Terminated Agency Risk Pool Actuarial Valuation

As of June 30, 2019

CalPERS

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Actuarial Certification

September 2020

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. This valuation is based on the member and financial data as of June 30, 2019 provided by the various CalPERS databases and the benefits under this risk pool 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 risk pool, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned are actuaries for CalPERS. All are members of the American Academy of Actuaries and the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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Highlights and Executive Summary

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Highlights and Executive Summary

Introduction

This is the actuarial valuation report for the Terminated Agency Risk Pool of the California Public Employees' Retirement System (CalPERS) that is being presented to the Board of Administration. This report shows that the Terminated Agency Risk Pool continues to be overfunded as of June 30, 2019.

Purpose of Report

This Actuarial Valuation for the Terminated Agency Risk Pool (TAP) of the California Public Employees' Retirement System (CalPERS) was performed by CalPERS' staff actuaries using data as of June 30, 2019 in order to:

- Set forth the funded status of this risk pool as of June 30, 2019
- Provide actuarial information as of June 30, 2019 to the CalPERS Board and other interested parties

Use of this report for other purposes may be inappropriate.

California Actuarial Advisory Panel Recommendations

The report satisfies all relevant basic disclosure requirements under the Model Disclosure Elements for Actuarial Valuation Reports recommended by the California Actuarial Advisory Panel. 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, 2018	June 30, 2019
1) Present Value of Projected Benefits		
a) Active Members	$0	$0
b) Transferred Members	25,133,366	24,557,908
c) Terminated Members	20,759,814	20,306,120
d) Members and Beneficiaries Receiving Benefits	99,172,618	103,842,833
e) Total	$145,065,798	$148,706,861
2) Market Value of Assets (MVA)	$286,352,337	$301,503,348
3) Unfunded Liability/(Surplus) [(1e) - (2)]	**($141,286,539)**	**($152,796,487)**
4) Funded Ratio [(2) / (1e)]	**197.4%**	**202.8%**

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 2.99 percent to 2.62 percent while the inflation assumption changed from 2.14 percent to 1.85 percent.

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.

Five terminated agencies were added to the TAP in the June 30, 2019 valuation:

- Armona Community Services District
- Janesville Fire Protection District
- Soledad Community Health Care District
- Three Arch Bay Community Services District
- Torrance City Redevelopment Agency

The total liabilities and assets associated with these terminations is approximately $1.1 million.

Subsequent Events

This report reflects events impacting the Terminated Agency Pool through June 30, 2019

Seven agencies will be added in the June 30, 2020 annual valuation:

- College Town
- Marin Health Care District
- La Branza Water District
- City of Placentia (Fire Category)
- Central Sierra Planning Council
- San Luis Obispo Regional Transit Authority
- Fort Ord Reuse Authority

The total liabilities and assets associated with these terminations is approximately $30 million.

Assets

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Assets

Reconciliation of the Market Value of Assets

1) Market Value of Assets as of June 30, 2018 Including Receivables	$286,352,337
2) Change in Receivables for Service Buybacks as of June 30, 2018	134,397
3) Benefit Payments to Retirees and Beneficiaries	(6,149,217)
4) Refunds	(72,326)
5) Lump Sum Payments	-
6) Transfers and Miscellaneous Adjustments	(196,167)
7) Investment Return	20,414,140
8) Market Value of Assets as of June 30, 2019 (w/o Pool Transfers) [(1) + (2) + (3) + (4) + (5) + (6) + (7)]	300,483,163
9) Net Transfers into and out of the Risk Pool	1,020,185
10) Market Value of Assets as of June 30, 2019 Including Receivables [(8) + (9)]	**$301,503,348**

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 will be 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 Surplus Segment will be 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 time 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 Surplus Segment that is invested in the PERF.

	June 30, 2018 Allocation $Millions		June 30, 2019 Allocation $Millions	
Immunized Segment	46.6%	133.5	51.6%	155.6
Surplus Segment	53.4%	152.9	48.4%	145.9
Total	**100.0%**	**$286.4**	**100.0%**	**$301.5**

Asset Returns

The rate of return for the TAP for the FY 2018 - 2019

Asset Type	Rate of Return
Immunized Segment	7.3%
Surplus Segment	6.7%
Total	7.2%

Liabilities

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Liabilities

Development of Accrued and Unfunded Liabilities

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

	June 30, 2018	June 30, 2019
1) Present Value of Benefits		
a) Active Members	$0	$0
b) Transferred Members	25,133,366	24,557,908
c) Terminated Members	20,759,814	20,306,120
d) Members and Beneficiaries Receiving Payments	99,172,618	103,842,833
e) Total	145,065,798	148,706,861
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	25,133,366	24,557,908
c) Terminated Members	20,759,814	20,306,120
d) Members and Beneficiaries Receiving Payments	99,172,618	103,842,833
e) Total	$145,065,798	148,706,861
5) Market Value of Assets (MVA)	$286,352,337	301,503,348
6) Unfunded Liability/(Surplus) [(4e) – (5)]	**$(141,286,539)**	**(152,796,487)**
7) Funded Status [(5) / (4e)]	**197.4%**	**202.8%**

Liabilities (continued)

(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.

	June 30, 2019
1) Liability (Gain)/Loss for the Year	
a) Accrued Liability at 6/30/2018	145,065,798
b) Benefit Payments to Retirees & Beneficiaries	(6,149,217)
c) Refunds	(72,326)
d) Interest	4,245,140
e) Expected Accrued Liability at 6/30/2019 [(1a) + (1b) + (1c) + (1d)]	143,089,396
f) Effect of Data Changes	-
g) Effect of Method Changes	-
h) Effect of New Entrants to the Pool	1,037,699
i) Changes due to Assumption Changes	4,644,599
j) Actual Accrued Liability at 6/30/2019	148,706,861
k) Liability (Gain)/Loss [(1j)-(1i)-(1h)-(1g)-(1f)-(1e)]	**(64,833)**
2) Asset (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/2018 Including Receivables	286,352,337
b) Changes in Receivables for Service Buybacks as of 6/30/2018	134,397
c) Benefit Payments to Retirees & Beneficiaries	(6,149,217)
d) Refunds	(72,326)
e) Lump Sum Payments	
f) Transfers and Miscellaneous Adjustments	(196,167)
g) Net Transfers into and out of the Risk Pool	1,020,185
h) Expected Interest	15,181,052
i) Expected Assets at 6/30/2019 [(2a) + (2b) + (2c) + (2d) + (2e) + (2f) + (2g) + (2h)]	296,270,260
j) Market Value of Assets as of 6/30/2018 Including Receivables	301,503,348
k) Asset (Gain)/Loss [(2i) – (2j)]	**(5,233,088)**
3) Liability (Gain)/Loss for the Year	
a) Liability (Gain)/Loss(1k)	(64,833)
b) Asset (Gain)/Loss (2k)	(5,233,088)
c) Total (Gain)/Loss [(3a) + (3b)]	**(5,297,920)**

- Expected interest on Liabilities 2.99%.
- Expected interest on Assets 4.88% This is based on a blend of the expected return on the two segments of the TAP Portfolio:

  Immunized Segment at 3.79%

  Surplus Segment at 7.00%

Liabilities (continued)

Funding History

Valuation Date	Accrued Liability	Market Value of Asset (MVA)	Unfunded Liability / (Surplus)	Funded Ratio
06/30/09	$59,791,658	$143,839,080	$(84,047,422)	240.6%
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%

Risk Analysis

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Risk Analysis

Analysis of Mortality Rate Sensitivity

The following analysis looks at the change in the June 30, 2019 funded ratio under two different mortality rate scenarios. Shown below are the funded ratios assuming mortality rates that are 10 percent lower and 10 percent 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, 2019

		Current Mortality Rates $Millions	-10% Mortality Rates $Millions	+10% Mortality Rate $Millions
a)	Accrued Liability	148,706,861	153,887,280	144,084,053
b)	Market Value of Assets	301,503,348	301,503,348	301,503,348
c)	Unfunded Liability(Surplus) [(a)-(b)]	(152,796,487)	(147,616,068)	(157,419,295)
d)	Funded Ratio	202.8%	195.9%	209.3%

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

Analysis of Inflation Rate Sensitivity

The following analysis looks at the change in the June 30, 2019 funded ratio under two different inflation rate scenarios. Shown below are the funded ratios assuming inflation rates that are 1 percent lower and 1 percent higher than the current valuation inflation rate assumption (1.85 percent). 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, 2019

		Current Inflation Rate $Millions	-1% Inflation Rate $Millions	+1% Inflation Rate $Millions
a)	Accrued Liability	148,706,861	130,570,286	155,124,243
b)	Market Value of Assets	301,503,348	301,503,348	301,503,348
c)	Unfunded Liability(Surplus) [(a)-(b)]	(152,796,487)	(170,933,062)	(146,379,105)
d)	Funded Ratio	202.8%	230.9%	194.4%

A decrease of 1 percent in the inflation rate assumption (1.85 percent to 0.85 percent) reduces the Accrued Liability by 12.2 percent. However, a 1 percent increase in the inflation rate (1.85 percent to 2.85 percent) increases the Accrued Liability by 4.3 percent. 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 percent.

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.

Appendices

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Appendix A – Statement of Actuarial Data, 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 they are 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

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.

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

2.619 percent compounded annually (net of expenses) is the yield on 30 Year US Treasury STRIPS as of June 30, 2019. This rate is used for all plans in this valuation. A rate of 2.99 percent was used in the prior year's valuation.

This rate is determined based on Board Resolution ACT-11-04, and Attachment 3 of the Agenda Item 4.b. of the August 2011 Benefit and Program Administration Committee Meeting entitled Methodology for Setting the Discount Rate for Local Agencies Terminating Their Contract for Retirement Benefits and for the Terminated Agency Pool.

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 - Statement of Actuarial Data, Methods and Assumptions

Economic Assumptions (continued)

Salary Growth

Annual increases vary by member category, entry age, and duration of service. The assumed increases are shown below.

Annual Percentage Increase

Public Agency Miscellaneous

Duration of Service	Entry Age 20	Entry Age 30	Entry Age 40
0	8.5%	7.8%	6.5%
1	6.9%	6.4%	5.3%
2	5.6%	5.1%	4.1%
3	4.7%	4.3%	3.4%
4	4.0%	3.6%	2.7%
5	3.4%	3.0%	2.2%
10	1.6%	1.4%	0.9%
15	1.2%	1.0%	0.6%
20	0.9%	0.8%	0.5%
25	0.8%	0.7%	0.4%
30	0.8%	0.7%	0.4%

Public Agency Fire

Duration of Service	Entry Age 20	Entry Age 30	Entry Age 40
0	17.0%	17.0%	17.0%
1	11.0%	11.0%	11.0%
2	7.0%	7.0%	7.0%
3	5.8%	5.8%	5.8%
4	4.7%	4.7%	4.7%
5	3.7%	3.7%	3.7%
10	1.6%	1.6%	1.6%
15	1.4%	1.4%	1.4%
20	1.3%	1.3%	1.3%
25	1.1%	1.1%	1.1%
30	1.0%	1.0%	1.0%

Public Agency Police

Duration of Service	Entry Age 20	Entry Age 30	Entry Age 40
0	10.3%	10.3%	10.3%
1	8.0%	8.0%	8.0%
2	6.3%	6.3%	6.3%
3	4.9%	4.9%	4.9%
4	3.8%	3.8%	3.8%
5	3.0%	3.0%	3.0%
10	1.5%	1.5%	1.5%
15	1.5%	1.5%	1.5%
20	1.5%	1.5%	1.5%
25	1.6%	1.6%	1.6%
30	1.7%	1.7%	1.7%

Public Agency County Peace Officer

Duration of Service	Entry Age 20	Entry Age 30	Entry Age 40
0	13.2%	13.2%	13.2%
1	9.6%	9.6%	9.6%
2	6.6%	6.6%	6.6%
3	5.3%	5.3%	5.3%
4	4.2%	4.2%	4.2%
5	3.4%	3.4%	3.4%
10	1.7%	1.7%	1.7%
15	1.5%	1.5%	1.5%
20	1.5%	1.5%	1.5%
25	1.8%	1.8%	1.8%
30	2.0%	2.0%	2.0%

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

Inflation

1.85 percent 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 2.14 percent was used in the prior year's valuation.

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 1.85 percent inflation assumption are not reflected in the valuation.

Appendix A - Statement of Actuarial Data, Methods and Assumptions

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Final Average Salary is increased by 1 percent 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 percent load for mortality fluctuation 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 percent.

Demographic Assumptions

Pre-Retirement Mortality

Non-Industrial Death Rates vary by age and gender. Industrial Death rates vary by age. See sample rates in table below. The non-industrial death rates are used for all plans. The industrial death rates are used for Safety Plans (except for Local Prosecutor safety members where the corresponding Miscellaneous Plan does not have the Industrial Death Benefit).

	Non-Industrial Death (Not Job-Related)		Industrial Death (Job Related)
Age	Male	Female	Male and Female
20	0.00022	0.00007	0.00004
25	0.00029	0.00011	0.00006
30	0.00038	0.00016	0.00007
35	0.00049	0.00027	0.00009
40	0.00064	0.00037	0.00010
45	0.00080	0.00054	0.00012
50	0.00116	0.00079	0.00013
55	0.00172	0.00120	0.00015
60	0.00255	0.00166	0.00016
65	0.00363	0.00233	0.00018
70	0.00623	0.00388	0.00019
75	0.01057	0.00623	0.00021
80	0.01659	0.00939	0.00022

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 percent will become the Non-Industrial Death rate and 1 percent will become the Industrial Death rate.

Appendix A - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

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-Industrial Disabled (Not Job-Related)		Industrial Disabled (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
50	0.00372	0.00346	0.01183	0.01083	0.00372	0.00346
55	0.00437	0.00410	0.01613	0.01178	0.00437	0.00410
60	0.00671	0.00476	0.02166	0.01404	0.00671	0.00476
65	0.00928	0.00637	0.02733	0.01757	0.01113	0.00765
70	0.01339	0.00926	0.03358	0.02183	0.01607	0.01111
75	0.02316	0.01635	0.04277	0.02969	0.02779	0.01962
80	0.03977	0.03007	0.06272	0.04641	0.04773	0.03609
85	0.07122	0.05418	0.09793	0.07847	0.08547	0.06501
90	0.13044	0.10089	0.14616	0.13220	0.14348	0.11098
95	0.21658	0.17698	0.21658	0.21015	0.21658	0.17698
100	0.32222	0.28151	0.32222	0.32226	0.32222	0.28151
105	0.46691	0.43491	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The mortality assumptions are based on mortality rates resulting from the most recent CalPERS Experience Study adopted by the CalPERS Board. For purposes of the mortality rates, the revised rates include 15 years of projected on-going mortality improvement using 90 percent of Scale MP 2016 published by the Society of Actuaries. For more details, please refer to the experience study report that can be found on the CalPERS website.

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	90%
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.

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.

Appendix A - Statement of Actuarial Data, 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
0	0.17420	0.16740	0.16060	0.15370	0.14680
1	0.15450	0.14770	0.14090	0.13390	0.12710
2	0.13480	0.12800	0.12120	0.11420	0.10740
3	0.11510	0.10830	0.10150	0.09450	0.08770
4	0.09540	0.08860	0.08180	0.07480	0.06800
5	0.02120	0.01930	0.01740	0.01550	0.01360
10	0.01380	0.01210	0.01040	0.00880	0.00710
15	0.00600	0.00510	0.00420	0.00320	0.00230
20	0.00370	0.00290	0.00210	0.00130	0.00050
25	0.00170	0.00110	0.00050	0.00010	0.00010
30	0.00050	0.00010	0.00010	0.00010	0.00010
35	0.00010	0.00010	0.00010	0.00010	0.00010

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
0	0.1298	0.10130	0.11880
1	0.0674	0.06360	0.08560
2	0.0320	0.02710	0.06170
3	0.0237	0.02580	0.04450
4	0.0087	0.02450	0.03210
5	0.0052	0.00860	0.01210
10	0.0005	0.00530	0.00530
15	0.0004	0.00270	0.00250
20	0.0003	0.00170	0.00120
25	0.0002	0.00120	0.00050
30	0.0002	0.00090	0.00030
35	0.0001	0.00090	0.00020

The Police Termination and Refund rates are used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Appendix A - Statement of Actuarial Data, 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
5	0.04220	0.04220	0.03930	0.03640	0.03440
10	0.02780	0.02780	0.02710	0.02630	0.02150
15	0.01920	0.01920	0.01740	0.01560	0.01200
20	0.01390	0.01390	0.01090	0.00790	0.00470
25	0.00830	0.00830	0.00480	0.00140	0.00070
30	0.00150	0.00150	0.00070	0.00000	0.00000
35	0.00000	0.00000	0.00000	0.00000	0.00000

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
5	0.0094	0.01630	0.01870
10	0.0064	0.01260	0.01340
15	0.0048	0.00820	0.00920
20	0.0038	0.00650	0.00640
25	0.0026	0.00580	0.00420
30	0.0014	0.00560	0.00220
35	0.0000	0.00000	0.00000

- 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 - Statement of Actuarial Data, 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

	Miscellaneous		Fire	Police	County Peace Officer
Age	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000170	0.000100	0.000100	0.000100	0.000100
25	0.000170	0.000100	0.000100	0.000100	0.000100
30	0.000190	0.000240	0.000100	0.000200	0.000120
35	0.000390	0.000710	0.000100	0.000300	0.000380
40	0.001020	0.001350	0.000100	0.000400	0.000660
45	0.001510	0.001880	0.000200	0.000500	0.001260
50	0.001580	0.001990	0.000500	0.000800	0.001800
55	0.001580	0.001490	0.000700	0.001300	0.000960
60	0.001530	0.001050	0.000700	0.002000	0.000570

- 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	0.000050	0.000020	0.000420
25	0.000190	0.001650	0.001310
30	0.000560	0.004760	0.002490
35	0.001190	0.007880	0.003700
40	0.002250	0.011000	0.005130
45	0.003980	0.014120	0.006720
50	0.020790	0.018460	0.009190
55	0.030660	0.047850	0.015050
60	0.043750	0.060240	0.017400

- 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 percent will become the Non-Industrial Disability rate and 50 percent will become the Industrial Disability rate.

Appendix A - Statement of Actuarial Data, 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

	Years of Service					
Age	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

	Years of Service					
Age	5	10	15	20	25	30
50	0.020	0.020	0.020	0.020	0.020	0.150
51	0.006	0.019	0.027	0.031	0.035	0.038
52	0.011	0.024	0.031	0.034	0.037	0.040
53	0.010	0.015	0.021	0.027	0.033	0.040
54	0.025	0.025	0.029	0.035	0.041	0.048
55	0.019	0.026	0.033	0.092	0.136	0.146
56	0.030	0.034	0.038	0.060	0.093	0.127
57	0.030	0.046	0.061	0.076	0.090	0.104
58	0.040	0.044	0.059	0.080	0.101	0.122
59	0.024	0.044	0.063	0.083	0.103	0.122
60	0.070	0.074	0.089	0.113	0.137	0.161
61	0.080	0.086	0.093	0.118	0.156	0.195
62	0.100	0.117	0.133	0.190	0.273	0.357
63	0.140	0.157	0.173	0.208	0.255	0.301
64	0.140	0.153	0.165	0.196	0.239	0.283
65	0.140	0.178	0.215	0.264	0.321	0.377
66	0.140	0.178	0.215	0.264	0.321	0.377
67	0.140	0.178	0.215	0.264	0.321	0.377
68	0.112	0.142	0.172	0.211	0.257	0.302
69	0.112	0.142	0.172	0.211	0.257	0.302
70	0.140	0.178	0.215	0.264	0.321	0.377

Appendix A - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2% @ 55

	Years of Service					
Age	5	10	15	20	25	30
50	0.008	0.013	0.018	0.021	0.022	0.033
51	0.009	0.016	0.020	0.023	0.026	0.036
52	0.015	0.018	0.020	0.021	0.025	0.030
53	0.016	0.020	0.024	0.028	0.031	0.035
54	0.018	0.022	0.026	0.030	0.034	0.038
55	0.040	0.040	0.056	0.093	0.109	0.154
56	0.034	0.050	0.066	0.092	0.107	0.138
57	0.042	0.048	0.058	0.082	0.096	0.127
58	0.046	0.054	0.062	0.090	0.106	0.131
59	0.045	0.055	0.066	0.097	0.115	0.144
60	0.058	0.075	0.093	0.126	0.143	0.169
61	0.065	0.088	0.111	0.146	0.163	0.189
62	0.136	0.118	0.148	0.190	0.213	0.247
63	0.130	0.133	0.174	0.212	0.249	0.285
64	0.113	0.129	0.165	0.196	0.223	0.249
65	0.145	0.173	0.201	0.233	0.266	0.289
66	0.170	0.199	0.229	0.258	0.284	0.306
67	0.250	0.204	0.233	0.250	0.257	0.287
68	0.227	0.175	0.193	0.215	0.240	0.262
69	0.200	0.180	0.180	0.198	0.228	0.246
70	0.150	0.171	0.192	0.239	0.304	0.330

Public Agency Miscellaneous 2.5% @ 55

	Years of Service					
Age	5	10	15	20	25	30
50	0.008	0.014	0.020	0.026	0.033	0.050
51	0.008	0.015	0.023	0.030	0.037	0.059
52	0.009	0.016	0.023	0.030	0.037	0.061
53	0.014	0.021	0.028	0.035	0.042	0.063
54	0.014	0.022	0.030	0.039	0.047	0.068
55	0.020	0.038	0.055	0.073	0.122	0.192
56	0.025	0.047	0.069	0.091	0.136	0.196
57	0.030	0.048	0.065	0.083	0.123	0.178
58	0.035	0.054	0.073	0.093	0.112	0.153
59	0.035	0.054	0.073	0.092	0.131	0.183
60	0.044	0.072	0.101	0.130	0.158	0.197
61	0.050	0.078	0.105	0.133	0.161	0.223
62	0.055	0.093	0.130	0.168	0.205	0.268
63	0.090	0.124	0.158	0.192	0.226	0.279
64	0.080	0.112	0.144	0.175	0.207	0.268
65	0.120	0.156	0.193	0.229	0.265	0.333
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 - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2.7% @ 55

	Years of Service					
Age	5	10	15	20	25	30
50	0.003	0.010	0.016	0.034	0.033	0.045
51	0.009	0.016	0.023	0.042	0.038	0.047
52	0.015	0.019	0.024	0.040	0.036	0.046
53	0.012	0.020	0.028	0.047	0.046	0.060
54	0.020	0.027	0.035	0.054	0.056	0.073
55	0.033	0.055	0.078	0.113	0.156	0.234
56	0.039	0.067	0.095	0.135	0.169	0.227
57	0.050	0.067	0.084	0.113	0.142	0.198
58	0.043	0.066	0.089	0.124	0.151	0.201
59	0.050	0.070	0.090	0.122	0.158	0.224
60	0.060	0.086	0.112	0.150	0.182	0.238
61	0.071	0.094	0.117	0.153	0.184	0.241
62	0.091	0.122	0.152	0.194	0.226	0.279
63	0.143	0.161	0.179	0.209	0.222	0.250
64	0.116	0.147	0.178	0.221	0.254	0.308
65	0.140	0.174	0.208	0.254	0.306	0.389
66	0.170	0.209	0.247	0.298	0.310	0.324
67	0.170	0.199	0.228	0.269	0.296	0.342
68	0.150	0.181	0.212	0.255	0.287	0.339
69	0.150	0.181	0.212	0.255	0.287	0.339
70	0.150	0.181	0.212	0.243	0.291	0.350

Public Agency Miscellaneous 3% @ 60

	Years of Service					
Age	5	10	15	20	25	30
50	0.013	0.019	0.026	0.042	0.038	0.064
51	0.035	0.037	0.039	0.052	0.047	0.062
52	0.023	0.030	0.038	0.055	0.051	0.056
53	0.025	0.032	0.040	0.057	0.056	0.066
54	0.035	0.042	0.050	0.067	0.066	0.076
55	0.040	0.052	0.064	0.085	0.095	0.120
56	0.043	0.056	0.070	0.094	0.102	0.150
57	0.045	0.060	0.074	0.099	0.109	0.131
58	0.053	0.056	0.059	0.099	0.126	0.185
59	0.050	0.068	0.085	0.113	0.144	0.202
60	0.089	0.106	0.123	0.180	0.226	0.316
61	0.100	0.117	0.133	0.212	0.230	0.298
62	0.130	0.155	0.180	0.248	0.282	0.335
63	0.120	0.163	0.206	0.270	0.268	0.352
64	0.150	0.150	0.150	0.215	0.277	0.300
65	0.200	0.242	0.283	0.330	0.300	0.342
66	0.220	0.264	0.308	0.352	0.379	0.394
67	0.250	0.279	0.309	0.338	0.371	0.406
68	0.170	0.196	0.223	0.249	0.290	0.340
69	0.220	0.261	0.302	0.344	0.378	0.408
70	0.220	0.255	0.291	0.326	0.358	0.388

Appendix A - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Miscellaneous 2% @ 62

	Years of Service					
Age	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 - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire ½ @ 55 and 2% @ 55

Age	Rate
50	0.015880
51	0.000001
52	0.034420
53	0.019900
54	0.041320
55	0.075130
56	0.110790
57	0.000001
58	0.094990
59	0.044090
60	1.000000

Public Agency Police ½ @ 55 and 2% @ 55

Age	Rate
50	0.025520
51	0.000001
52	0.016370
53	0.027170
54	0.009490
55	0.166740
56	0.069210
57	0.051130
58	0.072410
59	0.070430
60	0.300000

Public Agency Police 2% @ 50

	Years of Service					
Age	5	10	15	20	25	30
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.040	0.040	0.040	0.040	0.061	0.087
53	0.040	0.040	0.040	0.040	0.082	0.123
54	0.040	0.040	0.040	0.046	0.098	0.158
55	0.072	0.072	0.072	0.096	0.141	0.255
56	0.066	0.066	0.066	0.088	0.129	0.228
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 - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2% @ 50

	Years of Service					
Age	5	10	15	20	25	30
50	0.009	0.009	0.009	0.009	0.013	0.020
51	0.013	0.013	0.013	0.013	0.020	0.029
52	0.018	0.018	0.018	0.018	0.028	0.042
53	0.052	0.052	0.052	0.052	0.079	0.119
54	0.067	0.067	0.067	0.067	0.103	0.154
55	0.089	0.089	0.089	0.089	0.136	0.204
56	0.083	0.083	0.083	0.083	0.127	0.190
57	0.082	0.082	0.082	0.082	0.126	0.189
58	0.088	0.088	0.088	0.088	0.136	0.204
59	0.074	0.074	0.074	0.074	0.113	0.170
60	0.100	0.100	0.100	0.100	0.154	0.230
61	0.072	0.072	0.072	0.072	0.110	0.165
62	0.099	0.099	0.099	0.099	0.152	0.228
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

Public Agency Police 3% @ 55

	Years of Service					
Age	5	10	15	20	25	30
50	0.035	0.035	0.035	0.035	0.070	0.090
51	0.028	0.028	0.028	0.029	0.065	0.101
52	0.032	0.032	0.032	0.039	0.066	0.109
53	0.028	0.028	0.028	0.043	0.075	0.132
54	0.038	0.038	0.038	0.074	0.118	0.333
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
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 - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 3% @ 55

	Years of Service					
Age	5	10	15	20	25	30
50	0.001	0.001	0.001	0.006	0.016	0.069
51	0.002	0.002	0.002	0.006	0.018	0.071
52	0.012	0.012	0.012	0.021	0.040	0.098
53	0.032	0.032	0.032	0.049	0.085	0.149
54	0.057	0.057	0.057	0.087	0.144	0.217
55	0.073	0.073	0.073	0.109	0.179	0.259
56	0.064	0.064	0.064	0.097	0.161	0.238
57	0.063	0.063	0.063	0.095	0.157	0.233
58	0.065	0.065	0.065	0.099	0.163	0.241
59	0.088	0.088	0.088	0.131	0.213	0.299
60	0.105	0.105	0.105	0.155	0.251	0.344
61	0.118	0.118	0.118	0.175	0.282	0.380
62	0.087	0.087	0.087	0.128	0.210	0.295
63	0.067	0.067	0.067	0.100	0.165	0.243
64	0.067	0.067	0.067	0.100	0.165	0.243
65	1.000	1.000	1.000	1.000	1.000	1.000

Public Agency Police 3% @ 50

	Years of Service					
Age	5	10	15	20	25	30
50	0.050	0.050	0.050	0.100	0.155	0.400
51	0.040	0.040	0.040	0.090	0.140	0.380
52	0.040	0.040	0.040	0.070	0.115	0.350
53	0.040	0.040	0.040	0.080	0.135	0.350
54	0.040	0.040	0.040	0.090	0.145	0.350
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
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 - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 3% @ 50

	Years of Service					
Age	5	10	15	20	25	30
50	0.020	0.020	0.020	0.040	0.130	0.192
51	0.008	0.008	0.008	0.023	0.107	0.164
52	0.023	0.023	0.023	0.043	0.136	0.198
53	0.023	0.023	0.023	0.043	0.135	0.198
54	0.027	0.027	0.027	0.048	0.143	0.207
55	0.043	0.043	0.043	0.070	0.174	0.244
56	0.053	0.053	0.053	0.085	0.196	0.269
57	0.054	0.054	0.054	0.086	0.197	0.271
58	0.052	0.052	0.052	0.084	0.193	0.268
59	0.075	0.075	0.075	0.116	0.239	0.321
60	0.065	0.065	0.065	0.102	0.219	0.298
61	0.076	0.076	0.076	0.117	0.241	0.324
62	0.068	0.068	0.068	0.106	0.224	0.304
63	0.027	0.027	0.027	0.049	0.143	0.208
64	0.094	0.094	0.094	0.143	0.277	0.366
65	1.000	1.000	1.000	1.000	1.000	1.000

Public Agency Police 2% @ 57

	Years of Service					
Age	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 - Statement of Actuarial Data, 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 - Statement of Actuarial Data, 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	0.0500	0.0500	0.0500	0.0500	0.0500	0.1000
51	0.0400	0.0400	0.0400	0.0400	0.0575	0.0942
52	0.0380	0.0380	0.0380	0.0380	0.0580	0.0825
53	0.0380	0.0380	0.0380	0.0380	0.0774	0.1169
54	0.0380	0.0380	0.0380	0.0437	0.0931	0.1497
55	0.0684	0.0684	0.0684	0.0912	0.1340	0.2423
56	0.0627	0.0627	0.0627	0.0836	0.1228	0.2168
57	0.0600	0.0600	0.0600	0.0800	0.1175	0.2125
58	0.0800	0.0800	0.0800	0.0880	0.1375	0.2275
59	0.0800	0.0800	0.0800	0.0920	0.1400	0.2275
60	0.1500	0.1500	0.1500	0.1500	0.1500	0.2275
61	0.1440	0.1440	0.1440	0.1440	0.1440	0.1700
62	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
63	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
64	0.1500	0.1500	0.1500	0.1500	0.1500	0.3188
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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

Appendix A - Statement of Actuarial Data, Methods and Assumptions

Demographic Assumptions (continued)

Public Agency Fire 2.7% @ 57

	Years of Service					
Age	5	10	15	20	25	30
50	0.0065	0.0065	0.0065	0.0065	0.0101	0.0151
51	0.0081	0.0081	0.0081	0.0081	0.0125	0.0187
52	0.0164	0.0164	0.0164	0.0164	0.0254	0.0380
53	0.0442	0.0442	0.0442	0.0442	0.0680	0.1018
54	0.0606	0.0606	0.0606	0.0606	0.0934	0.1397
55	0.0825	0.0825	0.0825	0.0825	0.1269	0.1900
56	0.0740	0.0740	0.0740	0.0740	0.1140	0.1706
57	0.0901	0.0901	0.0901	0.0901	0.1387	0.2077
58	0.0790	0.0790	0.0790	0.0790	0.1217	0.1821
59	0.0729	0.0729	0.0729	0.0729	0.1123	0.1681
60	0.1135	0.1135	0.1135	0.1135	0.1747	0.2615
61	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
62	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
63	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
64	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Miscellaneous Assumptions

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 were 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.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) were taken into account in this valuation. The compensation limit for classic member for the 2019 calendar year is $280,000.

Appendix B – 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 your 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 – 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%

(1) 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 percent 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 percent of final compensation.

Appendix B – 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 percent 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 percent 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 percent of final compensation for the first five years of service, plus 1 percent for each additional year of service to a maximum of 50 percent 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 – 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 percent of final compensation.

Increased Benefit (75% of Final Compensation)

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75 percent 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 percent or greater, with a maximum of 90 percent) 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 percent 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 percent 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.

Appendix B – Principal Plan Provisions

In other words, 25 percent or 50 percent 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 percent or 50 percent 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 currently credited at 7.5 percent 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 – 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 percent 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.

Appendix B – Principal Plan Provisions

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.

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 percent. 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 percent, 4 percent or 5 percent.

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 percent 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 percent 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, 2018	June 30, 2019
Number of Plans in the Risk Pool	109	109
Active Members	0	0
Transferred Members		
Counts	98	94
Average Attained Age	48.31	48.87
Average Years of Service	4.25	4.18
Average Annual Covered Pay	$110,769	$110,280
Terminated Members		
Counts	346	325
Average Attained Age	53.68	54.39
Average Years of Service	3.05	2.97
Average Annual Covered Pay	$47,812	$47,269
Retired Members and Beneficiaries		
Counts[1]	770	762
Average Attained Age	76.18	75.83
Average Annual Benefits	$8,061	$8,259

(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 Terminated Participants

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

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	Total	Average Salary
15 - 24	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0
30 - 34	4	0	0	0	0	0	4	66,296
35 - 39	13	1	0	0	0	0	14	107,289
40 - 44	11	3	0	0	0	0	14	102,700
45 - 49	17	5	3	0	0	0	25	116,867
50 - 54	11	4	3	1	0	0	19	104,141
55 - 59	5	0	0	0	0	0	5	118,022
60 - 64	5	3	0	0	0	0	8	77,647
65 and over	2	2	1	0	0	0	5	209,934
Total	**68**	**18**	**7**	**1**	**0**	**0**	**94**	**110,280**

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

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	Total	Average Salary
15 - 24	1	0	0	0	0	0	1	29,640
25 - 29	3	0	0	0	0	0	3	19,387
30 - 34	6	1	0	0	0	0	7	59,287
35 - 39	11	1	0	0	0	0	12	40,757
40 - 44	18	2	2	0	0	0	22	42,962
45 - 49	41	8	2	2	0	0	53	53,238
50 - 54	50	10	2	3	0	0	65	48,318
55 - 59	62	7	3	1	0	1	74	47,598
60 - 64	42	6	1	1	0	1	51	50,002
65 and over	32	4	0	0	0	1	37	37,588
Total	**266**	**39**	**10**	**7**	**0**	**3**	**325**	**47,269**

Appendix C – Summary of Participant Data

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type[1]

Attained Age	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 30	0	0	0	0	0	4	4
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	1	1
40 - 44	0	0	0	0	0	0	0
45 - 49	0	0	2	0	0	1	3
50 - 54	7	1	4	1	0	1	14
55 - 59	33	2	3	0	1	1	40
60 - 64	56	2	3	0	1	6	68
65 - 69	96	6	5	0	0	7	114
70 - 74	109	3	4	0	0	12	128
75 - 79	81	5	2	0	0	13	101
80 - 84	74	4	0	1	1	16	96
85 and over	136	7	1	0	0	49	193
Total	**592**	**30**	**24**	**2**	**3**	**111**	**762**

(1) 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[1]

Attained Age	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 30	0	0	0	0	0	2,262	2,262
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	1,067	
40 - 44	0	0	0	0	0	0	0
45 - 49	0	0	1,255	0	0	1,287	1,265
50 - 54	16,450	326	3,279	3,231	0	6,928	9,911
55 - 59	22,937	22,990	3,661	0	29,620	2,012	21,138
60 - 64	9,092	4,166	15,886	0	22,403	6,935	9,252
65 - 69	8,255	4,675	14,878	0	0	5,233	8,171
70 - 74	5,823	13,531	18,510	0	0	6,757	6,488
75 - 79	5,909	9,448	5,033	0	0	9,092	6,477
80 - 84	7,702	7,693	0	7,635	25,737	9,400	8,172
85 and over	6,965	5,390	1,507	0	0	9,775	7,593
Average	**8,115**	**7,967**	**9,761**	**5,433**	**25,920**	**8,353**	**8,259**

(1) 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[1]

Years Retired	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Total
Under 5 Years	105	3	5	0	0	34	147
5 - 9	101	0	4	1	0	21	127
10 - 14	92	2	2	0	0	12	108
15 - 19	80	3	5	0	1	16	105
20 - 24	67	5	3	1	1	12	89
25 - 29	38	4	2	0	0	7	51
30 and Over	109	13	3	0	1	9	135
Total	**592**	**30**	**24**	**2**	**3**	**111**	**762**

(1) 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[1]

Years Retired	Service Retirement	Non-Duty Disability	Duty Disability	Non-Duty Death	Duty Death	Death After Retirement	Average
Under 5 Years	15,018	15,435	3,928	0	0	11,468	13,828
5 - 9	7,547	0	2,800	3,231	0	11,089	7,949
10 - 14	5,660	4,166	10,416	0	0	8,527	6,039
15 - 19	6,209	13,991	9,396	0	29,620	3,764	6,434
20 - 24	6,421	5,314	33,075	7,635	22,403	4,980	7,256
25 - 29	6,114	10,609	1,094	0	0	4,647	6,068
30 and Over	7,202	5,647	11,402	0	25,737	5,512	7,170
Average	**8,115**	**7,967**	**9,761**	**5,433**	**25,920**	**8,353**	**8,259**

(1) 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 (continue)

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	0	0	9,048	9,048
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	1,067	1,067
40 - 44	0	0	0	0	0	0	0
45 - 49	0	0	2,509	0	0	1,287	3,796
50 - 54	115,148	326	13,116	3,231	0	6,928	138,749
55 - 59	756,905	45,980	10,983	0	29,620	2,012	845,500
60 - 64	509,132	8,331	47,658	0	22,403	41,608	629,132
65 - 69	792,459	28,050	74,391	0	0	36,630	931,530
70 - 74	634,706	40,592	74,041	0	0	81,083	830,422
75 - 79	478,640	47,241	10,066	0	0	118,196	654,143
80 - 84	569,981	30,772	0	7,635	25,737	150,393	784,518
85 and over	947,175	37,728	1,507	0	0	478,986	1,465,396
Total	**4,804,146**	**239,020**	**234,271**	**10,866**	**77,760**	**927,238**	**6,293,301**

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	1,576,905	46,306	19,641	0	0	389,920	2,032,772
5 - 9	762,209	0	11,198	3,231	0	232,874	1,009,512
10 - 14	520,686	8,331	20,832	0	0	102,321	652,170
15 - 19	496,740	41,972	46,981	0	29,620	60,218	675,531
20 - 24	430,232	26,570	99,224	7,635	22,403	59,763	645,827
25 - 29	232,323	42,436	2,188	0	0	32,532	309,479
30 and Over	785,051	73,405	34,207	0	25,737	49,610	968,010
Total	**4,804,146**	**239,020**	**234,271**	**10,866**	**77,760**	**927,238**	**6,293,301**

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 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 Pittsburg
City of Westmorland
Coalinga-Huron Mosquito Abatement District
College of The Desert, Associated Students Of
Cooperative Library Agency for Systems And Services
Corona City Redevelopment Agency
Daly City Redevelopment Agency
Deer Springs Fire Protection District
Descanso Community Water 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
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
Janesville Fire Protection District
Jefferson School District Federal Credit Union
Kaweah Delta Hospital 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
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
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 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-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
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 of Actuarial Terms

Accrued Liability: (also called Actuarial Accrued Liability or Entry Age Normal Accrued Liability) The total dollars needed as of the valuation date to fund all benefits earned in the past for current members.

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 funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

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.

Amortization Bases: Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a plan can be segregated by "cause," creating “bases” and each such base will be separately amortized and paid for over a specific period of time. However, all bases are amortized using investment and payroll assumptions from the current valuation. This can be likened to a home having a first mortgage of 24 years remaining payments and a second mortgage that has 10 years remaining payments. Each base or each mortgage note has its own terms (payment period, principal, etc.)

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, actuarial methodology changes, and/or gains and losses. Amortization methodology is determined by Board policy.

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

Class 1 Benefits: Class 1 benefits have been identified to be additional benefits which have a significant, ongoing effect on the total plan cost. In some cases, a Class 1 benefit may be an alternate benefit formula. These benefits vary by employer across the risk pool. Agencies contracting for a Class 1 benefit will be responsible for the past service liability associated with such benefit and will be required to pay a surcharge established by the actuary to cover the ongoing cost (normal cost) of the Class 1 benefit.

Class 2 Benefits: Class 2 benefits have been identified to be the ancillary benefits providing one-time increases in benefits. These benefits vary by employer across the risk pool. Agencies contracting for a Class 2 benefit will be responsible for the past service liability associated with such benefit.

Class 3 Benefits: Class 3 benefits have been identified to be additional benefits which have a minimal effect on the total plan cost. Class 3 benefits may vary by rate plan within each risk pool. However, the employer contribution rate will not vary within the risk pool due to the Class 3 benefits.

Discount Rate Assumption: The actuarial assumption that was called “investment return” in earlier CalPERS reports or “actuarial interest rate” in Section 20014 of the California Public Employees’ Retirement Law (PERL).

Appendix E – Glossary of Actuarial Terms

Entry Age: The earliest age at which a plan member begins to accrue benefits under a defined benefit pension Plan or risk pool. In most cases, this is the same as the date of hire.

(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member is at hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

Entry Age Normal 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.

(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

Fresh Start: A Fresh Start is when multiple amortization bases are collapsed to one base and amortized together over a new funding period.

Funded Status: A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100% means the plan or risk pool has more assets than liabilities and a ratio less than 100% means liabilities are greater than assets.

Normal Cost: The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long term contribution rate.

Pension Actuary: A business professional that is authorized by the Society of Actuaries, and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

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.

Risk Pool: Utilizing the law of large numbers, a risk pool is a collection of employer plans for the purpose of sharing risk. If a pooled plan has active members at the time of valuation, it belongs to the risk pool composed of all other pooled plans with the same benefit formula.

Unfunded Liability (UAL): When a plan or pool's Value of Assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Liability. If the Unfunded Liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

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