6/30/2023	171,101,061
k) Liability (Gain)/Loss [(1j)-(1i)-(1h)-(1g)-(1f)-(1e)]	**$890,128**
2) Asset (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/2022 Including Receivables	$361,574,892
b) Changes in Receivables for Service Buybacks as of 6/30/2022	-
c) Benefit Payments to Retirees & Beneficiaries	(8,668,610)
d) Refunds	(22,456)
e) Lump Sum Payments	-
f) Transfers and Miscellaneous Adjustments	(260,439)
g) Net Transfers into and out of the Risk Pool	4,035,946
h) Expected Interest[2]	14,799,785
i) Expected Assets as of 6/30/2023 [(2a) + (2b) + (2c) + (2d) + (2e) + (2f) + (2g) + (2h)]	371,459,119
j) Market Value of Assets as of 6/30/2023 Including Receivables	358,832,436
k) Asset (Gain)/Loss [(2i) – (2j)]	**$12,626,811**
3) Total (Gain)/Loss for the Year	
a) Liability (Gain)/Loss(1k)	$890,128
b) Asset (Gain)/Loss (2k)	12,626,683
c) Total (Gain)/Loss [(3a) + (3b)]	**$13,516,811**

[1] Expected interest on Liabilities is 3.1%.
[2] Expected interest on Assets is 4.12%. This is based on a blend of the expected return on the two segments of the TAP Portfolio: Immunized Segment at 2.50% and Non-immunized Segment at 6.80%

Liabilities

Funding History

Valuation Date	Accrued Liability	Market Value of Asset (MVA)	Unfunded Liability / (Surplus)	Funded Ratio
06/30/10	55,014,174	154,562,757	(99,548,583)	281.0%
06/30/11	70,524,343	184,380,119	(113,855,776)	261.4%
06/30/12	84,521,429	178,657,676	(94,136,247)	211.4%
06/30/13	78,123,425	194,227,188	(116,103,763)	248.6%
06/30/14	82,254,488	215,414,591	(133,160,103)	261.9%
06/30/15	88,473,668	219,694,509	(131,220,841)	248.3%
06/30/16	117,360,281	250,137,428	(132,777,147)	213.1%
06/30/17	139,904,430	281,900,545	(141,996,115)	201.5%
06/30/18	145,065,798	286,352,337	(141,286,539)	197.4%
06/30/19	148,706,861	301,503,348	(152,796,487)	202.8%
06/30/20	207,794,190	366,127,374	(158,333,184)	176.2%
06/30/21	196,452,685	390,862,083	(194,409,398)	199.0%
06/30/22	181,551,648	361,574,892	(180,023,244)	199.2%
06/30/23	171,101,061	358,832,436	(187,731,375)	209.7%

History of Plans in the Terminated Agency Pool

Valuation Date	Number of Plans in Pool	Number of Plans Joining Pool	Accrued Liability of Joining Plans ($ millions)	Number of Plans Leaving Pool
06/30/10	87	0	-	-
06/30/11	87	3	$1	3
06/30/12	90	3	-	-
06/30/13	90	2	-	2
06/30/14	94	4	$8	-
06/30/15	93	2	$3	3
06/30/16	98	5	$24	-
06/30/17	108	10	$28	-
06/30/18	109	1	$1	-
06/30/19	109	5	$1	5
06/30/20	119	10	$38	-
06/30/21	119	1	$1	1
06/30/22	121	4	$14	2
06/30/23	119	2	$8	4

Risk Analysis

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Risk Analysis

Analysis of Mortality Rate Sensitivity

The following analysis looks at the change in the June 30, 2023 funded ratio under two different mortality rate scenarios. Shown below are the funded ratios assuming mortality rates that are 10% lower and 10% higher than the current valuation mortality rate assumptions. This analysis gives an indication of the sensitivity of the funded ratio of the Terminated Agency Risk Pool to increasing or decreasing mortality rates over the long-term.

This type of analysis gives the reader a sense of the long-term risk to the risk pool's funded ratio.

Mortality Rate Sensitivity as of June 30, 2023

		Current Mortality Rates	-10% Mortality Rates	+10% Mortality Rate
a)	Accrued Liability	171,101,061	176,495,154	166,262,978
b)	Market Value of Assets	358,832,436	358,832,436	358,832,436
c)	Unfunded Liability (Surplus) [(a)-(b)]	(187,731,375)	(182,337,282)	(192,569,458)
d)	Funded Ratio	209.7%	203.3%	215.8%

A 10% increase (decrease) to the assumed mortality rates over the long-term would result in approximately a 6% increase (decrease) to the funded ratio.

Analysis of Inflation Rate Sensitivity

The following analysis looks at the change in the June 30, 2023 funded ratio under two different inflation rate scenarios. Shown below are the funded ratios assuming inflation rates that are 1% lower and 1% higher than the current valuation inflation rate assumption (2.07%). This analysis gives an indication of the sensitivity of the funded ratio of the Terminated Agency Risk Pool to increasing or decreasing inflation rates over the long-term.

Inflation Rate Sensitivity as of June 30, 2023

		Current Inflation Rate	-1% Inflation Rate	+1% Inflation Rate
a)	Accrued Liability	171,101,061	153,373,339	177,253,776
b)	Market Value of Assets	358,832,436	358,832,436	358,832,436
c)	Unfunded Liability(Surplus) [(a)-(b)]	(187,731,375)	(205,459,097)	(181,578,660)
d)	Funded Ratio	209.7%	234.0%	202.4%

A decrease of 1% in the inflation rate assumption (2.07% to 1.07%) reduces the Accrued Liability by 11.5%. However, a 1% increase in the inflation rate (2.07% to 3.07%) increases the Accrued Liability by 3.6%. Unlike the mortality sensitivity analysis above, the impact of the inflation rate sensitivity is not symmetrical. The reason for this is most plans in the TAP have a 2% COLA provision, which limits annual increases to 2%.

Discount Rate Sensitivity

The Terminated Agency Pool's funded ratio is not expected to be sensitive to changes in interest rates due to the Immunized Segment of the pool's market value of assets. Immunization of a significant portion of the risk pool's portfolio results in a funded status that is invariant to changes in the interest rate. Since the funded ratio is not expected to be sensitive to the discount rate for this risk pool, the most sensitive assumptions are the mortality rate and inflation rate assumptions. Consequently, a discount rate sensitivity analysis was replaced with a mortality rate and inflation rate sensitivity analysis for this risk pool.

Low Default Risk Obligation Measure

Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, requires the disclosure of a low-default-risk obligation measure (LDROM) of benefit costs accrued as of the valuation date using a discount rate based on high quality fixed income securities with cash flows that replicate expected benefit payments. This measure approximates the cost to purchase low-default-risk fixed income securities to fund the accrued benefit. The Accrued Liability provided in this report satisfies the requirements of a LDROM as specified in ASOP No. 4.

Appendices

A-1 Appendix A – Actuarial Methods and Assumptions

B-1 Appendix B – Summary of Principal Plan Provisions

C-1 Appendix C – Summary of Participant Data

D-1 Appendix D – List of Terminated Agencies

E-1 Appendix E – Glossary

Appendix A – Actuarial Methods and Assumptions

Actuarial Data

As stated in the Actuarial Certification, the data, which serve as the basis of this valuation, have 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 do not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for usually 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.

Actuarial Methods

Actuarial Cost Methods

The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits (i.e., transferred members and separated members) is equal to the present value of the benefits expected to be paid.

Asset Valuation Method

As there are no contributions or amortization requirements for the Terminated Agency Pool, there is no need to dampen fluctuations in the Market Value of Assets to derive an Actuarial Value of Assets. Therefore, the Actuarial Value of Assets has been set equal to the Market Value of Assets.

The excess of the actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability.

Actuarial Assumptions

Economic Assumptions

Discount Rate

The discount rate for this valuation is 3.75% compounded annually (net of expenses) which is the yield on 30 Year US Treasury STRIPS as of June 30, 2023. This rate is used for all plans in this valuation. A discount rate of 3.1% was used in the prior year's valuation.

The following procedure is used to determine the discount rate for terminated agency valuations:

a) Determine the duration of the pension liabilities as of the valuation date.

b) Determine the weights that should be applied to the 10 Year and 30 Year US Treasury durations (at spot rates at the valuation date), to equal the duration calculated in (a).

c) Apply the weights determined in (b) to the 10 Year and 30 Year US Treasury yields.

Appendix A - Actuarial Methods and Assumptions

Economic Assumptions (continued)

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 2023) is added to these factors for total salary growth.

Annual Percentage Increase

Public Agency Miscellaneous

Duration of Service	Entry Age		
	20	30	40
0	7.6%	6.2%	5.2%
1	6.6%	5.3%	4.2%
2	5.8%	4.5%	3.5%
3	5.0%	3.8%	2.8%
4	4.4%	3.2%	2.3%
5	3.8%	2.8%	1.9%
10	2.0%	1.3%	1.1%
15	1.6%	1.0%	0.7%
20	1.2%	0.8%	0.5%
25	0.9%	0.7%	0.3%
30	0.7%	0.5%	0.2%

Public Agency Fire

Duration of Service	Entry Age		
	20	30	40
0	15.2%	15.5%	6.3%
1	11.9%	11.4%	5.2%
2	9.4%	8.4%	4.2%
3	7.4%	6.1%	3.5%
4	5.8%	4.5%	2.8%
5	4.5%	3.3%	2.3%
10	1.9%	1.4%	0.8%
15	1.7%	1.2%	0.9%
20	1.5%	1.1%	1.0%
25	1.3%	0.9%	1.2%
30	1.1%	0.8%	1.3%

Public Agency Police

Duration of Service	Entry Age		
	20	30	40
0	11.8%	10.5%	6.5%
1	9.3%	8.1%	5.3%
2	7.4%	6.3%	4.3%
3	5.8%	4.9%	3.5%
4	4.6%	3.8%	2.9%
5	3.7%	2.9%	2.4%
10	1.9%	1.6%	1.2%
15	1.8%	1.5%	1.3%
20	1.8%	1.5%	1.5%
25	1.8%	1.4%	1.6%
30	1.8%	1.4%	1.8%

Appendix A - Actuarial Methods and Assumptions

Salary Growth (continued)

Public Agency County Peace Officer

Duration of Service	Entry Age		
	20	30	40
0	12.4%	10.5%	8.9%
1	9.4%	8.1%	6.7%
2	7.2%	6.2%	5.1%
3	5.4%	4.7%	3.9%
4	4.1%	3.6%	2.9%
5	3.1%	2.8%	2.2%
10	1.8%	1.4%	0.7%
15	1.7%	1.2%	0.7%
20	1.6%	1.1%	0.7%
25	1.6%	0.9%	0.8%
30	1.5%	0.8%	0.8%

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

Inflation

2.07% compounded annually. This assumption is used for all plans in the TAP. The inflation rate is determined as the difference between the yield on 30 Year US Treasury STRIPS and the yield on 30 Year US Treasury TIPS as of the valuation date. An inflation rate of 2.20% was used in the prior year's valuation.

Non-valued Potential Additional Liabilities

The potential liability loss under PPPA for a cost-of-living increase exceeding the 2.07% inflation assumption is not reflected in the valuation.

Appendix A - Actuarial Methods and Assumptions

Miscellaneous Loading Factors

Credit for Unused Sick Leave
Service credits are increased by 1% for those agencies that have accepted the provision providing Credit for Unused Sick Leave.

Conversion of Employer Paid Member Contributions (EPMC)
Final Average Salary is increased by the Employee Contribution Rate for those agencies that have contracted for 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" for these employees 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
At the time an agency terminates, the termination process requires applying a contingency load for unforeseen improvements in mortality. For terminations before January 1, 2018, a 7% load for unforeseen negative experience was applied (as set by Board Resolution ACT-11-02 and approved by the Board on June 15, 2011). In December 2017, the Board approved the CalPERS Experience Study and Review of Actuarial Assumptions, changing the load to 5%.

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.

Appendix A - Actuarial Methods and Assumptions

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.

Age	Healthy Recipients		Non-Industrial Disabled (Not Job-Related)		Industrial Disabled (Job-Related)	
	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 married upon retirement is assumed according to the following table.

Plan	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 in the TAP.

Separated Members

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

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Termination with Refund

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

Public Agency Miscellaneous

Duration of Service	Entry Age											
	20		25		30		35		40		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 with Refund rates are used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Termination with Vested Deferred Benefits

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

Public Agency Miscellaneous

Duration of Service	Entry Age									
	20		25		30		35		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

When a member is eligible to retire, the termination with vested benefits probability is set to zero.

- 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 used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Non-Industrial (Not Job-Related) Disability
Rates vary by age and gender for Miscellaneous Plans. Rates vary by age for Safety Plans.

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

- The Miscellaneous Non-Industrial Disability rates are used for Local Prosecutors.
- The Police Non-Industrial Disability rates are 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 used for Local Sheriff and Other Safety.
- Fifty Percent of the Police Industrial Disability rates are used for School Police.
- One Percent 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.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Service Retirement

Retirement rates vary by age, years of service, and formula, except for the Safety ½ @ 55 and 2% @ 55 formulas, where retirement rates vary by age only.

Public Agency Miscellaneous 1.5% @ 65

| Age | Years of Service | | | | | |
	5	10	15	20	25	30
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% @ 60

| Age | Years of Service | | | | | |
	5	10	15	20	25	30
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

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2% @ 55

Age	Years of Service 5	10	15	20	25	30
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% @ 55

Age	Years of Service 5	10	15	20	25	30
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

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2.7% @ 55

Age	Years of Service					
	5	10	15	20	25	30
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% @ 60

Age	Years of Service					
	5	10	15	20	25	30
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

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2% @ 62

Age	Years of Service					
	5	10	15	20	25	30
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

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire ½ @ 55 and 2% @ 55

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

Public Agency Police ½ @ 55 and 2% @ 55*

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

Public Agency Police 2% @ 50*

Age	Years of Service					
	5	10	15	20	25	30
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	1.0

*These rates also apply to Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2% @ 50

Age	Years of Service					
	5	10	15	20	25	30
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

Public Agency Police 3% @ 55*

Age	Years of Service					
	5	10	15	20	25	30
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	1.0

*These rates also apply to Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 3% @ 55

Age	|	Years of Service				
	5	10	15	20	25	30
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

Public Agency Police 3% @ 50*

Age	|	Years of Service				
	5	10	15	20	25	30
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 Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 3% @ 50

Age	Years of Service					
	5	10	15	20	25	30
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

Public Agency Police 2% @ 57*

Age	Years of Service					
	5	10	15	20	25	30
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 Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2% @ 57

	Years of Service					
Age	5	10	15	20	25	30
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

Public Agency Police 2.5% @ 57*

	Years of Service					
Age	5	10	15	20	25	30
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 Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2.5% @ 57

Age	Years of Service					
	5	10	15	20	25	30
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

Public Agency Police 2.7% @ 57*

Age	Years of Service					
	5	10	15	20	25	30
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 Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Appendix A - Actuarial Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2.7% @ 57

Age	Years of Service					
	5	10	15	20	25	30
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

Miscellaneous

Models

The valuation results are based on proprietary actuarial valuation models. The models are centralized and maintained by a specialized team to achieve a high degree of accuracy and consistency. The Actuarial Office is responsible for confirming the appropriateness of the inputs (such as participant data, actuarial methods and assumptions, and plan provisions) as well as performing tests and validating the reasonableness of the output. The results of our models are independently confirmed by parallel valuations performed by outside actuaries on a periodic basis using their models. In our professional judgment, our actuarial valuation models produce comprehensive pension funding information consistent with the purposes of the valuation and have no material limitations or known weaknesses.

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. The Section 415(b) dollar limit for the 2023 calendar year is $265,000.

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 as part of the actuarial gain or loss base. The compensation limit for classic members for the 2023 calendar year is $330,000.

Appendix B – Summary of Principal Plan Provisions

Description of 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 complex Public Employees' Retirement Law. The law itself governs in all situations.

Service Retirement

Eligibility

A CalPERS member becomes eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements.) 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 calculated for service earned by members 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 below are the factors for retirement at whole year ages:

Miscellaneous Plan Formulas

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

Appendix B – Summary of Principal Plan Provisions

Service Retirement (continued)

Safety Plan Formulas

Retirement Age	½ % @ 55 [1]	2% @ 55	2% @ 50	3% @ 55	3% @ 50
50	1.783%	1.426%	2.0%	2.4%	3.0%
51	1.903%	1.522%	2.14%	2.52%	3.0%
52	2.035%	1.628%	2.28%	2.64%	3.0%
53	2.178%	1.742%	2.42%	2.76%	3.0%
54	2.333%	1.866%	2.56%	2.88%	3.0%
55 & Up	2.5%	2.0%	2.7%	3.0%	3.0%

For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or larger. 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 have the option of providing a final compensation equal to the highest 12 consecutive months.

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 Service Retirement benefit is not capped. The Safety Service Retirement benefit is capped at 90% of final compensation.

Appendix B – Summary of Principal Plan Provisions

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 five 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 member becomes eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50.

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 five 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.

Benefit
The 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 33 1/3% 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 five 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.

Appendix B – Summary of Principal Plan Provisions

Industrial (Job Related) Disability Retirement

All safety members have this benefit. For 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. For plans which terminated after January 1, 2023, the amount is $2,000 for deaths after June 30, 2023.

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 often 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 children until they attain age 18; or, if no eligible children, 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.

Appendix B – Summary of Principal Plan Provisions

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 currently credited at 6% per year, 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, and has at least five 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 children 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 a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. The total amount paid will be at least equal to the Basic Death benefit.

Appendix B – Summary of Principal Plan Provisions

Optional Settlement 2W Death Benefit

This is an optional benefit.

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50, and has at least five 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 2W Death benefit.

Benefit

The Optional Settlement 2W 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 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried children 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. An employer may elect to provide this benefit for miscellaneous members.

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 children 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 children 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* children (*eligible* means unmarried children 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 children 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 2W. (A retiree who elects Optional Settlement 2W 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 children under age 18, if applicable. The total amount paid will be at least equal to the Basic Death Benefit.

Appendix B – Summary of Principal Plan Provisions

Cost-of-Living Adjustments

Standard Benefit

The Retirement Law provides for the payment of an annual cost-of-living adjustment (COLA) to be paid each May, beginning the second calendar year after the year of retirement. The basic COLA provision is 2%. The COLA adjustment is limited to the lesser of two compounded numbers - the rate of inflation or the COLA contracted by the employer. This means that members may receive increases smaller than the COLA provision in years where the rate of inflation is lower that the COLA provision. Similarly, members may see increases larger than inflation and even the COLA provision in some years.

Improved Benefit

Employers have the option of providing an improved cost-of-living adjustment of 3%, 4% or 5%.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against 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 inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

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 annually with 6% interest.

1959 Survivor Benefits Program

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 was required to provide this benefit if the members were 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 must 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 at www.calpers.ca.gov.

Appendix C – Summary of Participant Data

Source of the Participant Data

The data was extracted from various databases within CalPERS and placed in a database by a series of extract programs. Included in this data is:

- Individual member and beneficiary information,
- Employment and payroll information,
- Accumulated contributions with interest,
- Service information,
- Benefit payment information,
- Information about the various organizations which contract with CalPERS, and
- Detailed information about the plan provisions applicable to each group of members.

Data Validation Test and Adjustments

Once the information is extracted from the various computer systems into the database, update queries are then run against these data to correct for flaws found in the data. This part of the process is intended to validate the participant data for all CalPERS plans. The data are then checked for reasonableness and consistency with data from the prior valuation.

Checks on the data include:

- A reconciliation of the membership of the plans,
- Comparisons of various member statistics (average attained age, average entry age, average salary, etc.) for each plan with those from the prior valuation,
- Comparisons of pension amounts for each retiree and beneficiary receiving payments with those from the prior valuation,
- Checks for invalid ages and dates, and
- Reasonableness checks on various key data elements such as service and salary.

As a result of the tests on the data, a number of adjustments were determined to be necessary. These included:
- Dates of hire and dates of entry were adjusted where necessary to be consistent with the service fields, the date of birth and each other.

Appendix C – Summary of Participant Data

Summary of Valuation Data

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.

	June 30, 2022	June 30, 2023
Number of Plans in the Risk Pool	121	119
Active Members	0	0
Transferred Members		
Counts	84	77
Average Attained Age	49.77	50.23
Average Years of Service	4.19	4.04
Average Annual Covered Pay	$120,258	$125,354
Separated Members		
Counts	334	333
Average Attained Age	55.49	55.90
Average Years of Service	3.23	3.27
Average Annual Covered Pay	$46,951	$47,649
Retired Members and Beneficiaries		
Counts[1]	850	839
Average Attained Age	75.42	75.46
Average Annual Benefits	$10,013	$10,505

(1) Values may not match those on pages C-3 to C-6 due to inclusion of community property settlements.

Appendix C – Summary of Participant Data

Transferred and Separated Participants

Distribution of Transfers to Other CalPERS Plans by Age and Years of Service

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+		
15 - 24	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0
35 - 39	8	0	0	0	0	0	8	90,287
40 - 44	10	1	1	0	0	0	12	139,607
45 - 49	16	3	1	0	0	0	20	113,483
50 - 54	11	6	2	0	0	0	19	145,484
55 - 59	5	4	0	0	0	0	9	110,456
60 - 64	3	0	1	0	0	0	4	108,737
65 and over	3	1	1	0	0	0	5	158,352
Total	**56**	**15**	**6**	**0**	**0**	**0**	**77**	**$125,354**

Distribution of Separated Participants with Funds on Deposit by Age and Years of Service

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+		
15 - 24	0	0	0	0	0	0	0	0
25 - 29	1	0	0	0	0	0	1	29,640
30 - 34	4	0	0	0	0	0	4	26,060
35 - 39	15	2	0	0	0	0	17	50,980
40 - 44	11	2	2	1	0	0	16	58,822
45 - 49	33	8	0	2	1	0	44	50,606
50 - 54	57	9	5	0	0	0	71	52,766
55 - 59	50	6	2	4	0	0	62	44,902
60 - 64	54	6	1	1	0	1	63	47,248
65 and over	42	8	2	1	0	2	55	39,854
Total	**267**	**41**	**12**	**9**	**1**	**3**	**333**	**$47,649**

Appendix C – Summary of Participant Data

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type

Attained Age	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 30	0	0	0	1	0	4	5
25 - 29	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	0
40 - 44	0	0	1	0	0	1	2
45 - 49	0	0	0	0	0	0	0
50 - 54	14	0	5	0	0	2	21
55 - 59	36	1	5	1	0	2	45
60 - 64	53	2	4	0	1	3	63
65 - 69	98	5	4	0	1	7	115
70 - 74	116	6	8	0	0	10	140
75 - 79	117	3	7	0	0	19	146
80 - 84	92	4	5	0	1	20	122
85 and over	116	6	3	1	1	42	169
Total	**642**	**27**	**42**	**3**	**4**	**110**	**828**

- Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the counts may not match information on page C-2 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.

Distribution of Annual Benefit Amounts for Retirees and Beneficiaries by Age and Retirement Type

Attained Age	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 30	0	0	0	5,461	0	2,449	3,051
25 - 29	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	
40 - 44	0	0	532	0	0	1,155	844
45 - 49	0	0	0	0	0	0	0
50 - 54	17,047	0	3,789	0	0	1,015	12,364
55 - 59	15,179	353	14,980	3,582	0	6,978	14,206
60 - 64	19,517	25,396	8,072	0	35,018	1,433	18,362
65 - 69	15,205	2,849	13,436	0	24,250	8,343	14,267
70 - 74	11,029	8,907	11,185	0	0	7,108	10,667
75 - 79	8,568	13,509	9,747	0	0	5,425	8,317
80 - 84	6,467	5,109	4,202	0	29,997	10,542	7,190
85 and over	9,314	8,357	3,821	8,264	510	8,672	8,965
Average	**11,319**	**8,516**	**8,824**	**5,769**	**22,444**	**7,626**	**10,644**

- Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the counts may not match information on page C-2 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 C – Summary of Participant Data

Retired Members and Beneficiaries (continued)

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type

Years Retired	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 5 Years	101	1	6	0	0	35	143
5 - 9	110	3	7	1	0	19	140
10 - 14	112	1	2	1	0	13	129
15 - 19	106	4	6	0	0	12	128
20 - 24	77	3	7	1	1	12	101
25 - 29	53	7	6	0	1	9	76
30 and over	83	8	8	0	2	10	111
Total	**642**	**27**	**42**	**3**	**4**	**110**	**828**

- Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the counts may not match information on page C-2 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.

Distribution of Average Benefit Amounts for Retirees and Beneficiaries by Years Retired and Retirement Type

Years Retired	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Average
Under 5 Years	15,895	2,641	16,264	0	0	8,533	14,016
5 - 9	17,765	17,048	4,167	5,461	0	10,815	16,039
10 - 14	12,001	11,948	2,302	3,582	0	7,507	11,332
15 - 19	8,059	8,559	5,220	0	0	8,052	7,941
20 - 24	5,891	11,356	15,987	8,264	35,018	4,235	6,869
25 - 29	6,985	6,329	12,588	0	24,250	5,233	7,387
30 and over	8,255	6,450	2,560	0	15,254	4,258	7,480
Average	**11,319**	**8,516**	**8,824**	**5,769**	**22,444**	**7,626**	**10,644**

- Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the counts may not match information on page C-2 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 C – Summary of Participant Data

Retired Members and Beneficiaries (continued)

Distribution of Annual Benefit Amounts by Age and Retirement Type

Annual Amounts do not Include PPPA Payments

Attained Age	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 30	0	0	0	5,461	0	9,796	15,257
25 - 29	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	0
40 - 44	0	0	532	0	0	1,155	1,687
45 - 49	0	0	0	0	0	0	0
50 - 54	238,664	0	18,946	0	0	2,030	259,640
55 - 59	546,461	353	74,899	3,582	0	13,956	639,251
60 - 64	1,034,382	50,792	32,289	0	35,018	4,298	1,156,779
65 - 69	1,490,064	14,246	53,744	0	24,250	58,398	1,640,702
70 - 74	1,279,389	53,442	89,478	0	0	71,075	1,493,384
75 - 79	1,002,479	40,528	68,227	0	0	103,076	1,214,310
80 - 84	594,920	20,436	21,010	0	29,997	210,848	877,211
85 and over	1,080,481	50,140	11,464	8,264	510	364,214	1,515,073
Total	**$7,266,840**	**$229,937**	**$370,589**	**$17,307**	**$89,775**	**$838,846**	**$8,813,294**

Distribution of Annual Benefit Amounts for Retirees and Beneficiaries by Years Retired and Retirement Type

Annual Amounts do not Include PPPA Payments

Years Retired	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Average
Under 5 Years	1,605,350	2,641	97,584	0	0	298,651	2,004,226
5 - 9	1,954,188	51,145	29,167	5,461	0	205,490	2,245,451
10 - 14	1,344,090	11,948	4,603	3,582	0	97,589	1,461,812
15 - 19	854,227	34,234	31,322	0	0	96,618	1,016,401
20 - 24	453,638	34,068	111,909	8,264	35,018	50,824	693,721
25 - 29	370,206	44,304	75,525	0	24,250	47,093	561,378
30 and over	685,141	51,597	20,479	0	30,507	42,581	830,305
Total	**$7,266,840**	**$229,937**	**$370,589**	**$17,307**	**$89,775**	**$838,846**	**$8,813,294**

Appendix D – List of Terminated Agencies

Alhambra Redevelopment Agency

Armona Community Services District

Aromas Tri-County Fire District

Associated Students of California State University, Chico

Bay Area Library and Information System

Bay Area Sewage Services Agency

Ben Lomond Fire Protection District

California Egg Marketing/Research Agreement (1st Level)

California State University Foundation

California State University, Dominguez Hills Foundation

California State University, Fullerton Foundation

California Tahoe Regional Planning Agency

Camanche Regional Park District

Carmel Valley Fire Protection District

Central Coast Computing Authority

Central Coast Regional Criminal Justice Planning Board

Central Sierra Planning Council

Chico State University Foundation

Citrus Pest Control District # 2 of Riverside County

City of Loyalton

City of Paramount

City of Pittsburg

City of Placentia

City of Westmorland

Coalinga-Huron Mosquito Abatement District

College of The Desert, Associated Students Of

College Town

Cooperative Library Agency for Systems and Services

Corona City Redevelopment Agency

Daly City Redevelopment Agency

Deer Springs Fire Protection District

Descanso Community Water District

Downey Cemetery District

East San Gabriel Valley Human Services Consortium

Eel River Water Council

El Pueblo De Los Angeles State Historical Monument Commission

El Toro Water District

Etna Cemetery District

Exposition Metro Line Construction Authority

Fallbrook Hospital District

Fort Ord Reuse Authority

Fremont(John C) Hospital District

Fresno City Redevelopment Agency

Fresno State College Agricultural Foundation

Gilroy Rural Fire Protection District

Glen Ellen Fire Protection District

Golden Empire Transit District

Halcumb Cemetery District

Hamilton City Community Services District

Heffernan Memorial Hospital District

Herald Fire Protection District

Humboldt Bay Wastewater Authority

Idyllwild Water District

Independent Data Processing Center

Inland Manpower Association

Intelecom Intelligent Telecommunications

Irvine Child Care Project

Janesville Fire Protection District

Jefferson School District Federal Credit Union

Kaweah Delta Hospital District

La Branza Water District

Laney College Bookstore

Long Beach Promotion and Service Corporation

Lower Sweetwater Fire Protection District

Madera County Economic Development Commission

Mark Twain Hospital District

Meadow Vista County Water District

Metro Gold Line Foothill Extension Construction Authority

Mid City Development Corporation

Newport Beach City Employees Federal Credit Union

Niland Sanitary District

Northridge State University Student Center, Inc.

Orange County Intergovernmental Coordinating Council

Orange Cove Fire Protection District of Fresno And Tulare Counties

Oroville Mosquito Abatement District

Palo Verde Cemetery District

Paradise Fire Protection District

Paso Robles District Cemetery

Pioneer Community Services District

Placer Consolidated Fire Protection District

Plumas County Housing Authority

Provident Central Credit Union

Sacramento State University Associated Students

Samoa Peninsula Fire Protection District

San Benito Hospital District

San Diego Rural Fire Protection District

San Diego State University Foundation

San Francisco State University Franciscan Shops

San Francisco State University Frederick Burke Foundation

San Jose Housing Authority

San Jose State University Spartan Shops, Inc.

San Jose State University, Associated Students

San Luis Obispo Regional Transit Authority

San Marcos Cemetery District

San Mateo Local Agency Formation Commission

Sanitation Districts of Orange County

Santa Barbara County Housing Authority

Santa Clara City Redevelopment Agency

Santa Clara County Traffic Authority

Santa Cruz Port District

Saratoga Cemetery District

School Personnel Credit Union

Selection Consulting Center

Shasta Local Agency Formation Commission

Shasta-Trinity Schools Insurance Group

Soledad Community Health Care District

South Lake County Fire Protection District

Southeast Recreation and Park District

Southern Mono Hospital District

Springville Public Utility District

Student Union of San Jose State University

Sunline Transit Agency

Three Arch Bay Community Services District

Torrance City Redevelopment Agency

Trinity County Waterworks District

Tulare County Housing Authority

Twentynine Palms Water District

Veterans Home of California Post Fund

Victorville Fire Protection District

Weaverville Fire Protection District

West Bay Rapid Transit Authority

West Contra Costa Hospital District

Appendix E – Glossary

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 to their plan provisions.
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Classic Member (under PEPRA)

A classic member is a member who joined CalPERS 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 same as the date of hire.

Entry Age Actuarial Cost Method

An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a rate expressed as a level percentage of payroll, which is designed to remain level throughout the member's career.

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.

Funded Status

Any comparison of a particular measure of plan assets to a particular measure of pension obligations. The methods and assumptions used to calculate a funded status should be consistent with the purpose of the measurement.

Funding Target

The Accrued Liability measure upon which the funding requirements are based. The funding target is the Accrued Liability under the Entry Age Actuarial Cost Method using the assumptions adopted by the board.

Appendix E – Glossary

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.

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.

Traditional Unit Credit Actuarial Cost Method

An actuarial cost method that sets the Accrued Liability equal to the Present Value of Benefits assuming no future pay increases or service accruals. The Traditional Unit Credit Cost Method is used to measure the accrued liability on a termination basis.

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.

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California Public Employees' Retirement System

A Component Unit of the State of California